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# An Ontology for Developing e-Business Models

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*ABSTRACT: In this paper we demonstrate why executives and academics should consider thinking about e-business models. We show that the business model concept is an interesting tool for understanding, designing, sharing, measuring, changing and even simulating businesses. Based on an extensive review of e-business and business model literature we develop an e-business model ontology. This ontology defines the concepts in e-business models and the relationships between them and shall be the foundation for a variety of management tools that facilitate business decisions. Our e-business model ontology outlines what value a company offers to which customer segments. It describes the architecture of the firm and its network of partners for creating, marketing and delivering value and relationship capital, in order to generate profitable and sustainable revenue streams.*

*KEY WORDS: business models, e-business, strategic decisions, ontology, business design, knowledge representation*

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## 1. Introduction

Business models have recently been en vogue, especially in the domain of e-commerce and e-business. During the Internet-euphoria consultants, executives, academics and journalist have abusively used the term, but have rarely given a precise definition of what they exactly meant by using it. This is one of the reasons why the concept of business models has been discredited and is not in the spotlight anymore. In our opinion it merits a closer inspection by business executives and academics, because we think it is essential for businesses to assess, measure, change and sometimes even play with formal business models in order to make better decisions.

In this paper we construct and outline an ontology or framework for e-business models based on an extensive literature review. In our opinion the understanding and use of e-business models is essential in an increasingly dynamic and uncertain business environment for the following reasons:

1) The process of modelling social systems– such as an e-business model – helps identifying and *understanding* the relevant elements in a specific domain and the relationships between them (Ushold and King, 1995; Morecroft, 1994).

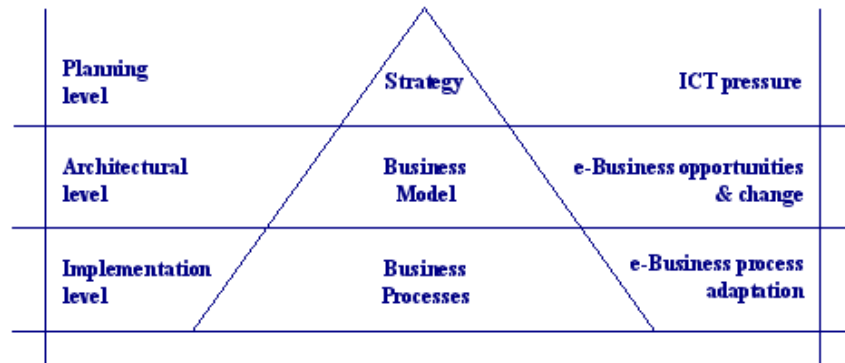
2) The use of formalised e-business models (i.e. an ontology) enables knowledge representation and helps managers easily *communicate and share* their understanding of an e-business among other stakeholders (Fensel, 2001) in the decision making process.

3) Mapping and using e-business models as a foundation for discussion facilitates *change*. Business model designers can easily modify certain elements of an existing e-business model (Petrovic et al., 2001).

4) A formalised e-business model can help identifying the relevant *measures* to follow in an e-business, similarly to the Balanced Scorecard Approach (Norton Kaplan, 1992).

5) e-Business models can help managers *simulate* e-businesses *and learn* about them. This is a way of doing risk free experiments and learning about possible consequences of decisions, without endangering an organisation (Sternman, 2000).

So what really is a business model anyway? As explained by Petrovic, Kittl and Teksten (Petrovic et al., 2001), a business model is not a description of a complex social system itself with all its actors, relations and processes. Instead it describes the logic of a “business system” for creating value, that lies behind the actual processes. Therefore we understand a business model as the conceptual and architectural implementation of a business strategy and as the foundation for the implementation of business processes (see figure 1).



**Figure 1.** *Business logic triangle*

In the next section we describe, as shown by Linder and Cantrell (2001), that most people speak about business models when they really only mean parts of a business model. We think that the existing business model literature essentially attacks one, two or all of the following three elements, which make up a Business Model: Revenue and product aspects, business actor and network aspects and finally, marketing specific aspects. This extensive literature review will help us construct our e-business model ontology or framework that we outline in the next section.

In the third section of the paper we propose an e-business model ontology (the eBMF) that highlights the relevant e-business issues and elements firms have to think of, in order to operate successfully and make the right decisions in the Internet era. An ontology is a framework that provides a shared and common understanding of a domain that can be communicated between people and heterogeneous and widely spread application systems (Fensel, 2001), just as are the goals of Business Models. This rigorous approach is necessary in order to achieve the five essential advantages of the use of business models described above. In our understanding a Business Model is nothing else than 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 revenue streams. The e-business model ontology we propose in this section is founded on four main pillars, which are product innovation, customer relationship, infrastructure management and financial aspects. These main elements are then further decomposed.

The outlined ontology could be the main basis for a range of software tools that allow managers to make more accurate decisions by designing, understanding, sharing and experimenting with their business models.

## **2. Three views of business models in literature**

In this section we explore the existing business model literature considering three aspects, which are revenue- and product-specific, business actor- and network-specific and marketing-specific. Most authors that have written about business models cover one or two and sometimes all of the three aspects mentioned above. Sometimes their approaches are highly abstract and very rigorous and sometimes they are purely descriptive and of low conceptual contribution. The goal of this literature review is to understand what a business model could be and what elements it should be composed of.

### ***2.1. Revenue/product aspects***

Some authors, such as Rappa (Rappa, 2001), provide a taxonomy of e-business models rather than an explanation of what elements such a model contains. For him a business model spells-out how a company makes money by specifying where it is positioned in the value chain. His classification consists of nine generic forms of e-business models, which are Brokerage, Advertising, Infomediary, Merchant, Manufacturer, Affiliate, Community, Subscription and Utility. These generic models essentially classify companies among the nature of their value proposition or their mode of generating revenues (e.g. advertising, subscription or utility model).

Tapscott, Ticoll and Lowy (Tapscott et al., 2000) provide a typology of business models that they call b-webs. They identify five generic b-webs, which are called Agoras, Aggregations, Value chains, Alliances and Distribution Networks. These five models are classified according to their degree of value integration (from self-organising to hierarchical) and their degree of control (low/high) of the value creation process.

### ***2.2. Business actor and network aspects***

The probably best known classification scheme and definition of electronic business models is the one of Timmers (Timmers, 1998). According to him, a business model is an architecture for the product, service and information flows, a description of the various business actors and of their roles, as well as a description of the potential benefits of these actors and finally a description of the sources of revenue. In addition he acknowledges the necessity of providing a marketing strategy, in order to accomplish a business mission. Timmers classifies the eleven generic e-business models he outlines, according to their degree of innovation and their functional integration.

A quite rigorous business model approach is the one provided by Gordijn and Akkermans (Gordijn et al., 2001). Their methodology is based on a generic value-

oriented ontology specifying what's in an e-business model. This approach allows the representation and understanding of value flows between the several actors of an e-business model. The main elements are value-oriented and actor-oriented.

Afuah and Tucci (2001) give another approach to business models that is value-centred and takes in account the creation of value through several actors. In this methodology one can find a list of business model components, from scope over pricing and revenue source to connected activities and capabilities. But it is less clear how the value is delivered to the customer; i.e. classical marketing problems such as channel design or conflict are not in the centre of this approach.

Amit and Zott (2001) give a highly network-centred approach. They describe a business model as the architectural configuration of the components of transactions designed to exploit business opportunities. Their framework depicts the ways in which transactions are enabled by a network of firms, suppliers, complementors and customers.

### ***2.3. Marketing specific aspects***

A very interesting business model methodology has been developed by Hamel (Hamel, 2000). For him a business model is simply a business concept that has been put into practice. He identifies four main business model components that range from core strategy, strategic resources over value network to customer interface. These components are related to each other and are decomposed into different sub-elements. The main contribution of this methodology is a view of the overall picture of a firm.

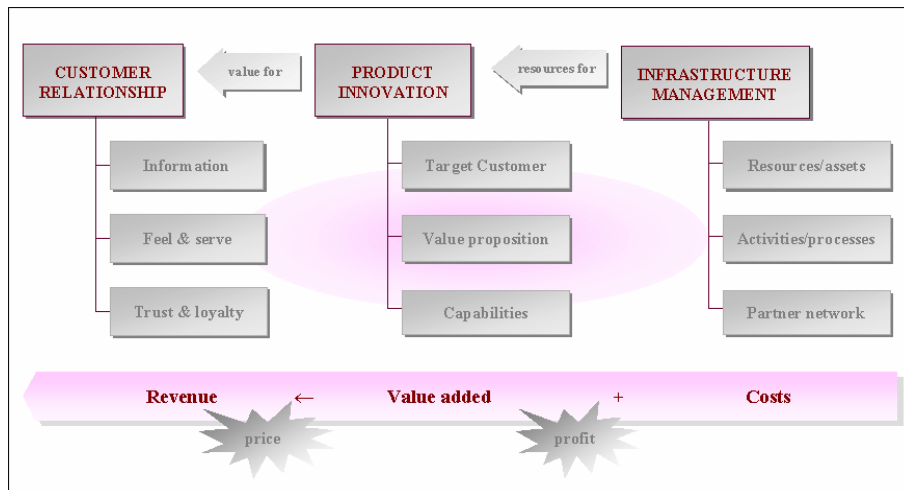
The business model approach by Petrovic, Kittl and Teksten (Petrovic et al., 2001) suggest that a business model can be divided into seven sub-models, which are the Value Model, the Resource Model, the Production Model, the Customer Relations Model, the Revenue Model, the Capital Model and the Market Model. These sub-models and their interrelation shall describe the logic of a business system for creating value that lies behind the actual processes.

Weill and Vitale (2001) give a systematic and practical analysis of eight so called atomic e-business models. These are Direct to Customer, Full-Service Provider, Whole of Enterprise, Portals/Agents/Auctions/Aggregators/Intermediaries, Shared Infrastructure, Virtual Community, Value Net Integrator and Content Provider. Every one of these atomic e-business models is analysed according to its strategic objectives and value proposition, its sources of revenue, its critical success factors and its core competencies. In addition the authors also outline the different model's channels, customer segments and IT-Infrastructure. Firms can combine atomic e-business models to create an e-business initiative.

### 3. The e-business model ontology

The goal of this sections is to define an approach that brings e-business model literature one step further, by providing a more rigorous building-block-like methodology that defines the essential concepts in e-business models and shows the relationships between them. Our e-business model ontology or framework has in some ways been inspired by the different enterprise ontology projects described in academic literature (Toronto Virtual Enterprise, Enterprise Ontology, Core Enterprise Ontology) (Bertolazzi et al., 2001). An ontology essentially gives a common understanding of a specific domain by defining its elements and the relationships between these elements. We think this rigorous and formalised approach is necessary in order to achieve the five main advantages of using business models (see first section). Especially strategic decisions on business model issues could improve drastically.

As explained above, our e-business model ontology is founded on four main pillars (see figure 2). (1) The *products and services* a firm offers, representing a substantial value to the customer, and for which he is willing to pay. (2) The *infrastructure and the network of partners* that are necessary in order to create value and to maintain a good customer relationship. (3) The *relationship capital* the firm creates and maintains with the customer, in order to satisfy him and to generate sustainable revenues. And last, but not least, (4) *the financial aspects*, which are transversal and can be found throughout the three former components, such as cost and revenue structures.



**Figure 2.** e-business model framework

### 3.1. Product innovation

This first pillar of the framework covers all product-related aspects. The main elements are the *value proposition* a firm wants to offer to a specific *target customer segment* and the *capabilities* a firm has to be able to assure in order to deliver this value.



Figure 3. Product innovation

**Value proposition.** This element refers to the value the firm offers to a specific target customer segment. ICT has created many new opportunities for value creation on the one hand and more efficient value creation on the other hand. We believe this opens up three trajectories of differentiation from competitors. The first one is (a) innovation through new, complementary or customised offerings. ICT allows firms to include strong and new information components into their offerings or in some cases even completely digitise their products. Through mass customisation (Piller et al., 2000) for example, firms can propose value tailored to the profile of every single customer. The shoe company Customatix<sup>1</sup>, to mention one example, lets their customers design their own personal footwear. The second trajectory of differentiation is (b) providing a lower price than the competition. Cost savings achieved through optimised infrastructure management or direct selling over the Internet (Benjamin and Wigand, 1995), can be passed on to customers in form of lower price tags. The third trajectory of differentiation is (c) a premium customer service level and customer relationship excellence. ICT allows firms to propose a whole new range of (often free) services that augment the value of the core offering. The company Live Manuals<sup>2</sup> for example, lets firms that sell consumer electronics offer their clients interactive and multimedia product manuals. Other services that can be provided through ICT, include product updates, training or support.

We combine the three trajectories outlined above with the approach of Kambil, Ginsberg and Bloch (Kambil et al., 1997), which further decompose the concept of value proposition into its sub-elements. They identify three main components. First, the cost element, which is decomposed into price, effort and risk. Second, the role of the customer, which can be buyer, user, co-creator or transferer of value. Third, the performance of the value proposition.

**Target customer.** A firm generally creates value for a specific customer segment. The definition of the market scope (Hamel, 2000; Afuah and Tucci, 2001) captures

<sup>1</sup> <http://www.customatix.com> [Accessed on December 10<sup>th</sup>, 2001]

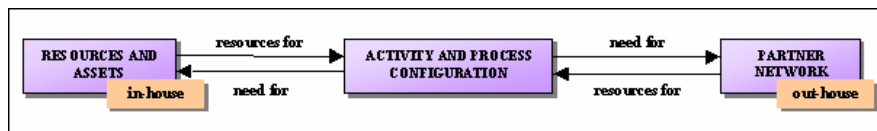
<sup>2</sup> <http://www.livemanuals.com> [Accessed on December 10<sup>th</sup>, 2001]

the essence of where the firm does and does not compete – which customers, which geographical areas, and what product segments. A firm can market either to businesses and/or individuals, commonly referred to as business-to-business (B2B) and business-to-consumer (B2C). What actually changes compared to classical marketing is the notion of distance and the notion of time. Through ICT firms expand their reach because geographical notions become less relevant and because Website or open 24/7. This is as much of an opportunity as also a threat because barriers to market entry are lower and competition increases (Porter, 2001).

**Capabilities.** To deliver the value proposition to different customers, a firm must ensure that it possesses the range of capabilities that underpin the proposed value. Several authors describe how value and competencies or capabilities are interconnected (Bagchi and Tulske, 2000; Wallin, 2000). Capabilities can be understood as repeatable patterns of action in the use of assets to create, produce, and/or offer products and services to a market (Wallin, 2000). For example, a retailer that sells perishable food over the Internet has to be able to assure rapid home delivery, a computer chip designer has to be able to constantly innovate and a news-site has to be able to offer up-to-date information.

### 3.2. Infrastructure management

This third pillar of the framework, the infrastructure management element, describes value system configuration (Gordijn et al., 2000) that is necessary to deliver the value proposition. This comprises the **activity configuration** of the firm, in other words the activities to create and deliver value, and, the relationship between them, the in-house **resources and assets** and the firm's **partner network**.



**Figure 4.** Infrastructure management

**Activity configuration.** The main purpose of a company is the creation of value that customers are willing to pay for. This value is the outcome of a configuration of inside and outside activities and processes. To define the value creation process in a business model, we use the *value chain framework* (Porter and Millar, 1985) and its extension, such as defined by Stabell and Fjeldstad (1998). They extend the idea of the value chain with the *value shop* and the *value network*. Former describes the value creation process of service providers, whereas latter describes brokering and intermediary activities. It is in this component of the e-business framework that we

will find such activities as Supply Chain Management (SCM), Efficient Customer Response (ECR), or e-procurement.

**Partner network.** The partner network outlines, which elements of the activity configuration are distributed among the partners of the firm. Management literature defines these strategic networks as “stable inter-organisational ties which are strategically important to participating firms. They may take the form of strategic alliances, joint-ventures, long-term buyer-supplier partnerships, and other ties” (Gulati et al., 2000). Especially the shrinking transaction costs make it easier for firms to vertically disintegrate and to reorganise in partner networks. Firms can then focus on their core competencies in the value system configuration and rely on partner networks and outsourcing for other non-core competencies and activities. One of the several examples of the impact of ICT on the modification of the activity distribution can be found in the food retailing business. Because of shrinking coordination and transaction costs retailers have introduced the so-called Vendor Managed Inventory (VMI). In this concept buyers completely transfer supply management to suppliers, which directly control the stock of the buyer and refurbish automatically, when necessary. Among other advantages, this substantially reduces inventory costs. In e-business literature there are several terms arising for these new forms of strategic networks in the value creation process, some call them b-webs (Tapscott et al., 2000), or fluid and flexible organisations (Selz, 1999), others call them value networks (Brandenburger and Nalebuff, 1996)

**Resources and assets.** In order to create value, a firm needs resources (Wernefelt, 1984). Grant (Grant, 1995) distinguishes tangible, intangible, and human assets. Tangible resources include plants, equipment and cash reserves. Intangible resources include patents, copyrights, reputation, brands and trade secrets. Human resources are the people a firm needs in order to create value with tangible and intangible resources.

### 3.3. Customer Relationship Capital

Through the use of ICT firms can redefine the notion of customer relationship. First, they can get a feel for and understand the customer by outlining an **information strategy**. Second, firms can exploit new ways to deliver value and expand reach by covering new and multiple **channels**. Third, companies must understand that **trust and loyalty** has become one of the most important elements in a business world that is increasingly virtual and has less face-to-face contact.

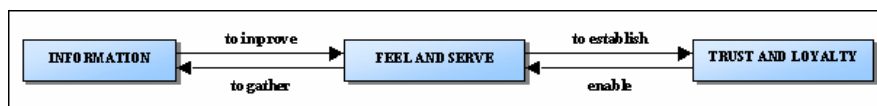


Figure 5. Customer relationship capital

**Information strategy.** The objective of the information strategy is threefold. First, the defining of the strategy of gathering customer information and second the outlines of how to use this information in order to excel in customer relationship (e.g. through personalisation and profiling). The third goal refers to the exploitation of customer information in order to discover new and profitable business opportunities and to ameliorate customer satisfaction. Data warehousing, data mining and business intelligence are important technologies that allow managers to gain insight on their customers buying behaviour. These insights can be used to create what Hamel (Hamel, 2000) calls the positive feedback effect. A firm with a large base of users, and a way of rapidly extracting feedback and information from those users, may be able to improve its products and services faster than its competitors. In this virtuous circle products and innovation can be improved, which in return attracts new customers. Information strategy should contribute to a personalised relationship with the firm's customer. Customer profiles allow rule-based one-to-one personalisation or collaborative filtering, which give the customer the feeling of having been taken seriously as an individual.

**Feel & Serve (distribution channels).** This element refers to the way a firm "goes to market" and how it actually "reaches" its customers (Hamel, 2000). This means a company must define its channel strategy and outline through which channels - either indirect or direct channels, operated by the firm or provided by a third party (e.g. agent, intermediary) - it wants to deliver the company's value proposition. The purpose of a channel strategy is to make the right quantities of the right product or service available at the right place, at the right time to the right people. (Pitt, 1999). ICT, and particularly the Internet, has a great potential to complement rather than to cannibalise a business's channels (Porter, 2001). Direct selling over the Web could improve margins, whereas selling through new Internet mediation services (cybermediaries) (Sarkar et al., 1995) could mean new market opportunities. Of course the expansion of the range of channels also increases the potential of conflicts between channels (Anderson et al., 1998) and demands strong management. Because ICT can fundamentally change the way firms interact with customers, we think it is important to closely analyse and understand channel interaction. To do this we use a grid (following Dolan, 2000) that draws the channel functions of the customer buying cycle (CBC) on the one axes and the range of channels on the other axes. We illustrate this in a simplified example of the bookseller Barnes and Nobles (see figure 6) who has a wide range of virtual and physical channels. On the x-axis of the grid we draw the channel phases of the CBC, which are Awareness, Evaluation, Transaction and After Sales and on the y-axis we provide a list of the different channels of Barnes and Nobles. Finally it is also important to mention that ICT opens up new opportunities to personalise and individualise the different phases in the CBC, which will deeply influence the customer's experience in doing business with the firm.

CHANNEL	Awareness	Evaluation	Purchase	After sales
Barnes and Noble Stores (Retail)	Promotion of authors and books	Reading corners, coffee shops, sales people	Cash registry (credit card or cash)	Return of books
Barnesandnoble.com (Website)	banners	Search function, customer review, critics, excerpt	Virtual shopping cart and checkout (credit card)	Order status, transaction history, return of
Affiliation Network (Internet)	Specialized affiliate Websites	Expert commentaries, recommendations		
Barnes and Noble University (Website)	Free online courses	Courses based on books of Barnes & Nobles		
TV, Print, Movies (Mass media)	Mass advertising			

**Figure 6.** Channel grid (following Dolan, 2000)

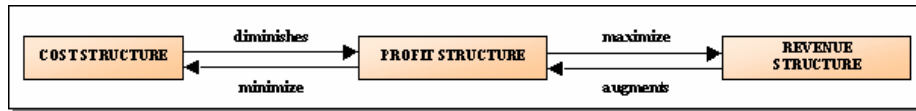
**Trust and loyalty.** It is essential to establish trust between business partners when the business environment becomes increasingly virtual and the implicated parties do not necessarily know each other anymore before conducting business. With the emergence of the Internet in business and commerce important research has been conducted on what trust actually is in cyberspace. There exists a certain number of mechanisms to build trust in e-business environments, such as, for example, virtual communities (Hagel and Armstrong, 1997), performance history, mediation services or insurance in case of harm, third party verification and authorisation, and, a clear and explicit privacy policy (Friedman, 2000; Dimitrakos, 2001).

Customer loyalty can be understood as the outcome of the customer's trust and satisfaction. To establish loyalty and relationship capital (Tapscott et al., 2000) the firm has to create positive relationship dynamics (Hamel, 2000), where emotional, as well as transactional elements in the interaction between firm and client play an important role. Even though well known, it is often forgotten that in most cases it is much cheaper to incite existing customers to do repeat business than to acquire new customers. In the early days of the Internet many e-businesses have concentrated on acquisition for growth and have neglected customer loyalty.

### 3.4. Financial aspects

The financial aspect, the last pillar of our framework is transversal because all other pillars influence it. This element is composed of the revenue model of the firm

and its cost structure. The formerly mentioned determine the firm's profit model and therefore its ability to survive in competition.



**Figure 7.** *Financial aspects*

**Revenue model.** This element measures the ability of a firm to translate the value it offers its customers into money and therefore generate incoming revenue streams. A firm's revenue model can be composed of different revenue streams that all have different pricing models. A fictional online media company for example, could sell its content in several different ways. It could collect subscription fees from its private customers and demand fixed prices for content (articles, films, and sound) from its business customers. The media company may also live from advertising and sponsoring that it could sell or auction to business customers. Another revenue stream could be commissions or transaction cuts from other businesses that conducted sales through the media company's Website. The new pricing mechanisms enabled by ICT should be used in order to maximise revenues. Particularly the Internet has had an important impact on pricing and has created a whole new range of pricing mechanisms (Klein and Loebbecke, 2000). It has become easier to compare prices, which will probably conduct firms to abandon fixed pricing. The German start-up [Guenstiger.de](http://www.guenstiger.de)<sup>3</sup> for example, allows customers to compare prices of products in a retail stores with the lowest prices in town by using a mobile phone.

**Cost structure.** This element measures all the costs the firm incurs in order to create, market and deliver value to its customers. It sets a price tag on all the resources, assets, activities and partner network relationships and exchanges that cost the company money. As the firm focuses on its core competencies and activities and relies on partner networks for other non-core competencies and activities there is an important potential for cost savings in the value creation process. The right use of ICT in customer relationship also opens up new opportunities for delivering premium customer services and therefore additional value at reasonable costs.

**Profit model.** This element is simply the outcome of the difference between revenue model and cost structure. Therefore it can be seen as the culminating point and as an expression of the entire e-business model ontology. Whereas Product Innovation and Customer Relationship shall maximise revenue, an effective Infrastructure Management shall minimise costs and therefore optimise the profit model.

<sup>3</sup> <http://www.guenstiger.de> [Accessed on December 10<sup>th</sup>, 2001]

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Business Model component		Rappa	Tapscott et al.	Timmers	Gordijn et al.	Ahuah et al.	Amit et al.	Hamel	Petrovic et al.	Weill et al.
<b>(1) PRODUCT INNOVATION</b>	Target Customer				Actors, market segment	Scope		Scope		Customer segments
	Value Proposition	Generic business models	Value integration, degree of control	Degree of innovation, generic business models	Value offering	Customer value	Efficiency, complement, lock-in, novelty	Business mission, differentiat.	Value model	Value proposition
	Capabilities									
<b>(2) INFRASR. MANAGEMENT</b>	Resources & Assets					Capabilities, implement.		Core competency, strategic assets		
	Activity Configuration			Functional integration	Value activity	Connected activities		Core processes, strategic config.	Production resource model	Channels
	Partner Network			Functional integration	Stakeholder network, value interfaces, value ports			Value network, company boundaries		
<b>(3) CUSTOMER RELATIONSHIP</b>	Information							Information and insight		IT infrastr.
	Feel & Serve							Fulfillment and support, customer benefits	Customer relationship model	Core competency
	Trust & Loyalty							Relation-ship dynamics		
<b>(4) FINANCIAL ASPECTS</b>	Revenue Model				Value exchange	Pricing strategy revenue sources		Pricing structure	Revenue model	Sources of revenue
	Cost Structure	Generic business models			Value exchanges				Capital model	
	Profit Model					Sustain-ability		Profit boosters		

Figure 8. eBMF & literature comparison

## 5. Conclusion

There are several reasons why academic research should be done in the area of business models and e-business models. First of all, even though many people talk about them, there is no common understanding of the domain. Business models are used to describe everything from how a company earns revenues to how it structures its organisation (Linder and Cantrell, 2001). This is demonstrated in figure 8, where we compare our e-business model ontology to the existing business model literature.

The second reason why the e-business model concept is interesting to study, is because it can be an adequate methodology and foundation for managerial tools to react and decide in an increasingly dynamic and uncertain business environment. As product life cycles become shorter, competition global and the use of ICT an imperative, managers have to find new ways to manoeuvre and decide in this complex environment. Managers have to understand the new opportunities offered by ICT, integrate them into their existing business models and share them with other stakeholders.

The framework presented in this paper could be the basis for further research on e-business models and prototypes of managerial decision tools. An e-business model description language for example, would make it possible to formally describe business models and generate different views (e.g. documents) in function of different needs (such as descriptions, graphical representations, business plans, reports for financing, acquisitions or mergers, etc.) (Ben Lagha et al., 2001). An e-business model design tool could help business model designers rapidly design, adapt, assess, compare and critic e-business models. This refers to the metaphor of the drawing table, where an architect assembles the different elements of a building. And finally, one could imagine a sort of e-business model flight simulator. With such a tool managers could do risk free experiments and “play” with and learn about their e-business models (Schrage, 1999). For more insight on possible research and software tools see Osterwalder and Pigneur (2002).

## 6. Bibliography

- AFUAH A., C. TUCCI C., *Internet Business Models and Strategies*, Boston, McGraw Hill, 2001.
- AMIT R., ZOTT C., “Value Creation in eBusiness”, *Strategic Management Journal*, vol. 22, 2001, pp. 493-520.
- ANDERSON E., DAY G.S., RANGAN V.K., “Strategic Channel Design”, *Journal of Product Innovation Management*, Volume 15, Issue 5, September 1998, pp. 472-473.
- BAGCHI S., TULSKIE B., “e-business Models: Integrating Learning from Strategy Development Experiences and Empirical Research”, *20th Annual International Conference of the Strategic Management Society*, Vancouver, October 15-18, 2000.

## An Ontology for Developing e-Business Models

- BEN LAGHA, S., OSTERWALDER, A., PIGNEUR, Y., "Modeling e-Business with eBML", *5<sup>e</sup> Conférence Internationale de Management des Réseaux d'Entreprises CIMRE'01*, Mahdia, October 25-26, 2001.
- BENJAMIN R.I., WIGAND R.T., "Electronic Commerce: Effects on Electronic Markets", *Journal of Computer-Mediated Communication* 1 (3), 1995.
- BERTOLAZZI P., KRUSICH C., MISSIKOFF, M., "An Approach to the Definition of a Core Enterprise Ontology: CEO", *OES-SEO 2001, Int. Workshop on Open Enterprise Solutions: Systems, Experiences, and Organizations*, Rome, September 14-15, 2001.
- BRANDENBURGER A., NALEBUFF B., *Co-opetition*, New York, Doubleday, 1996.
- DIMTRAKOS T., "System Models", e-Risk and e-Trust, Towards the E-Society, *IFIP Conference on E-Commerce, E-Business and E-Government*, Dordrecht, Kluwer Academic Publishers Group, 2001.
- DOLAN R.J., Going to Market, teaching note, 2000, Harvard Business School.
- FENSEL D., *Ontologies: Silver Bullet for Knowledge Management and Electronic Commerce*, Heidelberg, Springer-Verlag, 2001.
- FRIEDMAN B., KAHN P., HOWE D., "Trust Online", *Comm. ACM*, 43 (12), 2000, pp. 34-40.
- GORDIJN J., AKKERMANS J., VAN VLIET J., "Designing and Evaluating E-Business Models", *IEEE Intelligent Systems*, July/August 2001, Vol. 16, No. 4, pp. 11-17.
- GRANT R.M., *Contemporary Strategy Analysis*, Malden MA, Blackwell, 1995.
- GULATI R., NOHRIA N., ZAHEER A., "Strategic Networks", *Strategic Management Journal*, 2000, 21: pp. 203-215.
- HAGEL J., ARMSTRONG A., *Net Gain - Expanding Markets through Virtual Communities*, Boston, Harvard Business School Press, 1997.
- HAMEL G., *Leading the revolution*, Boston, Harvard Business School Press, 2000.
- KAMBIL A., GINSBERG A., BLOCH M., Re-Inventing Value Propositions, *Working Paper*, 1997, Stern School of Business, New York University.
- KLEIN S., LOEBBECKE C., "The transformation of pricing models on the web: examples from the airline industry", *13th International Bled Electronic Commerce Conference*, Bled, June 19-21, 2000.
- LINDER J.C, CANTRELL S. Changing Business Models: Surveying the Landscape, *Working Paper*, 2001, Institute for Strategic Change, Accenture.
- MORECROFT J.D., Executive Knowledge, Models, and Learning. In Morecroft, J.D. ; and Sternman, J.D. (editors) *Modeling for Learning Organizations*, pp. 3-28, Portland, Productivity Press, 1994.
- NORTON D., KAPLAN R., "The balanced scorecard:measures that drive performance", *Harvard Business review*, 70 (1), 1992.
- OSTERWALDER A., PIGNEUR Y., "An e-Business Model Ontology for Modeling e-Business", *Bled Electronic Commerce Conference*, Bled, June 17-19, 2002.

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- PETROVIC O., KITTL C., TEKSTEN R.D., "Developing Business Models for eBusiness" *International Conference on Electronic Commerce 2001*, Vienna, October 31. – November 4, 2001.
- PILLER F.T, REICHWALD R., MÖSLEIN K., "Information as a Critical Success Factor for Mass Customization or: why even a customized shoe not always fits", *ASAC-IFSAM 2000 Conference*, Montreal, July 8-11, 2000.
- PITT L., BERTHON P., WATSON R.T., "Changing Channels: The Impact of the Internet on Distribution Strategy", *Business Horizons*, Volume 42, Issue 2, 1999, pp. 19-28.
- PORTER M., "Strategy and the Internet", *Harvard Business Review*, 79 (3), 2001, pp. 62-78.
- PORTER M., MILLAR V., "How Information Gives You Competitive Advantage", *Harvard Business Review*, 63 (4), 1985, pp. 149-160.
- RAPPA M., Managing the digital enterprise - Business models on the Web, 2000 [http://ecommerce.ncsu.edu/business\\_models.html](http://ecommerce.ncsu.edu/business_models.html) [Accessed on March 22<sup>nd</sup>, 2002]
- SARKAR M., BUTLER B., STEINFELD C., "Intermediaries and cybermediaries: a continuing role for mediating players in the electronic marketplace", *Journal of Computer-Mediated Communication* 1 (3), 1995.
- SCHARAGE M., *Serious Play: How the Worlds Best Companies Simulate to Innovate*, Boston, Harvard Business School Press, 1999.
- SELZ D., *Value Webs: Emerging forms of fluid and flexible organizations. Thinking, organizing, communicating and delivering value on the Internet*, Dissertation at the University of St.Gallen, Switzerland, Bamberg: Difo-Druck OHG, 1999.
- STABELL C.B., FJELDSTAD O.D., "Configuring value for competitive advantage: on chains, shops, and networks", *Strategic Management Journal*, 19, 1998, pp. 413-437.
- STERNMAN J.D., *Business Dynamics: Systems Thinking and Modeling for a Complex World*, Boston, McGraw-Hill, 2000.
- TAPSCOTT D., LOWI A., TICOLL D., 2000. *Digital Capital - Harnessing the Power of Business Webs*, Boston, Harvard Business School Press, 2000.
- TIMMERS P., "Business Models for Electronic Markets, *Journal on Electronic Markets*, 8 (2), 1998, pp. 3-8.
- USHOLD M., KING M., "Towards a Methodology for Building Ontologies", *Workshop on Basic Ontological Issues in Knowledge Sharing*, held in conjunction with IJCAI-95, Montreal, August 20-25, 1995.
- WALLIN J., "Operationalizing Competencies", *5<sup>th</sup> Annual International Conference on Competence-Based Management*, Helsinki, June 10-14, 2000
- WEILL P., VITALE M.R., *Place to space: Migrating to eBusiness Models*, Harvard Business School Press, 2001.
- WERNEFELT, "A resource-based view of the firm", *Strategic Management Journal*, 5, 1984, pp. 171-181.