

Business Model Development for Virtual Enterprises

Evelyn Rojas, Ana Barros, Américo Azevedo, Antonio Batocchio

► **To cite this version:**

Evelyn Rojas, Ana Barros, Américo Azevedo, Antonio Batocchio. Business Model Development for Virtual Enterprises. Luis M. Camarinha-Matos; Lai Xu; Hamideh Afsarmanesh. 13th Working Conference on Virtual Enterprises (PROVE), Oct 2012, Bournemouth, United Kingdom. Springer, IFIP Advances in Information and Communication Technology, AICT-380, pp.624-634, 2012, Collaborative Networks in the Internet of Services. <10.1007/978-3-642-32775-9_62>. <hal-01520437>

HAL Id: hal-01520437

<https://hal.inria.fr/hal-01520437>

Submitted on 10 May 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Business Model Development for Virtual Enterprises

Evelyn Paola Soto Rojas¹, Ana Cristina Barros², Américo Lopes de Azevedo^{2,3},
Antonio Batocchio¹

¹Faculdade de Engenharia Mecânica-UNICAMP, Rua Mendeleev, 200-CEP 13083-860
Cidade Universitária "Zeferino Vaz" Barão Geraldo, Campinas, São Paulo – Brasil

²INESC TEC - INESC Technology and Science (formerly INESC Porto), Campus da FEUP,
Rua Dr. Roberto Frias, 378,4200-465 Porto – Portugal

³FEUP - Faculty of Engineering, University of Porto, Rua Doutor Roberto Frias S/N, 4200-465
Porto, Portugal

paolasoto@fem.unicamp.br, acbarros@inescporto.pt, ala@fe.up.pt, batocchi@fem.unicamp.br

Abstract. Virtual Enterprise is one form of collaborative networks that allows partners to exploit emerging business opportunities in a flexible way. Moreover, in the competitive landscape of the twenty-first century, the business model innovation has become increasingly a key element for companies' positioning in the market. Consequently, this paper aims at proposing a set of business model elements to be used by a virtual enterprise in order to explore a new business opportunity for its network. Literature review is used to identify the business model elements and evidence from a pilot case study confirms that these elements are considered in practice.

Keywords: Virtual Enterprise, Business Model, Collaboration, Competitiveness.

1 Introduction

The global economy is driven by or revolves around constant innovations. Therefore, many organizations seek today to create and capture innovations by systematically collaborating with outside partners [1]. One form of collaboration is the use of virtual enterprises and organizations are motivated to create them in order to perceive business goals they cannot achieve alone. These business goals may vary from the exploration of new market segments and opportunities to the reduction of costs or risk sharing [2], [3]. This main purpose for the formation of a virtual enterprise sets out its objective and will be the basis to establish its strategy, namely to define how it will achieve high levels of performance in the markets and industries it wants to operate [4].

The interest in business model development is not a recent topic. According to Magretta [5] "A successful business model represents a better way than the existing alternatives. It may offer more value to a discrete group of customers. Or it may completely replace the old way of doing things and become the standard for the next generation of entrepreneurs to beat". Given the importance of innovation on the business model, this paper aims at identifying key business model elements necessary to build a business model for virtual enterprises. It features an in-depth literature

study spanning various definitions, taxonomies, and ontologies about the business model and virtual enterprises themes. Subsequently, evidence from a pilot case study confirms its applicability in practice.

This paper is organized as follows. Section 2 reviews the literature about business model definition and Virtual Enterprise (VE) characteristics in order to build a theoretical background that supports the identified business model elements for a VE. Section 3 presents the research methodology and section 4 the paper's theoretical contribution by describing the sixteen business model elements identified for the development of a business model for a VE. Evidence from the pilot case study is presented and discussed in Section 5. Finally, section 6 concludes the paper.

2 Literature Review

2.1 Business Model Definition

An organization's business model is its driver for success, because it operationalizes the entrepreneurial opportunity that creates competitive advantages for the organization in its market [6], [7]. The success of many companies, e.g. Groupon, Ryanair, Amazon and Dell, can be attributed to the way they innovated their business models, challenging established industries and changing the rules of competition [8]. However, consensus about the definition of a business model has not been achieved among academics. Looking into the literature, we find several different constructs of the concept.

Amit and Zott [9] point out that "...The business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities". The framework proposed by these authors contains three-design elements - content, structure and governance - and four design themes - novelty, lock-in, complementarities and efficiency. This business model definition is flexible enough to be applied it to different industries and stages of venture maturity.

For Osterwalder et al. [1] "...Business model is a conceptual tool that contains a big set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams".

Morris et al. [10] propose the following definition "...A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets". These authors value the relationship between business model and strategy, and argue that a good business model captures the core logic and dominant strategy of a venture.

Chesbrough [11] argue that "...The business model is the heuristic logic that connects technical potential with the realization of economic value". The authors go beyond the creation of value by taking organizational aspects into consideration.

These various definitions are distinct, but complementary. Other points of view to define the business model have focused on: value creation [12], organizational aspects of the business model definition [13], [14], [15], and performance and sustainability [16], [17].

Based on the definitions from the literature reviewed, for the purpose of this paper, we define business model as follows: A business model explains how the logic of the organization is, the way it operates, and how it creates value for its stakeholders.

Previous works exist that have studied business model development in the context of business networks. Palo and Tähtinen [18] developed an empirically grounded conceptualization of a networked business model. The authors identified the generic elements of a business model in the field of technology-based services and propose to use these elements to build a networked business model.

Helander and Rissanen [19] developed a theoretical study in which they highlighted that in a network context the business model of a company must be linked to the business model of the other companies involved in the partnership. In addition, Komulainen et al. [20] identified three core elements for a network business model: product/service, business actors and their roles, and value-creating exchanges among the actors. And yet, among the existing research literature, we do not find works oriented to the context of virtual enterprises. Therefore, this paper contributes to this body of literature by proposing a set of business model elements to be used by virtual enterprises.

2.2 Virtual Enterprise: Relevant Characteristics and Key Issues of Competitiveness

In an attempt to increase the global competitiveness of firms, in recent years a variety of new organizational structures based on collaboration have emerged. These structures are alliances between companies, created to overcome the various limitations and challenges of the market. Thus, companies that specialize in certain knowledge, which is focused on its core competencies, seek to align themselves with other companies to fully meet the requirements of new products and services demanded by the market. Virtual Enterprise is one form of collaborative networks that allows partners to exploit emerging business opportunities in a flexible way.

Virtual enterprises have been widely discussed over the past decade. The definition of virtual enterprise used in this paper is based on the definition proposed by Camarinha-Matos et al. [21]: "...Virtual Enterprise represents a temporary alliance of organizations that come together to share skills or core competencies and resources", in order to answer to a specific business opportunity.

The concept of Virtual Enterprise (VE) is proposed as a competitiveness strategy that provides the features needed for companies to compete in the market and meet consumer needs, by means of shortening the time-to-market of their products and services. In addition, through the collaborative partnerships formed within the virtual enterprise, companies profit from further advantages, such as the division of costs, resources, and market expansion. An organization can play various roles within a VE during the different stages of the VE lifecycle. Indeed, various types of agents can be

found inside and around a VE, acting in roles such as Broker of the VE, VE Coordinator, and Member of the VE. According to Molina et al. [22] the broker is the key player in the formation of the VE, as it performs the process of partner search and selection by setting up appropriate infrastructure (considering physical, legal, social, cultural, and informational) for the formation of the VE.

The creation of a VE is triggered by the identification of a new business opportunity. Subsequently, partners with the skills needed for product development and manufacturing are selected. After the negotiation of contracts for signature, the virtual enterprise is ready to start its operations. Temporality is an important characteristic of virtual enterprises because it seeks to operate in the short run, and aims to achieve business opportunities in the short and medium term. Virtual enterprises are expected to overcome enormous spatial and temporal barriers, bringing together geographically dispersed resources.

The central feature of the virtual enterprise is the complementarity of skills between partners, i.e. each network partner dominates a sub-process or has a critical knowledge about a specific process, product, or market. All partners have to contribute directly or indirectly in creating customer value. Thus, the combination of skills provides synergy and greater flexibility to meet customer requirements. According to Larson [23] one of the potential success factors in this kind of collaboration is the ability to effectively and seamlessly assemble and utilize a pool of resources, derived from the various combinations of specific capabilities of the VE partners. Using this approach, partners can together achieve competitive advantages with minimum investment in permanent staff, fixed assets, and working capital.

Another feature of a virtual enterprise is its high flexibility. An organization can easily, join and leave at any time during the operation of the virtual enterprise. In a competitive environmental, the virtual enterprise is able to provide solutions that allow the replacement of partners, thus responding quickly to changing business needs. Table 1 summarizes the main characteristics of VE and some effects on competitiveness.

Table 1. Virtual Enterprise and Competitiveness

	Characteristics	Effects on Competitiveness	Source
Driven by opportunity	Explore specific business opportunities	The structure of the virtual enterprise allows it to respond quickly and effectively to a particular market demand, due to its high capacity for innovation and customer orientation.	[22], [24], [25], [26]
	Network dynamics and temporary	Permeate organizational boundaries, through partnerships, allows the virtual enterprise to explore new competitive advantages, extracting the maximum value from its partners.	[22], [24], [25], [26]
Mutual	Sharing core competencies among partners	The combination of skills provides synergy and greater flexibility to meet customer requirements.	[22], [24], [25], [26]
	Integration of business processes	Sharing resources, information, and knowledge enables the network to gain competitive advantages by sharing available individual capacity.	[22], [24], [25], [26], [27]
Flexibility	Companies can participate in multiple networks simultaneously	Resources can be easily reallocated to respond the opportunities of the constantly changing global market.	[22], [24], [25], [26], [27]
	An organization may easily enter or leave the network		

3 Research Methodology

This work aims at identifying the key business model elements necessary to build a business model for virtual enterprises. Consequently, we formulate our research question as follows: What are the relevant elements for the business model development of a virtual enterprise? This study followed two steps. First, we reviewed the literature on both areas of business model development (section 2.1) and virtual enterprises (section 2.2), in order to identify the business model elements suitable for virtual enterprises. Second, we carried out a pilot case study to verify if the business model elements identified are considered in practice [28]. The case study selected is a virtual enterprise of five members formed in the Northern Region of Portugal to explore a customer need. The unit of analysis is the VE and the data collection method used was two semi-structured interviews, one with the VE broker and the other with a VE member. Interviewer bias was countered with the use of an interview guide, the presence of two interviewers, and tape recording of the interviews. In next sections we introduce the business model elements proposed and present the pilot case study.

4 Business Model Elements for Virtual Enterprises

From the business model components shown by several authors in the literature and the virtual enterprise characteristics identified in section 2.1, we present in Table 2 the sixteen business model elements for VE's proposed in this paper.

Table 2. VE features and Business Model Elements

VE Characteristics	Business Model Components	Source
□ Driving by Business Opportunity	<i>CUSTOMERS</i>	<i>Customer needs</i> [22], [24], [25], [26]
		<i>Value proposition</i> [1], [10], [11], [29], [30], [31]
□ Complementarity □ Adaptation □ Dynamic participation	<i>VALUE NETWORK</i>	<i>Key Activities</i> [1], [24], [26]
		<i>Partners Evaluation</i> [32], [33]
		<i>Criteria Definition</i> [32], [33]
		<i>Actors</i> [9], [13], [18], [20], [34], [35], [36]
		<i>Roles</i> [18], [20], [35]
□ Sharing resources and processes □ Automation □ Polymorphism □ Flexibility	<i>VALUE EXCHANGE</i>	<i>Core competences</i> [18], [24], [26]
		<i>Shared Resources/Activities</i> [18], [19], [24]
		<i>Shared Information</i> [11], [37], [38]
		<i>Technology Supporting</i> [11], [37], [38]
		<i>Cost</i> [1], [17], [39], [40]
□ Automation □ Polymorphism □ Flexibility	<i>VALUE CAPTURE</i>	<i>Revenues</i> [1], [10], [13], [37], [40], [41], [42], [43], [44], [45]
		<i>Flows of information</i> [9], [13]
		<i>Security policies</i> [9]
		<i>KPI network performance</i> [46], [47]
	<i>NETWORK</i>	<i>Benefits Sharing</i> [9], [13]
	<i>GOVERNANCE</i>	

This business model elements identified for the context of virtual enterprises are showed in Figure 1. Starting with the identification of the customer’s needs, a virtual enterprise defines its value offer to a customer through an innovative solution. This innovation is the basis for developing the value proposition. The Value Network is further characterized by the VE key activities; Partners evaluation criteria definition; the organizational actors, their roles and core competences. Here the VE defines how the access to the complementary skills between organizations and the different types of knowledge exchange in a network will influence the network value [19].

Value Exchange deals with the transfer and transformation of the various resources, the effective combination of resources and capabilities of all actors in the network and how they create value, not only for the network’s end customer but also for the network’s partners [20]. The important elements to be considered are: technology requirements, shared resources, and shared information.

Value Capture or value appropriation, according to West [45], explain how the value creation is captured in order to sustain the business activity. The Value Capture elements identified were: Cost structure and Revenues source.

Network Governance refers to the different instruments that assess the performance level of the network, maintain a strict control of information, resources and capabilities of all actors in the network. The Network Governance elements identified were: flows of information, security policies, KPI network performance and benefits sharing.

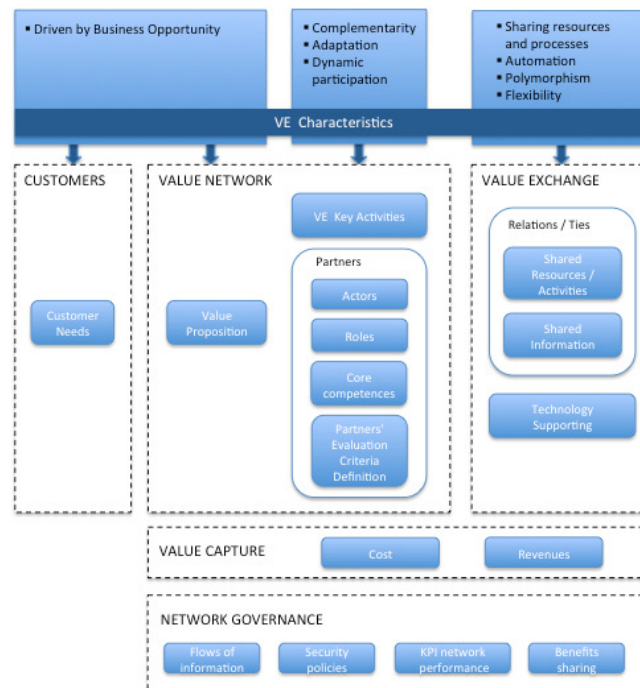


Figure 1. Business Model Elements for Virtual Enterprise

5 Case Study

The Virtual Enterprise in study is located in the Northern Region of Portugal and was conceived due to the vision of Firm A (network broker) to develop a new industrial equipment in collaboration with other organizations, following a network approach. Firm A is a market-leading company that provides solutions for surface adhesion, dry lubrication, and corrosion. Firm A considers the production technology and the level of training and knowledge of the painting line operators as core capabilities and driving factors of its quality. Therefore, since the operators' training process requires approximately two years for the worker to achieve a high level of expertise, Firm A decided to create a synergetic partnership to develop a robotic cell that would learn the operator's movements and recreate them. In this way, a virtual enterprise was created with five actors: Firm A as the network broker, two research laboratories providing knowledge on robotic technology (members B and C), Firm D as the equipment manufacturer, and Firm E providing software solutions. Previous experience of one respondent specifically emphasized that it is very difficult to work in a collaborative network environment without a leading company. In our case study Firm A is the leading member, responsible for assuring that the VE accomplishes its objective and for the negotiations within the VE members.

Our focus when conducting the semi-structured interviews was to explore whether the sixteen business model elements proposed in this paper through literature review, were in line with practice. The interviews were structured around themes. First, we focused on the customer needs (explained in the preceding paragraph) and the requirements for developing the robotic solution. When asked about the VE Value Network and its covering topics - VE key activities, partners' evaluation criteria definition, actors, roles, and core competences - the respondents were easily able to describe in great detail all these components. Respondents showed detailed understanding of the definition process of roles and responsibilities of each partner, and how the cost structure under contract was defined. A strong contributor to the increase of the level of trust among parties was the real-time information sharing with full visibility and transparency for all VE members. The information exchange is performed through a web-based platform provided by the research laboratory B, which includes mechanisms for monitoring and controlling the flow of information between organizations. Benefits sharing were perceived as cornerstones of the VE's business model. Through the cooperation and close relationships, each member of the virtual enterprise brings its expertise in the development of new industrial equipment creating a competitive differentiator in the market. Finally, the broker emphasized that in terms of evaluating the performance of the virtual enterprise, the most important aspect is the timely fulfillment of the activities planned. Evidence from the case study shows, that the defined business model elements are present in this case. However, further research is needed to validate these elements in other types and more complex networks.

6 Conclusions and Further Research

The fast changing market has established new standards of competitiveness for all types of organizations and has required fundamental changes in their business strategies. Thus, business model innovations have gained strength in recent years, appearing as a great opportunity that brings benefits for organizations.

This paper contributes to both fields of business model development and virtual enterprises by proposing a set of elements for the development of a business model for virtual enterprises. We were able to identify sixteen elements needed to define the business model of a virtual enterprise: Customer needs; Value Proposition; VE Key Activities; Partners (Partners Evaluation Criteria Definition, actors, roles, core competences); Relations/Ties (shared resources and shared information); Technology Requirements; Cost, Revenues; and Network Governance (Flows of information, Security policies, KPI network performance and benefits sharing).

Through the development of a pilot case study we were able to collect evidence, that the defined business model elements are present in virtual enterprises. However, further research is needed to validate these elements in other types of networks.

Acknowledgments. The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n° FoF-ICT-2011.7.3 - 285220 (Adventure Project - ADaptive Virtual ENterprise ManufacTURing Environment). The authors would like to thank INESC Porto for its support and the Adventure Project for their input and contributions.

References

1. Osterwalder, A.; Pigneur, Y.; Tucci, C. L. Clarifying Business Models: Origins, Present and Future of the Concept. *Communications of the Association for Information Systems*. v. 16, p.1-29 (2005)
2. Camarinha-Matos, L.; Afsarmanesh, H. Collaborative networks: value creation in a knowledge society. *Knowledge Enterprise: Intelligent Strategies in Product Design, Manufacturing and Management*. In: *Proceedings of PROLAMAT 2006, IFIP TC5 International Conference, Shanghai, China*, p. 26–40 (2006)
3. Lambert, D.M., Knemeyer, A.M. and Gardner, J.T. "Supply chain partnerships: model validation and implementation", *Journal of Business Logistics*, Vol. 25 No. 2, pp. 21-42. (2004)
4. Barney J. B., Clark D. N. *Resource-based theory: Creating and sustaining competitive advantage*, New York: Oxford University Press; D. G. Sirmon, M. A. Hitt & R. D. Ireland (2007)
5. Magretta, J. Why business models matter. *Harvard Business Review* May (2002)
6. Franke, N., Gruber, M., Harhoff, D., & Henkel, J. Venture capitalists' evaluations of start-up teams: Trade-offs, knock-out criteria, and the impact of VC experience. *Entrepreneurship Theory and Practice*, 32(3), 459–483 (2008)
7. Markides, C. *Game-changing strategies: How to create new market space in established industries by breaking the rules*. New York: Jossey-Bass (2008)
8. Kumar, N., Scheer, L. Kotler, P. "From Market Driven to Market Driving", *European Management Journal*, Vol. 18 No. 2, pp. 129–142 (2000)
9. Amit, R. & Zott, C. Value Creation in E-Business. *Strategic Management Journal*, 22(6/7), 493-520 (2001)

10. Morris, M., Schindehutte, M., & Allen, J. The entrepreneur's business model: toward a unified perspective. *Journal of Business Research*, 58, 726–735 (2005)
11. Chesbrough, H. W. Business model innovation: it's not just about technology anymore. *Strategy & Leadership*, 35(6), 12-17 (2007)
12. Klueber, R. Business model design and implementation for e-services. *Americas Conference on Information Systems (AMCIS'2000)*, 6, 2000. Long Beach, CA, Proceedings ... Long Beach, CA: AIS, 10-13 (2000)
13. Timmers, P. Business Models for Electronic Markets. *Journal of Electronics Markets*, v. VIII, n.2, p. 3-8 (1998)
14. Lechner, U.; Hummel, J. Business models and system architectures of virtual communities: from a sociological phenomenon to peer-to-peer architectures. *International Journal of Electronic Commerce*, v. 6, n. 3, p. 41-53 (2002)
15. Gangakhedkar, K.; Kevlani, S.; Bist, G. Business Models for Electronic Commerce. *IETE Technical Review*, v. 17, n. 4, p. 171-176 (2000)
16. Afuah, A.; Tucci, C. *Internet business models and strategies*. New York: McGraw-Hill (2001)
17. Rappa, M. A. The utility business model and the future of computing services. *IBM Systems Journal*, v. 43, n. 1, p. 32-42 (2004)
18. Palo T., Tähtinen J. "A network perspective on business models for emerging technology-based services", *Journal of Business & Industrial Marketing*, Vol. 26 Iss: 5 pp. 377 – 388 (2011)
19. Helander, N. and Rissanen, T. "Value-creating networks approach to open source software business models", *Frontiers of E-Business Research*, pp. 840-844 (2005)
20. Komulainen, H., Mainela, T., Sinisalo, J., Tähtinen, J. and Ulkuniemi, P. "Business model scenarios in mobile advertising", *International Journal of Internet Marketing and Advertising*, Vol. 3 No. 3, pp. 254-70 (2006)
21. Camarinha-Matos, L.M.; Afsarmanesh, H., Galeano, N.; Molina, A. Collaborative Networked Organizations – Concepts and practice in manufacturing enterprise. *Computers & Industrial Engineering* (2008)
22. Molina, A.; Velandia, M. & Galeano, N. Virtual Enterprise Brokerage: A Structure-driven Strategy to Achieve Build to Order Supply Chains. *International Journal of Production Research*, 45(17), 3853- 3880, (2007)
23. Larsson, A. et al. Engineering 2.0 – Exploring Lightweight Technologies for the Virtual Enterprise. In: *From CSCW to Web 2.0: European Developments in Collaborative Design*. eEds. David Randall; Pascal Salembier. Springer, 2010. p. 173-191 (2011)
24. Camarinha-Matos, L. M.; Afsarmanesh, H. The Virtual Enterprise Concept. In: *Working Conference On Infrastructures For Virtual Enterprises (PRO-VE'99)*, Oct. 27-28, Porto, Portugal, p. 3-14, (1999)
25. Azevedo, A. L. A emergência da empresa virtual e os requerimentos para os sistemas de informação. *Gestão & Produção*, v. 7, n. 3, dez. (2000)
26. Bremer, C. F.; Molina, A.; Ortega, L. M. Virtual organization models: Brazil and Mexico. *Encontro Nacional de Engenharia de Produção*, 20. São Paulo, USP, (2000)
27. Amato Neto, J. As tecnologias da informação e comunicação (TICs) e as redes dinâmicas de cooperação: um novo paradigma de produção. *Journal of Technology Management & Innovation*, v. 1, n. 4, (2006)
28. Yin, R.K. *Case Study Research: Design and Methods*. Applied Social Research Methods Series, Volume 5, Sage Publications, Thousand Oaks, 3rd ed. (2003)
29. Dubosson-Torbay, M.; Osterwalder, A.; Pigneur, Y. E- business model design, classification, and measurements. *Thunderbird International Business Review*, v. 44, n. 1, p. 5., (2002)
30. Lehmann-Ortega, L.; Schoettl, J. From buzzword to managerial tool: the role of business model in strategic innovation. *CLADEA*, Santiago de Chile. Santiago, p.1-14, (2005)

31. Casadesus-Masanell, R.; Ricart, J. E. From Strategy to Business Models and onto Tactics. *Long Range Planning*, v. 43, n. 2-3, p. 195-215. Elsevier Ltd., (2010)
32. Baldo, F., Rabelo, R.J. and Vallejos, R.V. in *IFIP International Federation for Information Processing, Volume 266, Innovation in Manufacturing Networks*; ed. A. Azevedo; (Boston: Springer), pp. 67-76 (2008)
33. Che Mat, N. A.; Cheung, Y.; and Scheepers, H, "Partner Selection: Criteria for Successful Collaborative Network". *ACIS 2009 Proceedings*. Paper 43. (2009)
34. Hedman, J.; Kalling, T. The Business model: A means to comprehend the Management and Business Context of Information and Communication Technology. *ECIS Proceedings*. Gdansk, Poland. p.148-162, (2002)
35. Weill, P. and Vitale, M. *Place to Space: Migrating to E-business Models*, Harvard Business School Press, Boston, MA. , (2001)
36. Westerlund, M., Rajala, R. and Leminen, S. "SME business models in global competition: a network perspective", *International Journal of Globalisation and Small Business*, Vol. 2 No. 3, pp. 342-58. (2008)
37. Alt, R., & Zimmerman, H. D. Introduction to special section on business models. *Electron Markets*, 11(1): 3-9, (2001)
38. Mason, K. and Spring, M. "The practice of business models", *Proceedings of the 26th IMP Conference, 2-4 September, Budapest, Hungary*, (2010)
39. Brousseau, E. and Penard, T. The economics of digital business models: A framework for analysing the economics of platforms, *Review of Network Economics*, 6 (2), pp. 81-110. (2006)
40. Stewart, D. W., & Zhao, Q. Internet marketing, business models and public policy. *Journal of Public Policy and Marketing*, 19: 287-296, (2000)
41. Yip, G. S. Using Strategy to Change Your Business Model. *Business Strategy Review*, v. 15, n. 2, p. 17-24. (2004)
42. Wikström, K.; Artto, K.; Kujala, J.; Söderlund, J. Business models in project business. *International Journal of Project Management*, v. 28, n. 8, p. 832-841. International Project Management Association, (2010)
43. Teece, D. J. Business models, business strategy and innovation. *Long Range Planning*, 43: 172-194. (2010)
44. Westerlund, M., Rajala, R. and Leminen, S. "SME business models in global competition: a network perspective", *International Journal of Globalisation and Small Business*, Vol. 2 No. 3, pp. 342-58, (2008)
45. West, J. "Value Capture and Value Networks in Open Source Vendor Strategies", in *Proceedings of the 40th Annual Hawaii International Conference on System Sciences (HICSS'07)*, Hawaii, pp. 176-186 (2007)
46. Camarinha-Matos L. M. and Abreu A. Performance indicators for collaborative networks based on collaboration benefits, *Production Planning & Control: The Management of Operations*, 18:7, 592-609, (2007)
47. Romero, D. Mechanisms for assessing and enhancing organisations' readiness for collaboration in collaborative networks. *International Journal of Production Research* 47:17, (2009)