

# TOWARDS THE DEFINITION OF BUSINESS MODELS AND GOVERNANCE RULES FOR VIRTUAL BREEDING ENVIRONMENTS

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*Virtual Organisation Breeding Environments (VBEs) represent an emerging valued added strategy for small and medium enterprises (SMEs), to respond in a competitive way to changing market conditions, through the integration of their capabilities in the configuration of Virtual Organizations. The creation of sustainable VBEs is a challenge that requires new business models based on collaborative and trustable environments. Since the VBE include several types of organisations its business model must consider a multi-value system definition and a multi-stakeholder perspective; that will also call for a new governing approach. This paper presents first attempts in the definition of guidelines for develop Business Models and Governance Rules in VBEs.*

## 1. INTRODUCTION

A Virtual Organisational Breeding Environment (VBE) represents an association or pool of organisations and their supporting institutions that have both potential and interest to cooperate with each other, through the establishment of a “base” long-term cooperation agreement. When one of the members (acting as a broker) identifies a business/collaborative opportunity, a subset of these organisations can be selected to form a Virtual Organization (VO) [1]. VOs are temporally alliances of organisations that come together to share skills or core competences and resources in order to better respond to business/collaboration opportunities and produce value-added products and services, and whose cooperation is supported by computers [1]. The aim of the VBE is to establish the base trust for organisations to collaborate in VOs, reducing the cost/time to find suitable partners for the VO, and the developing new capabilities by the composition of individual organisations’ capabilities [1].

For VBE creation is important to identify sustainable Business Models that support its daily operation and value generation. According to Osterwalder [6] a business model is a conceptual tool containing the set of objects, concepts and their relationships with the objective to express the business concept. It is a simplified

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Please use the following format when citing this chapter:

Romero, D., Galeano, N., Giraldo, J., Molina, A., 2006, in IFIP International Federation for Information Processing, Volume 224, Network-Centric Collaboration and Supporting Fireworks, eds. Camarinha-Matos, L., Afsarmanesh, H., Ollus, M., (Boston: Springer), pp. 103–110.

description and representation of the business idea – how it will make money and how it will be sustainable. In short, a VBE business model should define its organisational structure and describes how this VBE delivers products and/or services to create tangible and intangible values all its stakeholders.

Together with the definition of a VBE business model, the identification and clarification of its governance model is also important, it is required to define the operational rules, bylaws and principles that will govern the behaviour of the members of the VBE during its lifecycle. The challenge is the global acceptance of those rules and bylaws by all the members in the VBE. This paper presents some guidelines for develop VBE business model and VBE governance rules.

## 2. GUIDELINES FOR DEFINE A VBE BUSINESS MODEL

Considering the VBE context, two important characteristics are identified to define its business model: 1) a multi-value system, including the identification of different values: economic, social and knowledge; 2) a multi-stakeholder approach, identifying each stakeholder participation in value generation process.

The guidelines for define a VBE Business Model presented in this paper are based on the Methodology for Business Model Definition of Collaborative Networked Organizations [5], which uses Osterwalder's business model ontology [6]. This ontology is based on four pillars and nine building blocks (see Table 1). These pillars were adapted considering the main characteristics of a VBE: the multi-value proposition and the multi-stakeholder approach. The definition of each element in the VBE business model will allow the description of the business concept and will help to identify critical variables to observe in a particular VBE.

Table 1 – Definition of Business Model Pillars based on Osterwalder Ontology [7]

Pillar	Building Block	Definition
Product	Multi-value Proposition	Value offered to the stakeholder/customer (What).
Multi-Stakeholder Interface	Target Stakeholders	Target stakeholder/customer and target market (Who).
	Distribution Channel	Channels to reach the market and the customer/stakeholder.
	Stakeholders Relationship	Links and strategies to maintain customer/stakeholder relationship.
VBE Infrastructure Management	Multi-Value Configuration	Activities and resources arrangement necessary to create value for the customer (Value Configuration - How).
	VBE Capabilities	Capabilities will be integrated to underpin the VBE value proposition.
	Partnership	Strategic alliances, joint-ventures and long-term partnerships.
Financial Aspects	Cost Structure	Costs incurred in the creation, marketing and delivering of value.
	Revenue Model	Definition of the business model economic sustainability.

### 2.1 Product Pillar Definition for a VBE

**VBE Multi-value proposition:** The multi-value proposition of the VBE should be unveiled by the same primary questions used to define the nature and opportunity of any business: What are the needs to be satisfied? What are the main benefits for the stakeholders? Which are the offering and the advantages for the VBE stakeholders?

In the VBE business model the central value proposition for its stakeholders is the creation of a supporting environment based on ICTs, which provides common grounds for interaction/collaboration, and facilitation of VO establishment. The VBE will offer, as part of it central value proposition, a bundle of services for: establish a base of trust for organisations to collaborate in VOs; reduce the cost/time to find sustainable partners for VO configuration; assist with the dynamic VOs re-

configuration; provide some commonality for interaction; and an accepted business culture that includes cooperative business rules. Next table shows a generic value propositions for the main stakeholders involved in a VBE business ecosystem.

Table 2 – Multi-Value Proposition Definition for a VBE

Stakeholder	Value Proposition
<b>VBE Member</b>	<p>A VBE offer to its members a set of services for collaboration and integration that support the creation and operation of VOs. These services can be grouped in:</p> <ul style="list-style-type: none"> <li>▪ Core competencies identification services (tools, methodologies, guidelines for proper identification of VBE members' core competencies).</li> <li>▪ VO support services (services that support the VO creation and operation).</li> <li>▪ Trust building services (services related to enhance the collaboration among its members).</li> <li>▪ Commercialization/Marketing related services (marketing VBE member's competencies and assets).</li> <li>▪ Business process improvement services (derived from best practice implementation).</li> <li>▪ Support institution's related services (services that can be offered through the support institutions, such as financial, consulting or IT services).</li> </ul>
<b>VO Brokerage Team</b>	<p>A VBE offer to the brokerage team a set of services for collaboration and integration that support the VO lifecycle. These services can be grouped in:</p> <ul style="list-style-type: none"> <li>▪ VO creation services (information about VBE members profiles, competencies and performance history; negotiation and contracting tools; tools for identifying new business/collaborative opportunities; market monitoring tools; planning tools).</li> <li>▪ VO management services (project management tools; performance measurement and monitoring tools; decision support tools).</li> <li>▪ VO quality assurance services (good metrics for quality assurance in product/service delivery of VBE members should be accomplished).</li> </ul>
<b>Support Institutions</b>	<ul style="list-style-type: none"> <li>▪ A VBE offer to the support institutions access to new customers (members of VBE), opportunities to develop collaborative projects, and opportunities to increase its knowledge base.</li> </ul>

## 2.2 VBE Multi-Stakeholder Interface Pillar Definition

**VBE Target Stakeholders:** This building block focus on identifying the target stakeholders/customers with all their characteristics. Main questions to be answered are: Who are the target stakeholders? Who are the potential VBE members and support institutions? What are their needs?

The VBE potentially addresses all organisations (essentially SMEs) with the potential and the interest to cooperate with each other, through the establishment of a “base” long-term cooperation agreement [1]. Table 3 presents main VBE stakeholders with their main characteristics and needs.

Table 3 – VBE Target Stakeholders

Stakeholders	Examples of stakeholders	Characteristics to be identified
<b>VBE Member</b>	<ul style="list-style-type: none"> <li>▪ Large, Medium and Small Enterprises</li> <li>▪ VO Broker</li> <li>▪ VO Planner or Integrator</li> <li>▪ VO Coordinator</li> <li>▪ Support Institutions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify its competencies and capabilities (products/services, human resources, physical resources, ICT, process, practices).</li> <li>▪ Identify their specific needs.</li> <li>▪ Identify its location.</li> </ul>
<b>VO Brokerage Team</b>	<ul style="list-style-type: none"> <li>▪ VO Broker</li> <li>▪ VO Planner or Integrator</li> <li>▪ VO Coordinator</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify its brokerage capabilities.</li> <li>▪ Identify their specific needs related with the brokerage process.</li> </ul>
<b>Support Institutions</b>	<ul style="list-style-type: none"> <li>▪ VBE Advisor, VBE Service provider and VBE Ontology provider</li> <li>▪ Industrial Associations, Chambers of Commerce, Regional Development Agencies</li> <li>▪ Universities, Government Entities and Financial Institutions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify its offer of products and services.</li> <li>▪ Identify its competencies and capabilities.</li> <li>▪ Identify their specific needs.</li> </ul>

**VBE Distribution Channel:** Distribution channels are the mean of getting in touch and interact with VBE stakeholders. Main questions that should be answered are: Which communication channel is established among the VBE and its stakeholders?

Does the VBE offer its services/products through other companies that offer complementary products or services? In a VBE the main media to interact with stakeholders is the collaborative ICT platform (environment for virtual collaboration and cooperation); usually this platform is web-based. The internet is then, the main delivery and communication channel. The VBE can also use viral marketing and co-brand strategies to offer its products and services. Traditional distribution channels such as, television, radio, newspapers, among others can be used.

***VBE Stakeholders Relationship:*** The relationship describes the kind of links that a VBE establishes with its stakeholders. Main issues that should be addressed are: Which are the types of relationships that a VBE should establish with and among its members, brokerage team and support institutions? How are these relationships achieved? The VBE must develop trust-based relationships among its stakeholders and especially among its members. Sometimes members that can participate in a VO do not necessarily know each other, the VBE should provide confidence and trust supporting the collaboration process. There are certain number of mechanisms to build trust in the VBE, such as, performance records, mediation services, third party verification and privacy policies [2]. The ICT collaborative platform supports the stakeholders' relationships offering the right information at the right time and trust-related services.

### **2.3 VBE Infrastructure Management Pillar Definition**

***VBE Multi-Value Configuration:*** A multi-value configuration describes the arrangement of activities and resources that are necessary for the creation of value. Main VBE business processes that support the multi-value configuration in a VBE are: 1) Marketing and commercialization, in two directions: promote capabilities of VBE members, and increase VBE members' base; 2) VO service provisioning, including services that support VO lifecycle, cooperation and collaboration; 3) Enhancement of trust and loyalty; and 4) Business process improvement derived from best practice implementation. One way to evaluate the multi-value configuration is through the identification of the value balance for each stakeholder. Table 4 present one general balance for the VBE member value proposition which should be achieved with the deployment of the VBE business processes.

***VBE Capabilities:*** A capability is the ability to execute a pattern of actions [9] necessary in order to create value. Questions to be answered in this building block are: Which resources should the VBE have? How can the services of the VBE be expanded? Main VBE capabilities are: 1) Offer services to its members, such as brokering, legal, marketing, insurance services; 2) Offer common base ICT infrastructure; 3) Support cooperative business rules; 4) Offer a VBE bag of assets that will be shared by its members; 5) Offer services that support VO creation process; 6) Evaluation, qualification and certification of VBE members; and 7) Manage the VBE organization and its infrastructure.

***VBE Partnership:*** A partnership is a voluntarily initiated cooperative agreement between external organisations to the VBE in order to create value for all the stakeholders, especially VBE members. Main questions to address are: Which are

the partnerships developed? What is the reason for the partnership? How is achieved the involvement of partners? VBE support institutions are the main partnerships developed. Support Institutions complements VBE service offer (Table 3 presents main support institutions). Partnerships can be also developed with any organization with the capabilities to eliminate the competencies gap that VBE may have; the VBE should consider these new partners as potential members according to the governance rules defined.

Table 4 – Example of Multi-Value Configuration Definition for VBE Members

Value Type	Receive	Offer
Financial	<ul style="list-style-type: none"> <li>▪ Opportunity to increase incomes as result of the participation in business/collaborative opportunities.</li> <li>▪ Access to VBE services at a low cost.</li> <li>▪ International marketing.</li> <li>▪ Possible financial support or funding from government and financial institutions.</li> <li>▪ Reduce project costs and R&amp;D costs by splitting the investment with several VBE members.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Competencies in terms of resources, processes, practices, products/services and associated partners.</li> <li>▪ Joint purchases to increase negotiation power.</li> <li>▪ Branding transfer.</li> <li>▪ VBE membership payment.</li> </ul>
Technological	<ul style="list-style-type: none"> <li>▪ ICT resources that support collaborative work.</li> <li>▪ Use of a Profile and Competence Management System.</li> <li>▪ Technical support from different institutions.</li> <li>▪ VBE bag of assets (technological shared assets)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide information to create a VBE member profile with its competencies.</li> <li>▪ Professional advice to other VBE members.</li> <li>▪ Technological assets that could be shared.</li> </ul>
Knowledge	<ul style="list-style-type: none"> <li>▪ Opportunity to receive training.</li> <li>▪ Help in the definition of best practices during the evaluation in VBE recruitment process.</li> <li>▪ Knowledge transfer between VBE members.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Contribute to the body of knowledge of the VBE.</li> <li>▪ Share best practices and lessons learned.</li> </ul>
Social	<ul style="list-style-type: none"> <li>▪ Development of relationships between VBE members and support institutions.</li> <li>▪ Development of collaborative culture.</li> <li>▪ Reduction of risk in project collaboration.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Openness to start relationships between VBE members and support institutions.</li> <li>▪ Individual social and cultural values.</li> </ul>

## 2.4 Financial Aspects Pillar Definition for a VBE

This pillar includes two building blocks: cost structure and revenue model, referring to the definition of the VBE business model sustainability (financial performance and growth potential). Four activities should be performed in the creation of a VBE related to financial aspects: 1) identification of the investment required; 2) definition of mechanism to assure cost-effectiveness; 3) definition of: membership/ pricing policy, tariff structure, expenses policy, and analysis of the revenue stream; and 4) conceptualization of the accounting/financial system, and determination of the financial and growth indicators [5]. Questions to be answered in this pillar are: Which are the revenue model, the cost structure and the business model's sustainability of the VBE?

**VBE Cost Structure:** The cost structure is the representation in money of all the means employed in the business model. General VBE cost structure may include: ICT cost, staffing costs, billing costs, marketing costs (promotion/communication), general and administrative costs and operational cost. It is important to mention that the cost structure depends on each VBE type.

**VBE Revenue Model:** The revenue model should describe the way a VBE makes money and achieve its sustainability through a variety of revenue flows. Different types of revenue model can be used according to the type of VBE: membership fee,

VO commissions over business opportunity, external funding (government, research funds, banks etc.) and service transaction-based fee. In order to clarify the financial aspects of the VBE and the situations that may occur, Figure 1 shows through a value map a general VBE value transfer. The money flow is represented with the symbol "\$", and can be analyzed in more detail if specific amount of money are evaluated in a total balance (what is received vs. what is paid) per each organization. This value map was developed using Gordijn e<sup>3</sup>value tool [4] and gives a practical idea of all the actors involved in the VBE and its value transfer.

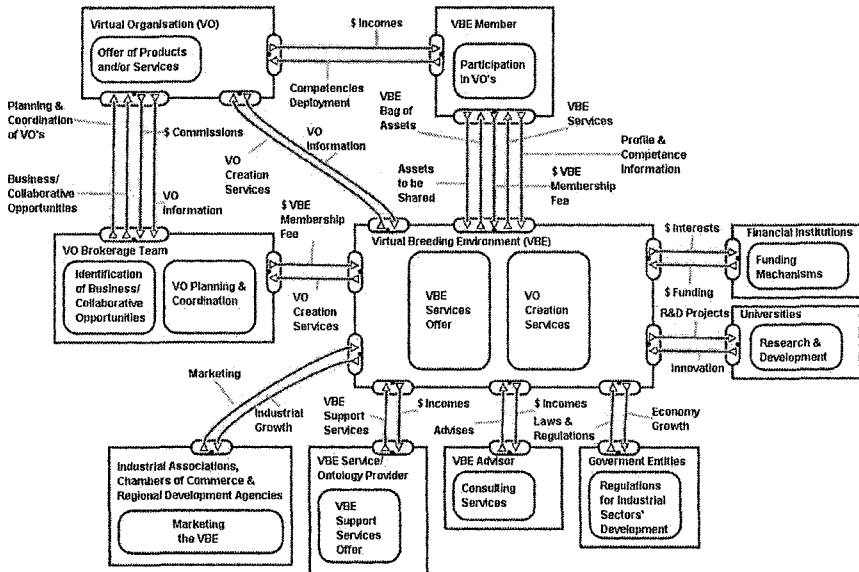


Figure 1 – VBE Value Map using e<sup>3</sup>value [4]

### 3. GUIDELINES FOR DEFINE VBE GOVERNANCE RULES

The governance word suggests the notion of steering, and in the most of the cases refers to the use of structures of authority and even collaboration, to allocate resources and coordinate or control activities in organisations. The governance term in VBE context is specifically aimed to describe the approaching process for facilitating and improving business/collaborative opportunities, as well as guaranteeing the sustainability and correct performance of all stakeholders involved. VBE Governance includes the definition of: principles, Bylaws, Functional Rules and Behavioural Rules.

**Principles:** values that govern a person or organisation behaviour, they constitute personal guidelines for stakeholders to behave within a VBE. They are referred to the social attitudes which will obviously impact VBE operational performance, such as honesty, trust and integrity, openness, performance orientation, responsibility, accountability, mutual respect and commitment to the organisation.

**Bylaws:** formally declare rules of operation which will regulate stakeholders' behaviour. VBE bylaws will define the regulations concern with the definition of stakeholders' roles, memberships, incentive and sanctions, ethical code, security principles, ICT use, conflict resolution policy, and establishment of financial policies. VBE principles and bylaws represent a global schema under which a VBE will control and monitor the performed activities of its stakeholders along the VBE lifecycle. Other important elements to bear in mind, when defining VBE principles and bylaws are: representation of those global and common activities for any VBE lifecycle stage, administration processes (accountability), management roles nomination and renewal processes, contract enforcement policy, and purchasing and management of outsourced services.

**Rules:** divided in two groups related to: stakeholders' behaviour and VBE functions.

*VBE Behavioural Rules* refers to the rules for good acting and conducting, including the ethical behaviour (ethical code) and culture. The ethical code will support trust building process in order to guarantee the social and operational sustainability of VBE. VBE culture comprises all organisation's beliefs, knowledge, attitudes, customs and socio-organizational aspects. The primary requirements for a proper collaboration culture in a VBE can be associated to: commitment, leadership, trust, self-learning, long-term and global vision, effective communication, innovation, sharing attitude, awareness for win-win development of business/collaborative opportunities, no discrimination, preparedness for collaboration, and recognition of merits for self-organizing leadership. It is important to mention that the VBE culture may result in part from managers' beliefs, but it also can result from VBE members' beliefs (opinions/approaches).

*VBE functional rules* support both operational and administrative processes along all VBE lifecycle stages (creation, operation, evolution, metamorphosis and dissolution). A general guide to establish the most important operational rules for VBE lifecycle supporting right activities execution is: general management and support process, business process management, membership management and knowledge management. Most of these tasks for defining VBE governance model are given to VBE manager and/or VBE advisor (for instance a specialized professional in laws, or an experienced support institution as consulter in network managing). The VBE manager will be in charge of administrating all tasks for the right daily performance of the VBE (assignment/reassignment of responsibilities, conflict resolution, making common VBE policies, etc), mean while the VBE advisor can serve as specialist consultant in some of these tasks [8]. Finally, the definition of specific governance rules will depend on many criteria as type of VBE, amount of members, past performance records, among others.

#### 4. CONCLUSIONS AND FURTHER RESEARCH

This paper provides the guidelines to define a VBE business model considering a multi-value system characterization and a multi-stakeholder perspective, proposing at the same time the main elements to be concerned in approaching a VBE governance model. Furthermore the VBE governance model is based on the principles of collaborative business and resulting of a first approach through definition of rules and bylaws to achieve a good VBE governing. All this guidelines

can be easily instantiated in different VBEs according to the industrial sector of its members, and the market characteristics and constraints.

The visualization of the VBE business model with a value network representation using the e3value tool gives a practical idea of all the actors involved in the VBE business and the value transfer among them (including money transfer).

The VBE business model guidelines proposed represent a contribution towards the definition of business models and eventually business processes for Collaborative Networked Organizations (CNOs).

Guidelines above described related to the VBE governance, represent a general approach to conduct the process of defining the principles, rules and bylaws in order to govern internal and external structure and functioning issues of a VBE, depending on the specific sector where it will perform its activities.

## 6. ACKNOWLEDGEMENT

The research presented in this document is a contribution for the ECOLEAD Project, funded by the European Community, FP6 IP 506958. The authors wish to acknowledge the support of the Innovation Center in Design and Technology from ITESM - Campus Monterrey.

## 7. REFERENCES

1. Camarinha-Matos, L., Afsarmanesh, H. and Ollus M. (2005). "ECOLEAD: A Holistic Approach to Creation and Management of Dynamic Virtual Organisations". Collaborative Networks and Their Breeding Environments. IFIP Working Conference on Virtual Enterprises. Springer. pp 3-16.
2. ECOLEAD D21.4b (2006). "Creating and Supporting Trust Culture in Virtual Breeding Environments". Editors: Afsarmanesh, H.; Msanjila, S.; Hodík, J. and Reháč, M. ECOLEAD Project: Internal Document Deliverable.
3. Fensel, D. (2001). "Ontologies: Silver Bullet for Knowledge Management and Electronic Commerce". Heidelberg, Springer-Verlag, 2001.
4. J. Gordijn and J.M. Akkermans, "e3-Value: A Conceptual Value Modeling Approach for e-Business Development", PDF document, Proceedings of K-CAP 2001, First International Conference on Knowledge Capture, Workshop Knowledge in e-Business, pg 29-36.
5. Jimenez, Guillermo, Galeano Nathalie; Nájera, Teresa; Aguirre, José Manuel; Rodríguez Ciprian, and Molina, Arturo (2005). "Methodology for Business Model definition of Collaborative Networked Organizations". Collaborative Networks and Their Breeding Environments. IFIP TC5 WG Sixth IFIP Working Conference on Virtual Enterprises, 26-28 September, 2005, Valencia Spain. Springer.
6. Osterwalder, A. (2004). "The Business Model Ontology a proposition in a design science approach (PhD-thesis)". Lausanne University, Switzerland. <http://www.hec.unil.ch/aosterwa/PhD/> pp. 42-102.
7. Osterwalder A.; Ben, Lagha S. and Pigneur, Y. (2002). "An Ontology for Developing e-Business Models". DSIage. <http://www.hec.unil.ch/yp/Pub/02-DsiAge.pdf>
8. Plüss, Adrian and Huber, Charles (2005). "VirtuelleFabrik.ch – A Source Network for VBE in Mechatronics". Virtual Organizations Systems and Practices. Edited by Luis M. Camarinha-Matos, Hamideh Afsarmanesh and Martin Ollus. Ed. Springer. pp. 255-264.
9. Wallin J. (2000). "Operationalizing Competencies". 5th Annual International Conference on Competence-Based Management, Helsinki, June 10-14.