

# VO Breeding Environments Value System and Metrics

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## INTRODUCTION

The concept of virtual organization breeding environment (*VBE*) has emerged as the necessary context for effective creation of dynamic virtual organizations (Afsarmanesh & Camarinha-Matos, 2005). One important element to be considered during the VBE operation life-cycle stage is value generation. A virtual breeding environment is a “*value network*” that should create different types of values such as goods, services, revenue, knowledge, and/or intangible benefits (Allee, 2000). Aimed to achieve the identification of values generated in a breeding environment, the present article reports research issues related to the definition of the VBE value system and metrics.

The *VBE value system* presented in this article will include the identification of the *value generation objects* (or capitals) in a virtual breeding environment and its *performance measurement system*, involving not only financial value generation objects but also the intellectual value generation objects (such as human capital, structure capital, innovation and learning capital, relational capital, and identity capital). Along with the VBE performance measurement system, the identification of potential incentives and sanctions are also described. Additionally, the identification of VBE *ethical values* are also studied through the definition of its culture and ethical code.

## BACKGROUND

According to Mariotti (2002), a *value network* is an interactive combination of information machines, and people. Value networks are concentrated in creating

value in each node. Fjeldstad and Haanæs (2001) claim that value creation in a value network does not lie in transforming objects per se, but in their mediation. The strength of a value network originates from cooperation and interaction among participating organizations. According to Haglund and Helander (1998) cooperation is motivated by increased revenue and reduced cost. The customer is the one in charge and other organizations manage their activities around it. An organization is chosen to be a member of the network because of its unique competencies (Haglund & Helander, 1998). There is an active function of choice. A value network is not seen as bound to certain region; it can even be global. The concept of industry is included in the discussion of value networks, but organizations inside a value network can be parts of different industries.

The VBE value system will help to identify the complex of dynamic exchanges between participants in the value network and explain how the different types of value are created through a set of relations between *VBE actors*.

## VBE Value System

For a complete definition of a value system, it is important to understand the term value and the types of values that are involved in a value system, and how these values can be measured. The term *value system* is defined as the ordering and prioritization of a set of values that an actor holds, exchanges, and creates; in this case, the “actor” is the virtual breeding environment. And, since value is multidimensional, the VBE value system should consider economic and ethical values.

The definition of a value system in a VBE context is based on the Parolini’s (1999) notion that “each

product/service offered requires a set of value creation activities that are performed by a number of actors forming a value creating system,” this offered happens in the VBE through its members and the creation of virtual organizations (VOs). As a result, a value system according to Afsarmanesh and Camarinha-Matos (2005) is important in terms of:

- Regulation role—for instance, to assure social cohesion, to understand member’s behavior and to build performance indicators.
- Transactions mechanism between partners such as to assure an equality utility between objects exchanged.

However, the emergence of new roles, new actors, and the continuous and repetitive interactions among partners figure that the value of a collaboration process is no longer determined only by its tangible assets (given by products/services supplied), but also by its intangible assets (e.g., value of relationships or “social capital”).

The definition of a *value system* for a virtual breeding environment is an important aspect for its strategic and operational management because a VBE value system allows the identification of the main elements that generate value in a VBE. This value generation should be evaluated from different perspectives: the different values that can be generated (economical, ethical, cultural, social, and strategic) in the breeding environments and the different VBE stakeholders that participate in value generation (VBE members, support institution, VBE administrator, opportunity broker, VO planner, VO coordinator). A value system should then include both economical and ethical values. Ethical values should guide and support the creation of economical value.

### Value and Performance Measurement

After the concept of value system is defined, the next step is to consider how values are going to be measured. Although a value system includes both economical and ethical values, usually the measurement is focused on the economical values, including tangible and intangible values. Ethical values are part of the behavior in an organization, and they support the legibility of their economical value creation process.

For the measurement of economical values (tangible and intangible), three important concepts should be considered: performance management, measurement,

and metrics (Lichiello & Turnock, 1999). These elements are present in the different models and methods that organizations use for performance measurement (Sveiby, 2002).

Some financial (financial capital) and nonfinancial (intellectual and social capital) methods and models have been proposed by different authors (Brooking, 1996; Carrillo, 2002; Edvinsson & Malone, 1997). Usually organizations should select the most appropriate model for measuring the value generated depending on purpose, situation, and audience (Sveiby, 2002). Two of the most used valuation methods are the European Foundation for Quality Management (EFQM, 2003) and the BSC (2007); both have a list of measures to evaluate different perspectives in an organization. Nevertheless, these methods focus on one organization and not in a network of organizations, so in order to apply them in a VBE context, they should be adapted considering the main elements in a collaborative networked organization.

### VBE VALUE SYSTEM ELEMENTS

The VBE value system includes the following main elements:

- The value generation objects or capitals in the VBE, in terms of tangible and intangible values.
- The performance measurement system that will include not only significant performance indicators for VBE members, VOs, and the VBE as whole but also the definition of incentives and sanctions.
- The definition of ethical values that will be supported by the code of ethics, culture, and rules that will govern the VBE.

### Value Generation Objects: Capitals in an Organization

The value generation objects in organizations are the different types of capitals that an organization holds. Capitals in an organization represent its bag of assets. We can identify three types of capitals: the financial capital related to all physical assets (that generates tangible values) and the intellectual and social capitals

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