Innovation and Value Models: a Conceptual Overview

Giana Lorenzini[*], Cláudia Libânio[**], Heloisa Helena Weber[*], Juliana Parise Baldauf[+]

[*] PPGEP/ Universidade Federal do Rio Grande do Sul
[**] PPGEP/ Universidade Federal do Rio Grande do Sul; Business Administration/ UniRitter
[+] NORIE/ Universidade Federal do Rio Grande do Sul

Email: giana@producao.ufrgs.br, clasl@terra.com.br, heloisa@producao.ufrgs.br, jparise@ibest.com.br

Abstract

The macroeconomic changes in 20th century have had a major impact in the way of thinking business models and also in the way of conceiving the relations of value between firms and customers. From a financial perspective to a multidimensional perspective, the concept about value has evolved to the experiences of consumption, trademarks, perceived quality, design and others. The new organizational relationships were expanded into value systems, the understanding of innovation and its importance in business. In such context, this exploratory study aims to build a conceptual and critical overview about the value concept evolution, considering the economic, productive and business management dimensions. The most important findings show the differences among theoretical lines of research. A comparison is proposed between the innovation generations and value concepts. The changing in the perception about the 'value created for the customer' is also highlighted. Furthermore, it is possible to point out that new measurement systems to the innovation processes, based on the researched models, are necessary to help companies to create value along their networks.

Keywords: conceptual overview; innovation; value concept evolution; value creation.

1 Introduction

The concept about 'value' has evolved over time in different theoretical lines, which run through areas like Engineering, Business Management and Economics. This crossover becomes more intricate when evaluating the major restructuring of production and consumption models shaped in 20th century. For several decades, the value relations were understood as the ratio between the product's function and its price.

In the 21th century, the structures made one hundred years earlier have given support towards a society driven by information and focused on intangible assets. Associated with the consumption's development, the traditional axiom about product and its costs still exists, but is no longer used as a great stigma to orient business models and the consumer experiences.

In this scenario, value systems can be drawn, composed by the understanding about the production reality contrasted with the complexity of expectations in the consumer market. All this together encompasses a set of activities that create value, since the basic source of raw materials to the delivery to the consumer (Shank & Govindarajan, 1993). Value systems can be seen as a possible way to innovate in design, product, marketing techniques or customer service. So innovation can be inserted within business, focused in the consumer in its demands to effectively create value (Simantob & Lippe, 2003).

Considering the way society is heading its consumption modes, both tangible and intangible, this study assumes that innovation is embracing changes to create value (Stamm, 2011). The main objective of this paper is to propose an overview about value concept evolution in a triple dimension, composed by economic, productive and management factors. The approach between value concept and innovation is also considered in the study.

The study is exploratory, which allows a detailed discussion of the topic. Theories and models about engineering, business and economics were researched from the literature. From the references, a

interlacement of the value concepts was made, followed by a critical panel about the theoretical models researched and the possibilities that society is building to rearrange and create value and proximity with the customers.

Finally, there is not only the presentation of the value concept, but also their imbrications along the lines that define innovation in business. The theoretical findings presented here can be reviewed by companies and can also support new ways of thinking business models in different kind of organizations.

2 The Structuring of Production Models and the Value Concept

The value concept has evolved along with the changes in business management and in the technological developments of each era. Through it, it's possible to identify milestones that have broken the dominant logic, overlapping traditional precepts. Such adaptations have changed the relational set between producers, consumers and consumer experiences. Thus, the structuring of business models was directly impacted by the rearrangements of the market and how this rearrangement was perceived and valued by consumers.

In the early 20th century, two organization forms in the factory system have affected the 'modus operandi' within the companies in the subsequent decades. The Taylorism has structured the technical labor division, assigning to each operator a given function, prioritizing the task in the shortest time possible. In its turn, Fordism has spread the Frederick Taylor's theory to institute it in the constitution of the assembly line, starting the production of Ford Model T. Henry Ford began to use assembly lines to manufacture cars, applying the same principles developed by Taylor, but with a more comprehensive strategy about production, mechanization (machinery, specialized tools, conveyor belt) and labor division. Both production models have established the rationality inside the production system, aiming to maximize the profit (Matos & Pires, 2006). Moreover, both Taylorism and Fordism have innovated in the way to plan and to design productive systems with strong consequences to the decades later. The conception about value, in this case, was related to the productive arrangements and the optimization of tasks and products.

According to Levitt (1990), the belief in the growth and affluence of the population, the substitute's absence, the exaggerated faith in mass production and falling costs per scale were driving organizations to focus on the products developed. The companies were thinking their business on products, without realizing the dynamics and the changes that were occurring in all consumption segments. This period was characterized as the 'Age of Production', in which it was believed that good products could just sell themselves, without considering the customer's opinion and desires about it (Czinkota *et al*., 2001). In this era, value was thought just as tangible value, related to cost reduction.

During the 30s, the pressure for improvements in working conditions changed the rationalist model. The Sociotechnical System and the School of Human Relations started to operate. In the same period, Maslow's studies have contributed to review the relationships between customers and products proposing a model composed of five basic needs of human beings, classified as basic, physiological, safety, esteem and self-realization (Formoso, 2010). So value has started to be considered in the production modes.

The unfolding of the Second World War brought the consequence of economic disruption. The industrial processes were reviewed to deal with the lack of resources and the need to develop a consumer market. Thus the 'Age of Sales' brought up, in which companies were trying to sell what they used to produce, instead of producing what the market really demanded. In this context, the marketing department still used to have a secondary role comparing to other areas inside the companies and the value concept was not thought as something related to the customer (Czinkota *et al*., 2001).

In this sense, the industrial world has had to be adapted to a system of multiple productions (Ohno, 1988). Pozo (2010) pointed out that until the early 50s, the markets were local and limited, lacking concern about customer satisfaction. From the 50's, the marketing discipline began to become more

evident. Czinkota *et al.* (2001) featured the 'Age of Marketing' as an important period that has started to identify and to meet the customer's needs and desires prior to the product production. For Kotler and Keller (2006), the consumer has begun to introduce new capabilities in the consumption way, using lots of information to interact and to compare impressions about the greater variety of goods and services available. Then, new practices and tools were to be considered by the companies to measure the quality of its processes and the satisfaction of consumers on products – extended to goods and services.

One such practice used worldwide, related to market monitoring, has began to be widespread in the mid-70s. According to Camp (1998), the benchmarking technique was introduced by Xerox in the 1970s. At the 80s, this practice was widespread worldwide, ten years after, its use has been consolidated inside organizations in Europe and North America. Camp (1998) added that leading companies such as Motorola, Ford, Du Pont, Kodak, among others still use benchmarking to improve quality and productivity in their market segments.

As an exponent of this period, there was the Toyota Production System, developed at the Toyota car factory, and expanded beyond the automobile borders to the Lean Production System. The Lean Production System can be understood as a business model focused on increasing customer satisfaction through a final set of principles and practices that promote continuous improvement (originally called 'kaizen' in the Japanese expression) and reduction of production losses at the corporate level (Scaffede, 2002; Lean Institute Brasil, 2011). It's guided by the purpose of creating value for customers with lower costs by identifying process improvement through the involvement of qualified and motivated workers (Lean Institute Brasil, 2011). Lean Production System prizes for simplicity and clarity of procedures and tools, with the effective use of technological innovations in products, processes and management (Silva Neto, 2000).

The contrast between Fordism and Lean Production is visible in the relationships built by each model. While the first one has sought to reduce unit costs of products through large-scale production, the Lean Model has aimed at the production of small batches and more variety of products. The Toyota Production System's foundations have started the philosophy about the absolute elimination of waste through increased automation, and operation mode through just in time to produce the product required by the market, controlling the amount of materials and the quality assurance of the final product (Monden, 1993). As proposed by Gudem *et al.* (2011), Lean is "an operational philosophy aimed at maximizing customer value while minimizing non-value-added activities, known as waste".

Since the 80s, business models have started to maximize value, considering the value chain from the suppliers until the customers. The New Information Era added more services and data to products, improving customer's experiences. Technology was not else based in manufacturing, as before, starting to be based on information. From this point of view, it is possible to see "(...) a company as an environment and as a set of relationships combining different values consisting of services, products and knowledge about the contexts into customer benefits and experiences (Randmaa *et al.,* 2011).

The evolution of production systems together with the respective theoretical models that underpin them are the basis for the development of innovation processes. As described before, the investments of entrepreneurs like Ford gave the starting point for series of radical proposals or subsequent incremental development in the production models. In its turn, the Lean System has started to focus on the understanding about customer, in order to separate value-added activities from waste (Gudem *et al.*, 2011).

The Figure 1 represents the concepts and theories drawn not in a linear way, but in a puzzling way where is possible to see the relation between the decades in a triple view of Engineering, Business Management and Economics. The crossing, unlike a linear proposition, shows the difficulty in separating areas of knowledge which eventually merge into the dynamism of the business.

Through this proposal the years between 1990 and 1910 show a decade with the launch of the assembly line, conducted by the Ford's and Taylor's models. The 20s present the integration between man and machines and a new orientation for sales. Between 1920 and 1940 the interdependence between

organizations was increased and the Human Theory was developed. The decade after has proposed the Technology-push and other important concepts about management presented by Drucker (1954) and Schumpeter (1942). A marketing orientation and the market pull came between 1950 and 1970, establishing a contrast with the technology-push model. The 80s were performed with the Toyota System philosophy and a total quality programs. The services revolution and the improvements in microelectronics created a scenario to the development of the technology information systems in the 90s. The amplitude of innovation models incorporated to business models became clear between 2000 and 2010, as presented by Koskela (2000), Hansen and Birkinshaw (2007) and Hamel (2007).

Figure 1: Concepts and theories of Engineering, Management and Economics. Source: Adapted of Ansoff and Mcdonell (1993); Bateman and Snell (1998); Robbins and Coulter (1998), Paula, I. C. (2004).

2.1 Value and Innovation Approach

Although the role of innovation debated in today's business environment, through the theoretical framework presented was possible to perceive the closeness between value concept and the innovation approaches. Over time, the models that have influenced the scenario of economic and social development have always been supported by a change in the way of thinking business models.

As presented by Randmaa *et al.* (2011), the value concept is knotty with the changes in the production models and its consequences in society. They argued that the most relevant impact from the Fordism to a New Information Era is the shift from a product and firm centric to a product and service systems, based on customer experiences. The economy has become more transparent as well the customers have become smarter, more demanding and networked in a non-stop process that is still evolving through dynamic and constant interactions and relationships.

According to the Theory of Economic Development (Schumpeter, 1982), entrepreneurs use innovation to create strategic advantage. There is a constant search for new ideas, which can destroy the old ones, introducing new rules and new sources of profits. Schumpeter (1982) proposed three basic phases to the innovation process: (1) Invention, as result of a discovery process, potentially open for commercial exploitation, but not necessarily realized; (2) Innovation, as the process of developing an invention on a commercial basis, (3) Diffusion, as the expansion of a commercial innovation, new products and processes (Schumpeter, 1982).

For Rothwell (1994), innovation can be distributed in five different generations that are compared here with value's levels, proposed by Randmaa *et al.* (2011). The first one innovation generation is called technology-push, assuming that a large process of internal development (R&D) could produce results in new products success, i.e., innovation would be pushed by technology developed internally by the company, as can be seen in Figure 2.

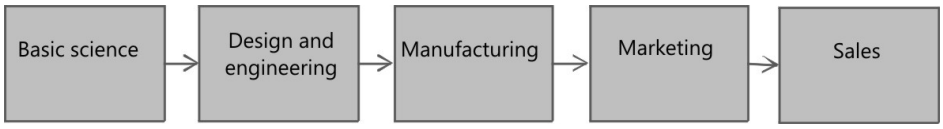

Figure 2: Technology-push model innovation process. Source: Adapted of Rothwell (1994)

The technology-push model emphasizes the process of offering technical and scientific development as a basic mechanism, i.e., as a result of programs related to R&D. This model is usually associated with radical changes linked to technological research which are then introduced into the market (Verganti, 2008).

In the market-pull model, innovation is represented as a choice among the organization's technical possibilities of each organization and the market demands identified, followed by the understanding about customers' needs and the subsequent research on technology that can serve them (Verganti, 2008). This model is considered the second generation of innovation, in which the market is the source of ideas, driving the R&D that is merely a reactive role in the process (Rothwell, 1984), as presented in Figure 3.

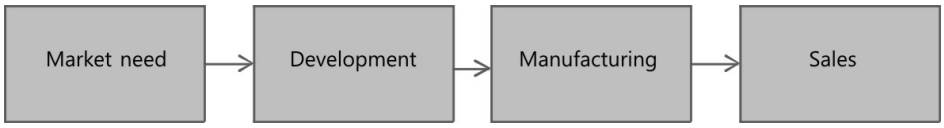

Figure 3: Market-pull model innovation process. Source: Adapted of Rothwell (1994)

Sierra, Rodrigues and Coradini (2010) present the technology-push concepts (pressure in the supply of technology) and market-pull (market demand) as complementary to innovation.

On the other hand, Kline and Rosenberg (1986) argued that innovation does not have uniform size, is not always marked by the beginning of research processes and should not be seen as a well-defined and homogeneous element that falls in the economy at a specific time. These authors stressed the need of adopt a model to consider the non-linear dimension of innovation. Thus they proposed the Chain-Linked Model, which considers five elements in the innovation process: market potential, invention and/or production of a design analysis; detailed design and testing; redesign and production; distribution and trade. The Chain-Linked Model emphasizes that market demands would be able to induce the creation of a new development process that would lead to a new product, which in turn would create new market conditions. This model works with the premise that the emergence of innovation can be driven by market demand and must meet not only the technical requirements, but also the market requirements.

Rothwell (1984) considered the Chain-Linked Model as the third generation of technological innovation process, characterized by the combination of two other models in a strong connection between the areas of marketing and R&D (Figure 4). The author stressed that the innovation models technology-push and market-pull were considered atypical and extreme examples of a more general process of interaction between technological capabilities and market needs. The Chain-Linked Model, on its way, has a multidisciplinary interface, marked by the strong presence of feedback and rationalization of resources applied to research processes (Figure 4).

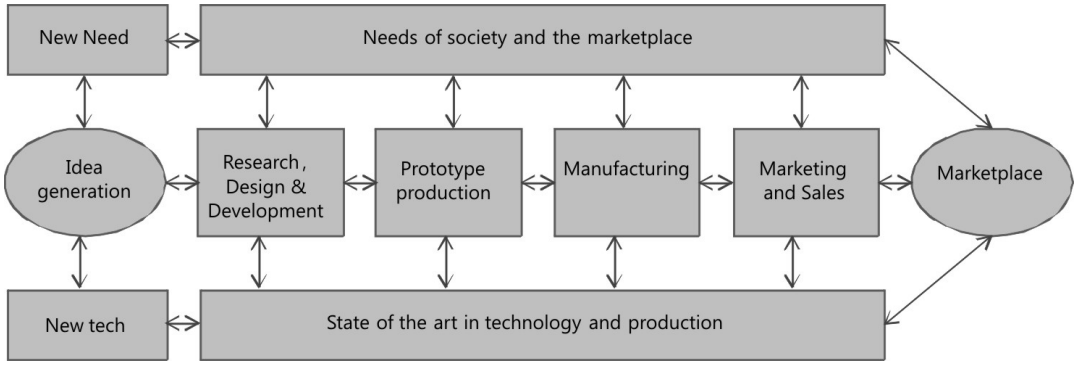

Figure 4: Coupling model of innovation. Source: Adapted from Rothwell (1994)

The fourth generation is represented by the integrated model (integrated innovation process), based on the characteristics of innovation in major Japanese companies. The model is characterized by integration and parallel development, where companies integrate suppliers into the development process of new product and also within the activities of different departments. So the departments work on the project simultaneously instead of consecutively (Rothwell, 1994).

The fifth generation model is represented by systems and networks, whose base is the integrated model, characterized by a variety of practices that enable greater efficiency in production. These practices include internal organizational characteristics, strong vertical systems articulated inter-organizations, horizontal external systems and, more radically, the use of sophisticated electronic system (Rothwell, 1994). This fifth generation model of the innovation process is composed by a large number of networks integrated both horizontally and vertically, between provider organizations and client organizations.

Considering the five generation levels proposed by Rothwell (1994), there are the four value levels, defined by Randmaa *et al.* (2011) which are complementary to the Rothwell's point of view in this study. The first level thinks about 'value strategy', considering product and service systems and the way companies can capture value. The second level is 'value perception', including value created, value added, product value and emotional value between companies and consumers. The third level is 'value proposition/ offering' which is centered in the building of value systems, value proposition and value constellation to improve an infrastructure for value creation. At last, the forth level is 'value creation', which considers the value for customers and the value creation, that is a "resulting activity where both the physical product, supporting services and the customer all play vital role" (Randmaa *et al.*, 2011).

Table 1: Innovation generation models versus value levels

	The innovation generation levels				
	Technology-push	Market-pull	Chain-Linked Model	Integrated Model	Networked model
Value Strategy	Investment in new technologies	Investment on customer research	Market demands create new development process to create new market conditions	Integrated development of chain	Integrated development of chain with focus in efficiency improvements
Value Perception	Product technical functions	Demands contrasted with the products launched	Creation of new market conditions from the demands and technologies developed	Value along all the production chain	Value along all the production network

Value Proposition/ Offering	Focus in product and new technologies discovery inside the company and launched in the market	New products that can fit customer's needs	Attendance to market and technological requirements	Links between actors in the product/ service development	Networks integrated both horizontally and vertically
Value Creation	Value is created by innovative products and processes	Sales represent value	Integrate and parallel development represent value	Value is created among suppliers, departments, customer	Inter-organizations, horizontally and vertically

Source: Adapted from Rothwell (1994) and Randmaa *et al.* (2011)

2.2 The nature of perceived value: add value to innovate or innovate to add value?

Currently marketing management presents a more cohesive and integrated approach, where consumers, employees, competitors and society are important in building value. This approach comes from the development of economic and productive models. It has been motivated by changes in global behavior, generally understood as globalization, deregulation, technological advances, privatization, increased of the customer's decision power, customization of goods, increased competition, convergent sector and the reduction or exclusion of intermediation in delivering products and services (Kotler & Keller, 2006, Porter, 1985).

The emergent use of new media communication and new points of contact with the consumer are also responsible for shortening the distance between people and nations around the world (Pinheiro & Gullo, 2009). In addition to functional innovation related to technology, there is also the radical innovation of meanings, in which new proposals are released to the market beyond the identification and treatment of a particular consumer demand, extrapolating to a change in the way of interpretation of products (goods or services) and their interaction in the socio-cultural environment (Verganti, 2008).

Zeithaml (1988) argued that customer value is any evaluation made by the customer of the product usefulness based on the perception of what is received and what is given. More than the models of the past century, today's companies are searching to create value through innovation. The way, however, is not always clear and one-directional; identifying a gap on what is customer's value, what is value to the customer and how adding value is related to innovation processes.

In the perspective of Flint, Woodruff and Gardial (2002), customer value refers to the personal values that each client carries and therefore guides their consumption behavior. For companies, customer value represents how much each individual customer returns value (as financial values, brand value…) to the organization, compared to the investment made on it. As analyzed in the section about the evolution of production models, customer value has long been ignored and today some business-driven technology-push strategies continue to preserve the focus on product technology, considering that the customer will appreciate the product anyway.

Despite of the concept about customer value, there is the 'value for the customer', which is different. This means the value perceived by the customer and it is essential for marketing strategies, i.e., the demands that come from the market. To Randmaa *et al.* (2011), value is a mental concept, by the way, the perceiving of it is individual and related to its context. Thus value for the customer, specifically, is created throughout the relationships between the company and its customers in a multidimensional and individual way. Value can be shared or co-created through open innovation, strategic alliances etc., what puts the value concept in an iterative and continuous process. To add value for the customer, investments are necessary to provide a price increase justified by self-improvement within the various production stages (Beserra; Britto, 2008). At this point, innovations may arise from different dimensions.

Goldstein and Toledo (2001) considered the difference between value and quality, where quality is related to product characteristics and value comes from the characteristics of consumers and their needs in relation to the product and its situation of use.

Mais *et al*. (2010) evaluate the company's inclusion in networks, which are larger and broader than those value chains by aggregating partnerships that go beyond the stage of product development. To the authors, participation in such networks shows an entrepreneurial profile, with the proposal to gain a competitive advantage over the competitors.

According to Sánchez-Fernández and Iniesta-Bonillo (2007), in an one-dimensional approach (Figure 6), the perceived value is essentially designed from an utilitarian perspective, through one or more variables, basically referring to benefits and costs. In the multi-dimensional approach, otherwise, the authors explain that the perceived value is generated from attributes or interrelated dimensions, i.e., from a complex phenomenon. In this approach, the authors fit the concepts of hierarchy of value from Gardial Woodruffe (1996) together with the hedonic and utilitarian value, highlighting the researches of Holbrook (2006) about value types (Sánchez-Fernández; Iniesta-Bonillo, 2007). Both one-dimensional and multi-dimensional approaches are presented in the Figure 5.

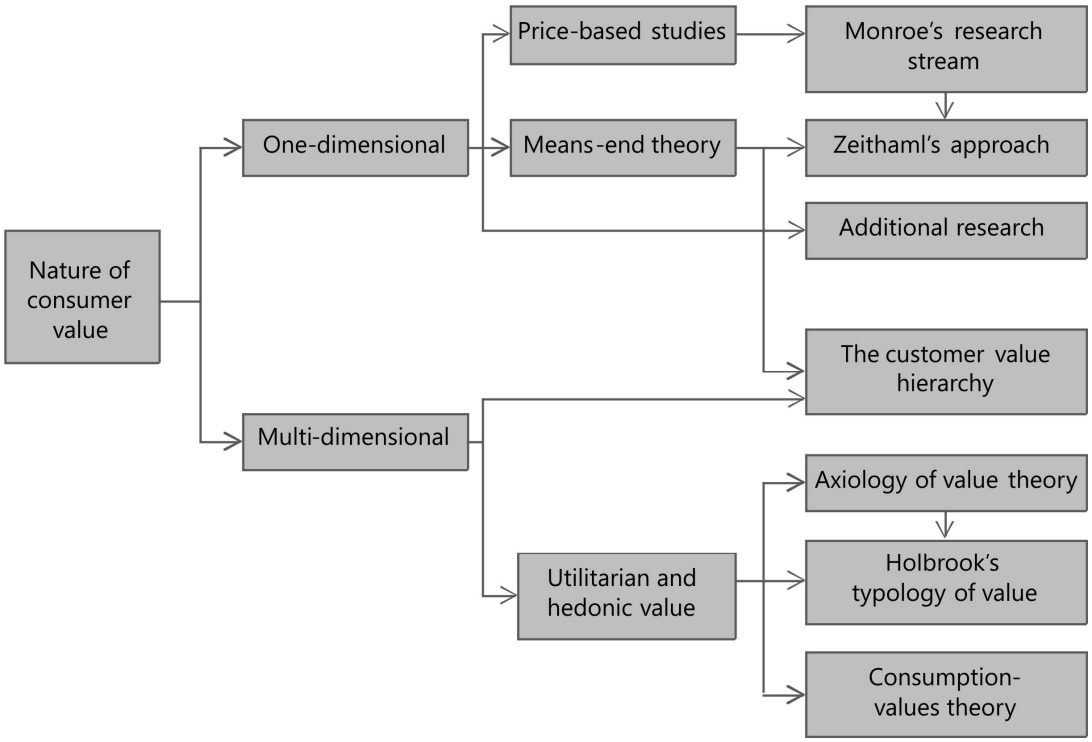

Figure 5: Theoretical lines of research on perceived value. Source: Adapted of Sánchez-Fernández & Iniesta-Bonillo (2007)

The analysis of value inside the one-dimensional and multidimensional proposes shows the need for further research into the conceptualization of perceived value. In particular, it is important to clarify the formative nature of the relationship between the multi-dimensional construct and its constituent dimensions, specially the role of value components, such as moral value and spiritual value in consumer behavior; the causal modeling in value compared to other variables (such as satisfaction, comparative value, commitment and loyalty); the dynamic nature of perceived value; the development of a measurement scale for comprehensive and effective concept.

3 Conclusion

This study aimed to build a conceptual overview about the evolution of the value concept, considering its economic, productive and management dimensions. Based on the review of a set of references collected,

it was possible to find out those different models, definitions and theoretical lines appeared over time to explain the value concept related to consumption and production processes.

As presented by authors like Gudem *et al.* (2011), in this theoretical research was also a challenge understand the position of the tangible aspects of value, which came from traditional production models, and the intangible aspects that are involving all society, as considered by Kotler and Keller (2006), and the competition between industries, as showed by Porter (1985).

The value concept has evolved specially since the 1980s, expanding from a one-dimensional perception to a multi-dimensional perception (utilitarian, hedonic and logical). The perspective provided by Lean Production System helped to the maximization of customer value inside the companies as well as changed the networks between suppliers, partners, and clients.

Nowadays, the value concept has a different contextualization and is important to constitute new business models. Whereas the customer was forgotten in the past, today it has a central role for companies. The differences presented between customer value and value for the customers were highlighted in this paper to point out the changes in the business strategies and production modes and the ways companies are trying to build value relationships with their customers.

As showed along the study, the inter-organizational networks are also relevant not just to transform products, but to put companies next to the customers and their requirements, potentials and context of life. The consumption has to be seen tangible and intangible, which means more difficulties in measurements and more competition between companies. The innovation processes have been planned to create and promote value.

The research has the limitation of being based on a reduced number of studies, so it is not possible to apply the results and conclusions in general. Therefore, the conceptual and critical overview presented as an exploratory study could support specific case studies, applied in different organizations. Considering the context is an important factor to value concept, the networks provided by each company can be analyzed. The comparison among traditional productive models and the new fuzzy business model is significant to propose future measurement systems about innovation processes and value besides companies. There is a need for structured researches involving innovation processes to create value. Finally, innovation may be seen in the context of value creation not only in a financial way, but also in a co-creation process of value.

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