



Innovation and competitiveness in companies: propositions for the construction of a measurement model

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Abstract

The main objective of this paper is to present a framework with some proposals for the construction of a model for measuring the competitiveness in companies. It was conducted a theoretical review of the themes competitiveness and innovation, analyzed critically the theoretical perspectives that address the two issues concurrently and present key metrics used by the literature. The methodology appears as a theoretical essay, considering the organization as the unit of analysis. The model proposed takes into account the constructs of the micro environment, macro and government in relation competitiveness and innovation. Finally, it raised four propositions of relations of the constructs involving the measurement of competitiveness in business and interaction with innovation.

Keywords: Innovation. Competitiveness. Innovation metrics.

Introduction

Innovation is a relevant theme because it has impact on the competitiveness of organizations (PENROSE, 1959; SCHUMPETER, 1997; NELSON; WINTER, 1982; TEECE, PISANO ; SHUEN, 1997; TIDD, BESSANT; PAVITT, 2008).

Competitiveness has been discussed by several authors and with different theoretical views. However, it is noticed that difficulty still remain to measure, on a precise way, competitiveness of companies in various sectors of the economy (PORTER, 1993;

HAGUENAUER, 1989; CHUDNOVSKY, 1990; CANTWELL, 2004; KUPFER, 1992; COUTINHO; FERRAZ, 1994; SOUZA, 2003; BRITO et al., 2009).

The literature deals with measurement models of competitiveness, but there is a lack of models that can contemplate both internal and external factors of the company.

For example, the model of competitiveness by Fernandez et al. (1997) has limitations, even taking into account the systemic, structural and business factors as determinants of competitiveness. This is because it does not consider the competitiveness in product dimension specifically; in addition, the development of skills is not highlighted as a factor to create competitiveness and also the business factors also require a more dynamic approach (PAIVA et al., 2014).

In Porter's diamond (1993) competitiveness is explained by resources conditions, demand conditions, strategy, structure and rivalry of companies and related industries and of support hazard and Government influence on four factors. The limitation of this model can be the fact the main focus is on national/international competitiveness, not taking into account national systemic aspects such as the macroeconomic, social and political-legal and the development of skills does not receive prominence (PAIVA et al., 2014).

Buckley et al. (1988) presents a model of competitiveness at country, industry, company and product levels, divided into three groups: competitive performance, potential competitiveness and managerial processes.

The focus of this study is at firm level, so it is important to consider the limitation of the model pointed by Paiva et al. (2014) which states that a few elements portray the competitiveness in each of the levels and groups, many models overlook the nature of supply and domestic demand; as well as they do not address the internal competitiveness of firms in the same industry, in addition to the generic indicators not depicting the specificities of the country, industry, company and product levels.

Thus, this theoretical essay aims to discuss the issue of competitiveness and innovation, organizational level and to introduce a framework based on theory and using the central constructs presented in the literature: micro, macro environment and the Government.

Competitiveness

In the literature, the term competitiveness is used by various authors and with different meanings. This article presents the main concepts, approaches and competitiveness indicators found in the literature.

Concepts of competitiveness

According to Porter (1993), competitiveness is the result of the ability of knowledge obtained by creating a performance superior to the competition. According to the same author (1999), competitiveness is the result of the combination of information, knowledge, technology, organization, cooperation and coordination, that result on competitive products at the international level. Thus, to Porter, one of the theorists

whose concepts of competitiveness have been discussed since the 80s, competitiveness is linked to productivity. To achieve a greater participation in the market it is necessary that companies achieve high levels of productivity, and increase it with the passage of time.

Haguenaer (1989) separates the concept of competitiveness in performance and efficiency. Performance is expressed in market share; for example, the participation of exports in the firm or group of firms – industry – in international trade would appear to be its most accurate predictor, in particular in the case of international competitiveness. Competitiveness and efficiency can be understood in the input/product relationship practiced by the firm, i.e. the company's ability to convert inputs into products with maximum yield. Under this view, competitiveness is coupled with the ability to produce more efficiently than competitors: best prices, quality, technology, wages, and productivity. Therefore, this vision of Haguenaer that when doing efficiently (productivity) the result can be effective in relation to its competitors confirms the affirmative of Stoner and Freeman (1995):

Peter Drucker proposed the judgment of an administrator's performance through the twin criteria of effectiveness – capacity of doing 'right things' – and effectiveness – the ability of doing things 'right'. Of these two criteria, as suggested by Drucker, effectiveness is the most important, since no efficiency level, the greater it may be, will compensate for the choice of the wrong goals (STONER; FREEMAN, 1995. p. 136).

Chudnovsky (1990) proposes the existence of microeconomic and macroeconomic approaches to the concept of competitiveness. The microeconomic approach lists the definitions of competitiveness focused on the firm, for example, the skills of a company in performing its projects, production and sales of a particular product in relation to its competitors. The macroeconomic approach defines competitiveness as the ability of national economies to present economic results, in some cases related to international trade, in other, more comprehensive, with the rise of living standards and social welfare.

Still at the international level competitiveness means the ownership of skills needed for a sustainable economic growth in an international selective competitive environment in which there are other countries, clusters or firms that have equivalent skills, however different (CANTWELL, 2004).

In Brazil, David Kupfer (1992) discusses aspects related to the phenomenon of competitiveness, particularly the tendency to identify a set of performance indicators or industrial efficiency. According to the author, competitive is the function of the appropriateness of strategies of individual firms to competition standard rate at the specific market. Therefore, the definition of competitiveness can be affected by the standard of competition transformed by the actions of the firm. Kupfer (1992) points out that the major inadequacy of concepts lies in the reduction of the concept of competitiveness to something that runs out on the product or at the firm that produces it

Coutinho and Ferraz (1994) affirm that a free market environment and open competition establishes the context in which competitive capacity is shaped. In this way, the firm competitiveness can be understood as "the productivity of companies

linked to the ability of Governments, the behavior of society and the natural and constructed resources, and checked by national and international indicators, allowing to conquer and ensure market slices" (p. 10).

Rodrigues Filho (1995) believes that competitiveness is the result of actions both at the commercial, and in the productive and administrative level, in order to achieve the objectives of the company: financial, growth, market share, and maintenance of preferred clients.

Barbosa (1999) states that the concept of competitiveness is clearer when the different levels of analysis are taken into consideration, whether at the enterprise, sectorial, regional or at international levels, because each level has a set of specific measures.

Analyzing the various concepts covered, it is clearly understood that the concept of Porter (1993) involves skills and knowledge. This knowledge is a result of the information, existing technology and interaction with the stakeholder, but its focus is at country's level.

Chudnovsky (1990) takes into account the existence of microeconomic and macroeconomic factors on the concept of competitiveness. What is also considered in the model proposed by this essay. Innovative capacity, another construct this model refers to, has support in the concept of Coutinho and Ferraz (1994) when they affirm that the open competition establishes the context in which competitive capacity is shaped.

This essay focuses on the enterprise level, and Barbosa (1999) states that it should take into account the different levels of analysis, since each level has a set of metrics.

The study that originated this article relies on Haguenaer (1989): competitiveness is the ability of a company (firm) to produce goods with specific quality standards, which are required for certain markets, using resources at levels equal to or lower than those used by competition for a certain period of time.

Competitiveness approaches

According to Haguenaer (1989), Kupfer (1992) and Ferraz et al. (1997) if competitiveness is considered as efficiency in a production process, with emphasis on the means of production, the competitiveness approach is focused on the criteria of the efficiency of the production process or the input/product relationship.

In this way competitiveness is translated by means of input-product relationship practiced by the firm, i.e., the company's ability to convert inputs into products with maximum yield.

On the other hand, when one considers competitiveness as a dynamic process and relative performance for the purposes of production, competitiveness approach uses the criteria of effectiveness or market position.

Haguenaer (1989), Kupfer (1992) and Ferraz et al. (1997) claim that competitiveness is somehow expressed in market share reached by the firm in the market at any given point of time.

Another factor that influences the competitiveness of companies is the consumer satisfaction in acquiring products or services, an ex post phenomenon. According to

Ferraz et al. (1997) the approach of dynamic perspective says: the market performance and production efficiency result from the capacity accumulated by companies in formulating and implementing competitive strategies, enabling them to maintain or increase their position in the market on a sustainable way. It's because the perception of the competitive analysis and economic environment of which it is part.

In this way, competitiveness arises as a characteristic that transcends the firm itself, related to the standard of competition in each market. It corresponds to the set of critical success factors in this market and not just to the intrinsic factor of a firm's product or service.

There is also a competitiveness approach that finds support in the theory of the RBV - Resources-Based View firm, similar to the approach of competitiveness as efficiency, because it focuses on the capabilities and skills. These are the basic factors to establish and sustain the competitive advantage of firms. In this way, it is possible to understand the strategic business performance and establish directions for formulating market strategies (HADJIMANOLIS, 2000).

Chart 1 illustrates the traditional approaches and the dynamic approach, based on efficiency and effectiveness or the behavior of the firm, as well as it lists the factors and related indicators.

Chart 1 – Different approaches of competitiveness and related indicators

TRADITIONAL APPROACHES		DYNAMIC APPROACH
Based on efficiency	Based on efficiency/effectiveness	Based on the firm's behavior
<p>Factors</p> <p>Optimization of production: increase in productivity, quality of process, loss reduction.</p>	<p>Factors</p> <p>Performance, market share, clients' satisfaction, product quality.</p>	<p>Factors</p> <p>Productive structure; competitiveness pattern: scale and scope economies; specific competencies; past experiences; perspective as to the environment.</p>
<p>Indicators</p> <p>Price, cost, technical coefficients, productivity parameters of the international industry factors</p>	<p>Indicators</p> <p>Profitability, sales volume, exports, Market share, number of contracts signed or successful biddings.</p>	<p>Indicators</p> <p>Combined (price, costs, productivity, profitability, sales volume, shared Market.)</p>

Source: Adapted from Souza, 2003.

Indicators of competitiveness

This study is conducted at the organizational level; so it considers firm indicators of competitiveness. Since this competitiveness depends on internal and external factors, indicators may be directly related to the firm, as for example: investment, costs, workforce profile. But it also considers indicators relating to the activity sector, region and country. Haguenaer (1989), Kupfer (1992) and Ferraz et al. (1997) use indicators such as price, cost, technical coefficients and parameters of productivity of the factors of the international industry, as an ex ante phenomenon. Because competitiveness is regarded as efficiency of the production process. When Haguenaer (1989), Kupfer

(1992) and Ferraz et al. (1997) approach competitiveness as the performance in a dynamic process, the most commonly used indicators are the market share, volume of exports and market shared with other companies; exchange rate policies, conditions of production, demand and sales channels are also analyzed.

Competitiveness represents the comparison between the actors of the same environment who will determine the concept and ways to evaluate it (HININGS; GREENWOOD, 1989). Therefore, it is necessary to consider the sector's standard of competition, as well as the cultural aspects related to the environment. (PETTIGREW; WHIPP, 1993) and (FERRAZ et al., 1997). The resulting referential of the behavioral patterns of these actors at the various levels of the environment (either regional, national or international), at the technical or institutional dimensions, influences the choices of leaders and determines the bases of competition of organizations.

Coutinho and Ferraz (1994) in the study of the Competitiveness of the Brazilian Industry (ECIB) propose to measure competitiveness through national and international indicators. They establish the classification of indicators in three dimensions: capacity-building indicators; efficiency indicators; and performance indicators.

In summary, there is theoretical contribution to propose a measurement model of competitiveness, object of this article.

Innovation

Innovation can contribute to businesses on different forms, it is possible to identify a strong relationship between market performance and the insertion of new products on the market (TIDD, BESSANT; PAVITT, 2008). Innovation can also increase profitability by launching new products, once the innovative products become market leaders, enterprises care about innovation processes. Companies wishing to innovate and do something new will have to learn to practice innovation (TIDD; BESSANT; PAVITT, 2008).

However, in a dynamic environment it is not possible to find uniformity. The diversity of concepts allows to note that the idea of innovation is always linked to changes, new combinations of factors that break with the existing balance (SCHUMPETER, 1997). Thus, it is necessary to investigate the main lines of understanding of the term innovation.

Concepts of innovation

The concept of innovation is being discussed since the 18th century when Adam Smith was studying the relationship between capital accumulation and manufacturing technology. Division of labor, technological changes and the competition were studied as elements of the economic development. The relationship between innovation and economic development is studied more systematically by Schumpeter (1934) in his book *Theory of Economic Development*.

For Rosenberg (1969), innovation arises from the dynamic process of technological development; i.e., misfits or imbalances in the production process and market ser-

vice. It is a fundamental element for the introduction of a technical change that can boost economic growth. These imbalances between the various elements in the system create the bottlenecks that concentrate the attention of several actors in solving problems of more efficient allocation of resources. In this context, Rosenberg (1969) suggests a theory of induced technical change based on the obvious and mandatory need to overcome restrictions on growth where the innovators seek to solve the problems of the productive process (bottlenecks require solutions). For the author, the innovative activity behaves like a search procedure, in which the results from derivatives are not known *ex-ante*. Thus, innovation and investment decisions, oriented towards the future, will inevitably involve a relative degree of uncertainty.

Utterback (1971) defines innovation as an invention that reaches the stage of introduction of a new product on the market. If invention refers to a new process, the innovation should occur at the phase of its first use, and the invention is a unique solution to a need or desire. The author also recalls that what is behind this concept is to request that an idea has been taken forward to the point of producing impact.

Dosi (1988) points out that technological innovation involves troubleshooting satisfying, at the same time, certain cost and commercial requirements. The problems are typically "poorly structured", so that the information available does not provide a solution to the problem. The "solution" of technological problems certainly involves the use of information taken from previous experiences and formal knowledge; however, it also involves specific capacity building and not coded by the inventors.

Táلامo (2002) considers that innovation is more comprehensive, going beyond just the novelty or invention. There are several stages between an invention and the final consumer, which range from the functional activities of a company, such as development, purchasing, logistics, production, and other activities that are performed prior to the availability of new product or service on the market or the commercial use of a new process or equipment.

For Tidd, Bessant and Pavitt (2008) innovation is something new that aggregates social value or wealth, it is the development of new values that maintain or increase the competitive position of a company.

Types of innovation

According to the Oslo Manual (2005) a company can perform several types of changes in its working methods, its use of production factors and the types of results that increase its productivity and/or its commercial performance. The Manual defines four types of innovation: product innovations: involves significant changes in products and services potentialities, there including goods and services totally new and important enhancements to existing products; process innovations represent significant changes in production and distribution methods; organizational innovations refer to the implementation of new organizational methods, such as changes in business practices, workplace organization or external relations of the company; and marketing innovations involve the implementation of new marketing methods, including changes in product design and packaging, in product promotion and placement, and in methods of establishment of prices of goods and services.

Innovation can be incremental or radical. According to the Oslo Manual (2005) radical or disruptive innovation cause significant impact in a market and economic activity of firms in this market. This concept is centered on the impact of innovations, as opposed to its novelty. The impact may change the structure of the market, create new markets or make existing products obsolete (CHRISTENSEN, 1997). Incremental innovation includes the modification, improvement, simplification, consolidation and improvement of products, processes, services and existing production and distribution activities.

Innovation metrics

According to Grupp and Mogee (2004), the Science and Technology (S&T) or Innovation Indicators are tools created to measure innovative performance of a country and develop public policies to enhance innovation in areas perceived as most important. The first report on national S&T indicators was published in the United States in 1973, by the National Science Foundation. In the decade of 70 many countries have also begun to publish reports on S&T indicators. The OECD played an important role in the standardization of these documents, since each country published them with their own formatting. The European Commission published the first European report on S&T indicators in 1994 (GRUPP; MOGEE, 2004).

The measurement of S&T and Innovation requires the evaluation of various dimensions, leading to the use of composite indicators. But there is an important difference between its application in companies, where the data can be questioned and not automatically determine investment decisions, and their use in public policy, by the lack of theoretical models that guided the selection and the weight of the different indicators in different countries (PAVITT, 1988).

For Freeman and Soete (2009), problems persist in both the measurement of inputs and results, due to differences in definition, classification and measurement of most indicators.

Chart 2 presents the main innovation metrics, based on the research of Bashir et al. (2009).

Chart 2 – Innovation metrics

METRICS OF INNOVATION	AUTHORS
Use in activities with intensive use of knowledge, percentage of total use.	European Community (2013)

Jobs on fast growing enterprises	European Community (2013)
Trade balance of high and medium technology products to the total trade balance and services with intensive use of knowledge in a percentage of total exports of services	European Community (2013)
Expenditures on R&D	Tidd (2001); Motohashi (1998); Li and Atuahene-Gima (2001); Walker et al (2002); Koschatzky (1999)
Patents	Tidd (2001); Motohashi (1998); Walker et al (2002)
Significant innovations	Tidd (2001)
Innovations research	Tidd (2001); Evangelista (1998); Klomp and Van Leeuwen (2001); Hinloopen (2003); OCDE (2005)
Advertisement of products	Tidd (2001); Chaney et al (1991); Chaney e Devinney (1992); Walker et al (2002)
Employees dedicated to innovation	Tidd (2001); Motohashi (1998); Li and Atuahene-Gima (2001)
Judgment of experts	Tidd (2001)
Expenditures with innovation or innovative activities (R&D; design and engineering; investments in fixed assets; investments in marketing)	Pacelli (1998); Koschatzky (1999); Hinloopen (2003)
Emphasis in the innovation process (subjective)	Zahra (1989); Li and Atuahene-Gima (2001)
R&D facilities	Motohashi (1998)
Relation between expenditures with internal R&D and acquired externally	Motohashi (1998)
Licensing revenue (expenses and revenues with patent licensing and other licenses)	Motohashi (1998)
Emphasis on the diversity of lines of new products (subjective)	Li and Atuahene-Gima (2001)
Emphasis on the speed of introduction of new products (subjective)	Li and Atuahene-Gima (2001)
Number of innovations adopted	Damanpour (1989); Gopalakrishnan (2000)
Cooperations and external networking	Koschatzky (1999)
Percentage of revenue acquired with new products	Hinloopen (2003)

Source: Based on Brito et al., 2009.

Innovation and competitiveness

Once the themes of competitiveness and innovation are addressed in separate, now the relationship between these two constructs is analyzed. According to Coutinho and Ferraz (1994), the competitive success depends on the creation and renewal of competitive advantages for businesses, in a process that the company strives to obtain peculiarities that distinguish it favorably from the others.

In this context, innovation is the engine of development and the large weight factor in the survival of companies in competitive environment (COUTINHO; FERRAZ, 1994). In this way, it is important to rescue the literature that deals jointly with the themes innovation and competitiveness.

Penrose (1959) argues that innovations generate competitive advantage for the company that creates them. According to the author, innovations are fundamental to the acquisition of new knowledge and to the introduction of new processes and services in the enterprise. This corroborates Schumpeter's vision (1997) which states that competition arises from innovations. Thus, the creation of new products, new organizational structure, new markets, new economic spaces and new sources of raw materials may alter the pattern of competition between firms.

For Schumpeter (1997), the fundamental determinant of the dynamic process of the economy is innovation itself, and it is also essential to define the paradigms of economic competitiveness in the development and setting up of industrial structures. As a result, the introduction and diffusion of innovations in the market occurs naturally and as processes resulting from differentiated growth on the part of firms.

For Nelson and Winter (1982), the Schumpeterian competition tends to produce winners and losers, so that some firms certainly will take greater advantage of technical opportunities than others. The tendency is to increase the degree of concentration as this process moves forward. Growth brings advantages to the winners, whereas decline produces technical obsolescence and disadvantage to the losers. The result of the search process is not only an innovation of immediate use, but is also a starting point to undertake future search processes, due to the established competence in that particular field and due to the existence of possible innovations maybe still unknown in the vicinity of the technology developed.

According to Teece, Pisano and Shuen (1997) the competitive advantage results from the size or ownership of assets, increasingly related to the ability of companies to mobilize knowledge, technological skills and experience to create new products and services, and new forms of distribution and supply. International purchases can help companies to obtain knowledge and technology, but to sustain a competitive advantage over time, capabilities are required which are renewed with the innovation of processes, products, markets and forms of organization.

Tidd, Bessant and Pavitt (2008) make clear that the benefits generated by innovative measures lose their competitive power as others imitate. In this way, the organization should progress to an increasing innovation, otherwise it will be left behind. The authors further complement that the growth of competitiveness in sales is not just the result of the ability to offer lower prices than those of competitors, but also non-economic factors such as design, customization and quality.

When analyzing the relation of innovation to competitiveness Paiva et al. (2014) brings to discussion the ideas of Schumpeter (1997), Nelson and Winter (1982), who believe in the influence of innovation and ability to break barriers by changing sectorial structures. They also emphasize the importance of the firm's learning path in the search for competitive advantages, which directly influence the internal resources, which for Penrose (1959) is the firm's primary instrument of competitiveness.

It is therefore noticed the intrinsic relationship between competitiveness and innovation; this can be a path or strategy for companies to achieve and maintain market share in a sustainable way. It is precisely in this relation between innovation and competitiveness that this study aims to propose a model.

Competitiveness and innovation metrics

Carvalho et al. (2012) emphasize that the main indexes of internationally recognized competitiveness are the Global Competitiveness Index (GCI), published by the WEF, the World Competitiveness Yearbook (WCY), published by the Institute for Management of Development (IMD), and the Industrial Performance Index (IPI), reported by the United Nations Industrial Development Organizations (Unido).

In surveys conducted on variables and indicators of competitiveness, as per chart 3, it was possible to identify the main indicators used by the current literature.

To establish the state of the art of studies relating Innovation and Competitiveness a survey was held in the database of EBSCO-Business Source Premier, using key words: innovation, competitiveness. Initially, 308 articles were identified which deal with the theme innovation and competitiveness at the same time. Among them only 31 articles showed metrics for innovation variables and/or competitiveness.

On Chart 3 it is possible to observe the number of variables and indicators found in this research. It shows the diversity among the variables and indicators used in the studies of competitiveness. However, it is possible to group them into three categories: those related to innovation, market characteristics and financial characteristics.

Chart 3 – Competitiveness variables and indicators

	INDICATORS		
	INNOVATION	MARKETING	FINANCIAL
VARIABLES	Patent (2)	Sustainability (1)	Sustainability (1)
	Process (1)	Process (2)	Intellectual Capital (1)
	Sustainability (1)	Firms (1)	Rentability (3)
	Product (1)	Product (1)	
	Intangible assets – Networks(1)	Marketing (1)	
	Knowledge (1)	Intellectual Capital (1)	
	R&D (7)	Internationalization (3)	
	Partnerships/Strategic Orientation (1)	Market Share (2)	
	Intellectual Capital (1)		
	Innovation Organizational Culture (1)		
	Innovation Capacity (5)		
	Learning, Commitment and Trust (1)		
	Public Policies (2)		

Source: The Authors, 2014.

It was not found uniformity in the metrics and even on concepts of innovation and competitiveness. Using as a parameter chart 2, the innovation metrics based on the Bashir et al. (2009) research and comparing the variables and indicators identified in the researched articles, some similarities can be found: spending on R&D, patents and innovation capacity were also used as measures of innovation.

It should be highlighted that in the articles researched the intent was to treat the innovation, financial market indicators separately, while in chart 2 of the Brito et al. the metrics were treated together as innovation.

Systemic approach to innovation

According to Schumpeter (1997) there are some conditions to innovate: recombine resources, to convince the consumer and the capitalist, i.e., if the company does not do so, or at least one of these elements, it does not innovate.

Teece, Pisano and Shuen (1997) in the approach of dynamic capabilities of the firm and in accordance with the resource-based view (RBV) say that it is precisely the firm that is able to adapt itself to a changing environment. In this case, three elements of analysis must be taken into account. The **position**, namely, how the firm positions itself in the market according to its competence or market share, its **trajectory** of innovation and organizational **routines**.

The authors confirm Penrose (1959) who already suggested these elements to achieve innovation. In this way, the relation between competitiveness and innovation can be presented as a systemic approach to innovation, i.e., a firm does not innovate by itself, but innovates within a systemic context.

On the Schumpeterian vision, given unstable micro or macro system, a low demand due to economic constraints, whether it is economical or of income of the population, the company decides whether or not to innovate. Taking also into consideration that typically companies do not invest in innovations, but acquire externally innovation through technological adequacies (PINTEC, 2011).

Possas (1996) recognizes the importance of systemic factors of competitiveness, taking into consideration the conditions of the competitive environment, of the economic/institutional system and of infrastructures, which generate externalities to firms.

For the discussion of systemic competitiveness, Possas (1996) presents three analytical elements, in terms of **allocative efficiency** which is the neoclassical point of view. From the point of view of **production efficiency** which considers technological aspects of administration which, according to the author himself, is relevant, but is not the main aspect. And from the point of view of **selective efficiency**, i.e., it is the selection environment that will make the firm competitive, so that it can adapt itself to this selection environment.

The neo-Schumpeterian current proposes the **selective efficiency** approach, which has widespread support in the evolutionary conception disseminated by Nelson & Winter (1982), which deals with the market as a selection environment. That in the broadest Schumpeterian sense the selection environment of innovation is the most important socio-economic role of markets, and the normative or evaluative counterpart consideration of its efficiency must refer to its ability to meet adequately this selection, whether in the environment of selection of new products and processes, or their respective improvements, differentiation, new sources of inputs, new forms of industrial organization, new markets (POSSAS, 1996).

The nature of the systemic factors of competitiveness are categorized into three levels, according to Possas (1996): **first**, the factors that stimulate the creation and consolidation of a competitive environment, where the markets can provide the selectivity for the increase of its innovative, productive and allocational efficiency, as well as the economic efficiency of the entire system; **second**, the factors that come from externalities to business competitiveness, including appropriate conditions of communication and energy infrastructure, transport, qualification of manpower with technological profile, and scientific and technological infrastructure; and **third**, the political and institutional factors related to the institutional framework and the Government policies that affect the configuration of the corporate economic environment.

But there is a challenge as to the definition competitiveness indicators by innovation, constancy over time, diversity and peculiarities in the business according to the Schumpeterian theory. In the next topic are listed some propositions for the construction of a measurement model of competitiveness in enterprises.

Proposals for the construction of a measurement model of competitiveness in enterprises

To complete the study of the relationship between innovation and competitiveness and gather information required for the proposition of a model of business competitiveness, a new bibliographical research was conducted. Articles relating: "Performance and Innovation", and "Innovation and Competitiveness" were researched, totaling 110 references.

Figure 1 presents the synthesis of the relations found between competitiveness and innovation, at the enterprise level. It represents the basis for the preparation of four conceptual propositions that allow the establishment of relations between the variables and its ability to impact on the competitiveness of the company.

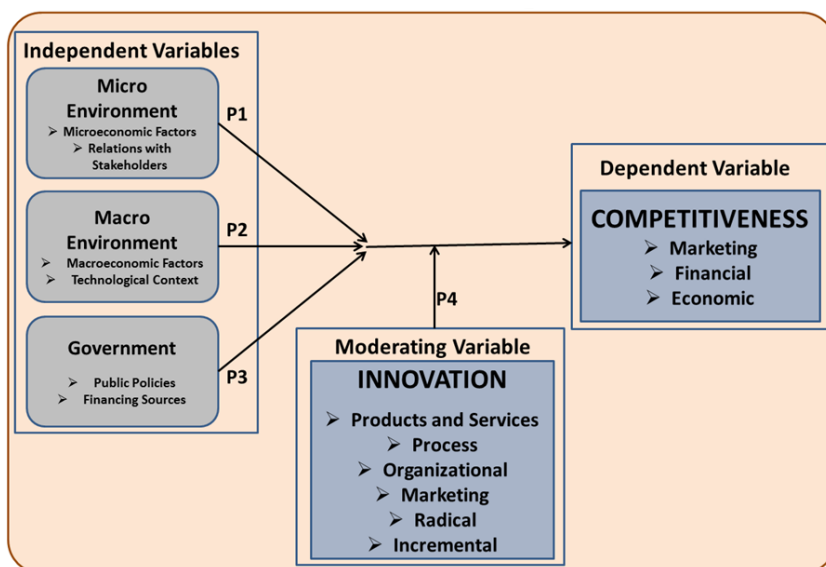


Figure 1 – Relation of constructs to measure competitiveness in the companies

Source: The Authors, 2014.

This model considers the constructs of micro, macro and Government environment. To measure competitiveness, the company is considered as the unit of analysis, but it is not alone: there is the microeconomic environment, macroeconomic factors and the role of Government. Each one of these elements is a construct: company, microeconomic environment, macroeconomic environment, Government, innovation and competitiveness.

To operationalize the model, the variables that measure each construct should be listed.

Once established the conceptual relations between the constructs and operationalized the variables it is possible to develop propositions to test the veracity of the model.

Thus, four propositions are shown, represented in Figure 1 as "Pn". After each proposition, the variables are listed.

Proposition 1: Microeconomic factors and relationship with stakeholders in the micro environment affect the competitiveness of companies.

Through the OECD studies (2009) *Innovation in Firms – the Microeconomic Perspective* it was possible to establish a relationship of measurement activities of the innovation process at the organizational level. For the **microenvironment** construct, the following variables may be used: level of competition; introduction of new product; partnerships or changes in relations with other companies; external research and development; spending on the introduction of innovations in the market.

The firm must know what its best potential is and what its main shortcomings are. There are strengths and weaknesses due to resources owned or not due to the firm, or the nature of its relations between the firm and its clients, employees, supply chain partners, suppliers, institutions, financing institutions and Government agencies (FERRELL; HARTLINE, 2009).

For the authors Tidd, Bessant and Pavitt (2008), the measurement of innovation may give a direction to the organization and as a consequence, give one response to certain difficulties of implementation or even acceptance of the product, for example, on the market in which it is inserted. To measure the variables of this construct, it was taken into consideration the idea of the authors, considering a series of specific measures of inner workings of innovation process within the organization, such as: internal activities of R&D; foreign acquisition of R&D; acquisition of other external knowledge; software acquisition; acquisition of machinery and equipment; training; investments in innovation; adoption of innovation; patents; significant innovations; marketing, among others.

Proposition 2: The macroeconomic factors and the technological context in the macro environment affect the competitiveness of companies.

It is known that there are problems in the process of measuring the economic activities, consequently, difficulties in establishing macroeconomic variables. One can understand macro economy as the study of economic aggregates, of their behavior and the relations that hold among themselves (GIANNETTI da FONSECA, 2006). To measure the macro environment construct the following aggregates may be used: gross domestic product - GDP; classification of country or region or municipality where it is inserted; income; general level of prices; consumption; investment; taxes; imports; exports; inflation; level of employment; wages; interest rate, among others.

Included in the macro environment are some incentives or obstacles that induce, stimulate or restrain technological changes. According to Dosi, Pavitt and Soete (1990), following Rosenberg (1969), the induction mechanisms relate to a number of factors such as: technological bottlenecks in interrelated activities; shortage of critical inputs; abundance of certain inputs; great price shocks or offer; changes and the growth rate of demand; changes in prices related to capital/work; patterns of industrial conflicts.

There are also the opportunities and threats outside the firm, regardless of strengths and weaknesses. They typically occur within competitive, economic, political, cultural or technological environments (FERRELL; HARTLINE, 2009).

Proposition 3: Public policies and the sources of government funding affect the competitiveness of companies.

Government policy influences on corporate strategy and structure and in rivalry, through resources like capital market regulations, tax policy and antitrust laws. Government policy may in turn be influenced by determinants. The choices and the allocation of investments are affected by the number of local competitors (PORTER, 1993). So, the government construct is measured using the following variables: economic growth; income distribution; infrastructure investments; interest rates; availability of credit; foreign exchange; inflation; public policies; incentives, among others.

About **Government** construct, Dosi (1988) presents a classification of variables in which policies may act on the technological progress: scientific/technological system's ability to provide innovative advances; economic agents' ability to incorporate technology; incentives/stimulus/restrictions that are ahead of the agents in the process of adjustment and innovation; intensity of competitive threats; and the cost and profitability of innovations.

Proposition 4: The radical or incremental innovation even in products, services or process or still in the organizational form and in marketing is a moderator of the relation between the micro, macro, Government environment and competitiveness of enterprises at the market, financial or economic ambit.

According to Penrose (1959), innovations generate competitive advantage for the company. In this way, innovations are fundamental to the acquisition of new knowledge and to the introduction of new processes and services in the enterprise. Corroborating Schumpeter (1997) who states that competition arises from innovations. Thus, the capacity for innovation is regarded as a result that includes some kind of innovation: product, process, marketing or organizational; and some degree of innovation: radical and incremental (OECD, 2005).

To deal with this environment of risks and uncertainties and increase its competitiveness, companies must master the fundamentals of innovation, in order to gain sustainable competitive advantage (PORTER, 1993). Thus innovation can be a moderating factor in relation to micro, macro environment and Government lead companies competitiveness.

With these four propositions, this study sought to present a proposal for the construction of a measurement model of competitiveness in companies, or at least raise the discussion of the constructs and a set of variables that may be part of a template. With the correct methodology, future studies, deepening in the literature of the constructs and variables, may be the leitmotif for reaching a model of measuring competitiveness in companies.

Final Considerations

Bibliographic surveys carried out have not been conclusive in identifying theoretical contribution to explain the relationship between innovation and competitiveness in the organizational level. Several authors claim that innovation creates competitive advantage for companies, for example, Penrose (1959) argues that innovations generate competitive advantage for the company that creates. According to the author, innovations are fundamental to the acquisition of new knowledge and to the introduction of new processes and services in the enterprise. That supports Schumpeter's vision (1997) when he says that competition arises from innovations. For him, the fundamental determinant of the dynamic process of the economy is innovation itself, and also essential to define the paradigms of economic competitiveness in the development and setting up of industrial structures. However, empirical tests were not found to prove these relationships.

The contribution of this article is to present **Proposals for the Construction of the Measuring Model of Competitiveness in Companies**.

This model was based on the studied literature on competitiveness and innovation, taking into account the constructs of **macro and micro environment and Government**, in a systemic approach to competitiveness.

Despite the broad theoretical review performed, there may be limitations of this model: disregarding any construct that is relevant to the analysis of competitiveness; operationalizing the constructs with some irrelevant variable; or using variables that are difficult to measure.

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