

# Triple Helix and Innovation in the Furniture Sector of Serra Gaúcha, Rio Grande do Sul, Brazil

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## Abstract:

Growing global competition among companies requires them to seek and adopt strategies to achieve profitability, prosperity and competitiveness. In this sense, companies increasingly focus their efforts on innovation to achieve their objectives, gaining differentiation in the market, and ensuring their survival and stability. In this way, this study seeks to identify the innovation perception of entrepreneurs of the furniture sector of the Serra Gaúcha, State Rio Grande do Sul, Brazil from the model of the Triple Helix developed by Etzkowitz (2000), aligned to the four dimensions of innovation proposed by the Oslo Manual (2005): product, process, marketing and organizational innovation. The methodology used for the research consists of a multiple case study, with an exploratory qualitative approach, through which it was possible to analyze the understanding of five businessmen from the furniture sector of the Serra Gaúcha. The results of the research indicate that the innovations perceived by the interviewees in the furniture sector of the Serra Gaúcha are improvements in the production processes, through market trends, and in the companies studied, the existence of innovation projects based on the integration between Government, company, and university as advocated by the Triple Helix.

**Keywords:** Furniture industry. Innovation. Triple Helix.

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## 1. INTRODUCTION

The current so-called "knowledge economy", brings in its essence the idea that companies need to be knowledge-aware, and to be able to transform it into a competitive advantage. In the face of this situation, companies have started to adopt new forms of work management, generating and deploying innovations with the concern to adjust the world requirements of the market (LASTRES; CASSIOLATO; ARROIO, 2005).

In view of the economic development, the furniture sector, according to data of the Association of the furniture industry of Rio Grande do Sul (MOVERGS) in 2013, is composed of 2,580 companies in Rio Grande do Sul, which generated 44,574 jobs, and produced 93 million pieces, worth R\$6,9 billion. The production in Rio Grande do Sul represents 13.8% of companies active in the country, 18.2% of the national production, 13.6% by volume of persons employed, and 30.7 percent of Brazilian exports (MOVERGS, 2013).

In this sense, the furniture sector comprises a set of activities that help in the economic development of a region, both as a country, would provide the emergence of industries of several segments, since the origin of the raw material until the marketing and product delivery to the consumer.

Thus, we can affirm that the sector studied has social relevance, given the significant participation in the generation of jobs, both in Rio Grande do Sul, and in the Serra Gaúcha region. In addition, the research has relevance, because it deals with the study of innovation, that is directly involved with academia, and with the generation of research.

Thus, the objective of the research was to identify the perception of entrepreneurs of the furniture industry in the region of the serra gaúcha, regarding innovation, according to the dimensions of the Oslo Manual (2005), from the perspective of the triple helix. In this perspective, the University acts as relations with inducing businesses and the Government, aimed at the production of new knowledge, technological innovation and economic development (ETZKOWITZ; LEYDESDORFF, 2000).

This article is structured into five sections, in addition to the introduction, the theoretical references. Then, it presents the methodological procedures used in section 4 the results and discussion and in section 5 the final considerations, and finally, references.

## 2. THEORETICAL REFERENCES

The following items, a description of the Triple Helix and Innovation, based on the theory.

### 2.1 Innovation

The conceptual approach to innovation has developed and obtained greater space from the works of Schumpeter in 1912, with the publication of the book: *Theory of economic development*. For Schumpeter (1934), innovation is the action to innovate, to create processes that promote the break in the economic system, allowing the emergence of news.

According to Schumpeter (1934), in capitalism economic development is driven by the impact of technological innovations, which occur through the process of "creative destruction", where innovation is characterized by a process of creation of the new before the destruction of the obsolete, contesting so the idea of the balance of the economy.

For this process to occur, it is necessary to put in operation the capitalist machine, as well as to keep in operation, being that she is the result of new goods and services, new forms of industrial organization, new production methods, and new markets that are created by capitalist companies. (SCHUMPETER, 1961).

Innovation as an idea, practice or object that is perceived as new by an individual or other unit of adoption (ROGERS, 1962). Is the ability to introduce new equipment and machines, as well as new organizational solutions in the production process or in the market (HAUSTEIN, 1980).

According to Pavon and Goodman (1981), innovation is a set of activities entered in a certain time and place, leading to the introduction successfully on the market and for the first time more idea in the form of new or improved products, processes, services or management techniques and organization. Innovate means introducing new, conceiving himself to organizational innovation as the process to introduce, adopt and implement a new idea (case, good or service) in an organization in response to a perceived problem, transforming a new idea in something concrete (ALENCAR, 1997).

Thus, innovation is the process in which from an idea, invention or recognition of a need for a product, service or useful technique, evolves until it is commercially acceptable (GEE, 1981). It is related to the discovery, experimentation, development, imitation and adoption of new products, new production processes and new organizational arrangements (DOSI, 1982).

This way, innovation concerns the changes that may be related to the product that the organization offers, or to the process (TAKAHASHI; TAKAHASHI, 2007). So how is associated to growth where new businesses are created from new ideas, generating competitive advantage (BESSANT; TIDD, 2009).

According to the Oslo Manual (OECD, 2005), innovation is the implementation of: a new product or service or significantly improved; of a process; a new method of marketing; or a new organisational method in business practices in workplace organisation or external relations.

For Schumpeter (1961), innovation can be set in five different ways, namely: the introduction to the market of a new product or service; introduction of a new method of production; the creation of a new market in a given country; the conquest of a new source of supply of raw materials or work in process products; the implementation of a new structure in a market.

### 2.2. Triple Helix

According to Sabato and Botana (1968) Latin America is not recognized by owning a network of relationships among Government, production structure and scientific and technological infrastructure as instruments of progress. Thus, the authors (SABATO, BOTANA, 1968) created the first schematic representations of national systems of Innovation, called "Sábato's triangle", and whose vertices are in Government, the productive sector and scientific and technological infrastructure.

Etzkowitz and Leydesdorff (2000) introduced the Triple Helix approach, a model of relationships, which considers the companies as the driving innovation process, focused on the network of communication and expectations that redrawing the arrangements between universities, industry and institutional Government.

Thus, innovation is treated as a dynamic process, and relations between University, industry, and Government of the Triple Helix approach become key components of innovation strategies. In addition, different possibilities of relations between the three levels can generate alternative strategies for economic growth and social transformation (ETZKOWITZ, LEYDESDORFF, 2000).

For Sbragia et. al. (2005), the Triple Helix model of innovation is an evolution of the Triangle of Sábato, where each of the members going on to perform functions before the other two exclusive and businesses operate as local and regional development agents to meet in the that interaction center.

The Triple Helix model, the company carries out important activities in the economy, being the industry leader. The Government for your time exerts a major role in the contractual relations that ensuring stability for interaction and exchanges between the actors of this process. While the University has your pillar on knowledge, and your competitive advantage vis-à-vis the other institutions are the students, who have continuous flow of ideas and projections (ETZKOWITZ, 2009).

## 3. METHODOLOGICAL PROCEDURES

The present research has applied nature, being characterized as a case study, qualitative and exploratory approach. It is characterized as applied because it aims to generate knowledge to practical application and solution of specific problems, involving truths and local interests (MATIAS-PEREIRA, 2012).

It can still be characterized as case study, which consists of the deep study of one or a few objects, which allows ample and detailed knowledge (Gil, 2008). It is also characterized as qualitative, with the view that qualitative research ignores numbers by working solely with texts. Thus, the survey does not enumerate or measure the events studied. It addresses actions and opinions of the companies studied, that is, part of the focus or matters of broad importance is defined in the course of the study (BAUER; GASKELL, 2003).

The research is still characterized as exploratory, considering that it seeks to identify the perception regarding innovations in the furniture sector the Serra Gaúcha. Exploratory research has the objective of formulating the problem and clarifying issues, which increases the familiarity of the researcher with the phenomenon or environment to be investigated (DENCKER; VIÁ, 2002).

In relation to the population size and sample, according to Eisenhardt (1989), the ideal quantity of elements in qualitative studies, is four cases or more. Therefore, with regard to the research instrument, an open question questionnaire was used, applied to five managers, owners or partners responsible for the companies concerned, consisting of 8 open questions, and sent by electronic means to Entrepreneurs of furniture industries in Serra Gaúcha, being collected the data between June and August of 2015.

After the collection of the data was carried out analysis of them by means of content analysis, which according to Vergara (2010), consists of a technique of data processing that aims to show what is being addressed regarding certain topic. According to Flick (2009), one of the essential characteristics of qualitative analysis of content is the use of categories. Thus, the categories defined by Etzkowitz and Leydesdorff (2000) were used according to Table 1.

**Table 1 - Categories of analysis set from Etzkowitz and Leydesdorff (2000)**

Relationship between companies as a sector	Participation in innovation projects.
	Concrete results of integration of the sector.
	Strategic relationship with universities.
Relationship between enterprise and Government	Sources of information used to develop innovations.
	Concrete innovations over the past 3 years.
Relationship between the company and universities	Participation in innovation projects.
	Concrete results of integration of the sector.
	Strategic relationship with universities.

Source: D'Arrigo et.al. (2014).

### 2.3 Furniture Industry In Rio Grande do Sul

According to the State Agency for the development and promotion of investment (AGDI), in 2015, in terms of revenues in the furniture sector, State of Rio Grande do Sul, Brazil, occupies second place, behind only State of São Paulo, Brazil.

Revenues of companies producing furniture and mattresses, established in the State of Rio Grande do Sul, Brazil, grew 67.5% from 2009 to 2013, which represents an average expansion of 13.8% per year (MOVERGS, 2013).

The turnover of the furniture and mattresses companies of State of Rio Grande do Sul, Brazil, grew 67.5% in the period 2009 to 2013, which represents an average expansion of 13.8% per year (MOVERGS, 2013).

Analyzing the production furniture industries in State of Rio Grande do Sul, Brazil, it is possible to identify the State's largest furniture polo is located in the Serra Gaúcha. From RAIS 2010 information, the Serra Gaúcha has 1,541 companies. Among this total of companies, the municipality of Bento Gonçalves houses 301 industries, whose estimated billing was R \$2,023,830,000 reais, generating more than 7,920 direct jobs in the same year.

The furniture sector of Serra Gaúcha comprises the municipalities of Antônio Prado, Bento Gonçalves, Boa Vista do Sul, Carlos Barbosa, Coronel Pillar, Caxias do Sul, Cotiporã, Fagundes Varela, Farroupilha, Flores da Cunha, Garibaldi, Gramado, Guabiju, Guaporé, Montauri, Monte Belo do Sul, Nova Araçá, Nova Bassano, Nova Pádua, Nova Prata, Nova Roma do Sul, Protásio Alves, Pirai, Santa Tereza, São Jorge, São Marcos, São Valentim do Sul, Serafina Corrêa, União da Serra, Veranópolis, Vila Flores, Vista Alegre do Prata (AGDI, 2015).

In this context, it is possible to realize how the companies of the furniture industry of State Rio Grande do Sul, Brazil, and above all the companies of the Serra Gaúcha, has been growing and standing out on the market, and therefore the relevance of the research dealing with innovation, and that enable obtaining competitive advantage for companies and for the sector.

## 4. RESULTS AND DISCUSSION

The process of data analysis is to extract meaning from data, sort them for analysis, conduct separate analyses, deepen the understanding of the data, and explain your broader meaning (CRESWELL, 2007). So, after the categorization of answers through qualitative content analysis, has been identified in the present study the relationship between businesses and industry, and the results presented in Table 2.

Thus, it was observed that the involvement of associations occurs in relation to the integration of industries, that is, suppliers, logistics and customers, facilitating the negotiations. In addition, create projects to the external market, provide knowledge about new technologies available in the market, new trends, and new legislation in force. However, this integration is complex and difficult to deal with the perception of respondents, and could be improved to benefit the industry as a whole.

As the expectations for the future, it was observed that are being traced and followed goals and change strategies to react to the current economic crisis, since, according to the respondents, companies go through difficulties, however, are optimistic as to the future, seeking technological solutions, innovation in products and services, and creating actions in conjunction with the sector aiming at the international market.

**Table 2 - Relationship between Industry companies**

	<b>EFFECTIVE ROLE OF ASSOCIATIONS</b>	<b>CONCRETE RESULTS OF INTEGRATION OF THE SECTOR</b>	<b>FUTURE PERSPECTIVE</b>
<b>E1</b>	Makes closer the relationship between supplier and customer industries.	The integration between furniture companies is rather difficult and complex.	The integration between furniture companies is rather difficult and complex.
<b>E2</b>	The effective involvement of furniture associations in Sierra is minimal.	The integration generates knowledge about new technologies available on the market, and legislation.	The integration generates knowledge about new technologies available on the market, and legislation.
<b>E3</b>	Effective role in export projects and market research.	Strengthening the claims on the Government.	Strengthening the claims on the Government.
<b>E4</b>	Provide knowledge about technology and legislation.	The integration between furniture companies is rather difficult and complex.	The integration between furniture companies is rather difficult and complex.
<b>E5</b>	Find ways to strengthen the sector.	The integration generates knowledge about new technologies available on the market, and legislation.	The integration generates knowledge about new technologies available on the market, and legislation.

Source: Prepared by the authors.

The analysis about the relationship between companies in the furniture sector and Government, is presented in table 3.

**Table 3 - Relationship between companies and government**

	<b>Integrated government participation in innovation projects</b>	<b>RESULTADOS CONCRETOS DE INTEGRAÇÃO ENTRE GOVERNO E SETOR</b>
<b>E1</b>	Imperceptible participation of the government.	It requires more investment and incentives on the part of the government.
<b>E2</b>	No government support to innovate and grow.	There are no results.
<b>E3</b>	You don't understand government support.	I have no knowledge of any results.
<b>E4</b>	Technical laboratories, technical schools and commercial actions focused on the export of furniture.	There was a tax burden reduction on production and on products, encouraging sales and generating jobs.
<b>E5</b>	Through SEBRAE has given great help to small businesses.	SEBRAE has helped in the results of companies, mainly with planning and incentive to innovation.

Source: Prepared by the authors.

Thus, it was observed that the majority of respondents did not perceive the government's participation in innovation projects, except for one respondent, who reported that the government created laboratories and technical schools, commercial actions facing the export of furniture, in addition to the Activities of SEBRAE in the aid of micro-enterprises.

Similarly, when questioned about the concrete results of integration between the Government and the sector, respondents claim that they are non-existent, and that there should be more investment and incentives from the government. However, an interviewee claims that by reducing the tax burden on furniture in 2012, the government has encouraged industry sales and consequently generated jobs with this initiative, while the fifth respondent States that it perceives the effective participation of SEBRAE in the aid of the growth and innovation of micro-enterprises.

Finally, there was also analysis on the relationship between the companies of the furniture sector of the Serra Gaúcha and the universities, and the results presented in Table 4.

**Table 4 - Relationship between companies and university**

	<b>Strategic relationship with universities</b>	<b>Sources of information used to develop innovations</b>	<b>Concrete innovations in the last three years</b>
<b>E1</b>	Little involvement of the university with the sector.	Unknown source of information to develop innovation specifically of the furniture sector.	Adaptation of product features.
<b>E2</b>	Nonexistent	Nonexistent	Process improvements.
<b>E3</b>	Through the generation of professionals for the sector.	Through the courses, focused on the design and production of furniture, they generate skilled professionals for the sector, and develop innovations.	Changes in the design of the products.
<b>E4</b>	Through specialization courses in furniture production there is development of research work.	Exchange with other universities, visits to fairs of the segment and sharing of experiences of the companies.	Changes in the design of products, and improvements in processes.
<b>E5</b>	Nonexistent	Product design Development.	Process improvements.

Source: Prepared by the authors.

In this way, it was observed that the strategic relationship occurs through the generation of skilled professionals, in addition to the exchange of knowledge, as well as the realization of research works.

In relation to the sources of information used to develop innovations, it was possible to observe that the courses focused on the design and processes of production of furniture generate professionals that develop innovations in furniture industries. In addition, other sources of information are the realization of exchanges between universities, visits to fairs and sharing of experiences of the companies.

When asked about the existence of specific innovations in companies during the last three years the responses were as follows: a respondent answered that were created innovations in the functionalities of the products (product innovation), two responded that were created improvements in processes (process Innovation), and two responded that were carried out changes in design of products (product innovation). Thus, it was possible to observe that the innovations that have occurred in the industry over the last three years are related to product innovation and process Innovation.

## 5. FINAL CONSIDERATIONS

The research sought to identify the perception of entrepreneurs of the furniture industry of the Serra Gaúcha, regarding innovation in the perspective of the Triple Helix proposed by Etzkowitz and Leydesdorff (2000). So, was addressed to the companies' relationship with each other, with the Government, and with universities in the generation of innovation, with the purpose to understand how companies understand this relationship. In this way, through the study it was found that the use of the concept of the model is non-existent in practice of the companies studied.

Through research, it was found that there is a significant interaction between companies, as well as there is little incentive for the Government to generate innovations in the sector and little incentive for growth. As for the universities, it was possible to identify that play on your relationship with the furniture sector, because through the courses generate professionals to the market, in addition to performing research works related to the sector in issue.

As it has not been possible to observe the interaction between the propellers (Government, industry and University), it is possible to identify that even if there are claims of improvements in products and processes on the part of the respondents, there was no concrete actions for innovation in the sector in the last three years.

You can see that the Triple Helix model developed by Etzkowitz and Leydesdorff (2000) is not used as a tool to leverage the innovative process, and is not part of the strategic planning of companies so far, although some signs of future integration.

It is suggested for future studies, the analysis of innovation based on the Triple Helix in other sectors, creating quantitative questionnaire through the likert scale, and by applying the study to a larger sample size, the generalisation of results.

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