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INTRODUCTION

Interdisciplinarity is the main topic and the main goal of this conference.

Since the sixteen century with the creation of the first Academy of Sciences, in Napoles (Italy) (1568), and before that with the creation of the Fine Arts Academies, the world of science and arts began to work independently, on the contrary of the Academy of Plato, in Classical Antiquity, where science, art and sport went interconnected. Over time, specific sciences began to be independent, and the specificity of sciences caused an increased difficulty in mutual understanding.

The same trend has affected the Human and Social Sciences. Each of the specific sciences gave rise to a wide range of particular fields. This has the advantage of allowing the deepening of specialised knowledge, but it means that there is often only a piecemeal approach of the research object, not taking into account its overall complexity. So, it is important to work for a better understanding of the scientific phenomena with the complementarity of the different sciences, in an interdisciplinary perspective.

With this growing specialisation of sciences, Interdisciplinarity acquired more relevance for scientists to find more encompassing and useful answers for their research questions.

CIEO (Research Centre for Spatial and Organizational Dynamics) organises this conference, being Interdisciplinarity an important issue.

It is focused on social sciences with an integrative focus in the questions of well-being in society, and it is funded by the Foundation for Science and Technology. FCT rated CIEO with a classification of “Very Good” and one of the main reasons for this good evaluation was surely our potential for Interdisciplinarity.

CIEO has researchers from various scientific fields, and one of its main features is to develop knowledge from the interactions between complementary scientific areas of interest.

This conference was an excellent opportunity for strengthening and enriching our interdisciplinary systematic approach, not only for the CIEO members, but also for all the delegates researching in different scientific fields.

It was also an opportunity to show innovative research in social and human sciences, and to improve networks between researchers from different scientific disciplines.

The conference themes included topics from the following scientific fields: Economics, Management, Sociology, Psychology, Education, Sport, Tourism, Landscape Architecture, Geography and Political Sciences, just to mention a few.

As the CIEO is structured along three research areas, we have tried to organize the communications in parallel sessions corresponding to these three areas: 1) Cities and Spatial Dynamics; 2) Organizations, Innovation and Learning Spaces; 3) Tourism, Communities and Behaviour. There was also a significant number of communications included in the category of “Other topics”.

In this conference we had more than 300 communications presented in symposiums, parallel sessions, conferences and posters.

The diversity of papers and communications submitted enabled us to compile a scientific program which builds a bridge between theory and application. With its multidisciplinary focus, the scientific program covered a large number of topics, which we hope will provide many opportunities for stimulating exchange between participants in an interdisciplinary perspective.

Participants came from several countries, namely from Spain, Brazil and Portugal, and so, although the official language of the congress was English, presentations in Portuguese and Spanish were permitted.

In this “Book of Proceedings” papers could be written in English, Portuguese and Spanish.

101 of the communications presented at the conference are published here. They are organized in six parallel sessions and posters, corresponding to the structure of the conference program.

We believe this book can be an important contribution to establish the state of the art in the field of Interdisciplinarity in Social and Human Sciences.

The editors
Saul Neves de Jesus
Patrícia Pinto

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INNOVATION MANAGEMENT IN MICRO AND SMALL COMMERCIAL ENTERPRISES: AN ANALYSIS OF THE LEVEL OF INNOVATION

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ABSTRACT

Micro and Small Enterprises (MSE), mostly the Commercial MSE are considered the most dynamic and elastic forms of activity. In the economy, the foundation and development of these are important for the creation of the so-called “normal” economic environment. In the recent past, it was enough for enterprises to meet their needs in a profitable way to stay on the market, but that scenario has changed dramatically. The key to longevity and business competitiveness lies in innovation. Accordingly, the main objective of this research was to present a conceptual model of innovation research in Commercial MSE to analyse (1) the innovation level of Commercial MSE, (2) how the innovation presents itself in the Commercial MSE as a result of its business environments. For this the study was based on a sample of 213 Commercial MSE of the State of Piauí. The data were collected through the application of the Innovation Radar conducted by the SEBRAE Local Innovation Agents program. Statistical techniques of descriptive, exploratory and inferential nature were used. The results showed that MSE have innovation capacity between “Little Innovative” and “Occasional Innovative”.

Keywords: Micro and Small Commercial Enterprises, Innovation, Brazil, Management.

JEL Classification: M10, M20, M31

1. INTRODUCTION

In the recent past it was enough for companies to meet their needs in a profitable way to stay in the market, but that scenario has changed dramatically. It's no longer enough simply to meet needs in a profitable way; at present it's necessary to be one step ahead towards the future, because the strategies that have succeeded in the past are not guarantees of sustainable success, which can be exemplified by Tidd, Bessant and Pavitt (2005, p. 42) asserting that “organizations build capacities around a particular trajectory, and those that may be strong at a later (specific) stage of an established trajectory find, in general, next”.

Accordingly, organizations should seek tools and capabilities to assist them in gaining competitive advantages, which in Martín and López (2007, p. 267) conception refer to a “situation of superiority or favourable conditions that one thing has over another”, or as the authors themselves point out, “the concept of competitive advantage is understood as any characteristic of the company that differentiates it from the others, placing it in a relative position of superiority to compete” (p. 267), which Tidd *et al.* (2005) effectively elect as innovation, although a competitive advantage may arise from size or heritage, among other factors, the scenario gradually shifts in favour of those organizations that continuously manage to mobilize knowledge, what they already have; Information, or what is available in the environment, and the creativity to design the creation of novelties in their offerings, be they products or services, and the ways in which they create and launch these offers.

An innovation according to the Oslo Manual, which is a reference in the subject in several countries, is the implementation of a new or significantly improved product or service, or a process, or a new marketing method, or a new method organization of the workplace or in external relations (OCDE & FINEP, 2005).

Innovation is the specific instrument of business activity. It's the action that endows the resources of a new capacity to create wealth. Innovation actually creates the resource. A “resource” is something that does not exist until man discovers a use for something existing in nature and thus endows with economic value (Drucker, 1987).

Ultimately, as Tidd *et al.* (2005, p. 30), “the truth is that, whatever the technological, social or market conditions involved, the key to creating - and maintaining - competitive advantage tends to belong to those organizations that innovate continuously”. However, it should be noted that there are significant differences in the way large organizations innovate compared to their smaller counterparts, particularly Micro and Small Enterprises (MSE). Large organizations may have large resources invested

in Research and Development (R&D) or market research, which is almost impossible for MSE due to their financial fragility and the strong competitive pressure from the globalization of markets. While large organizations are apt to develop large-scale innovations, MSE often adopt innovation strategies through technology acquisition (Tidd *et al.*, 2005).

Given the importance attributed to innovation, the present research has the primary objective of verifying how the innovation presents itself in the Commercial MSE of the State of Piauí, considering that innovation is now considered as the key to obtaining competitive advantages, creating positive results both for the companies involved in the innovation process and for the economy as a whole.

Besides this brief introduction, the article is structured in four points. The following is the framework of the study, where the main concepts that guided the investigation are explained. Subsequently, the conceptual model and the research hypotheses are presented. Next, the methodology and the analysis of the results are presented, being this the core of the present investigation and, finally, the contributions of the accomplishment of this investigation.

2. THEORETICAL FRAMEWORK

2.1 Concepts of Innovation

Reichert, Camboim and Zawislak (2015) postulate that innovation is the result of the capacity of companies, taking into account the technological and market patterns in each branch of activity, of absorbing, adapting and transforming knowledge into technology and this into operational, managerial routines and commercial practices that lead companies to achieve superior performance, in keeping with Drucker's (1987) thinking that innovation is action that provides the resources of a new capacity to create wealth. In the words of Drucker (1987, p. 42), "Innovation creates, in fact, the resource. A resource is something that doesn't exist until man discovers a use for something existing in nature, and thereby endowing it with an economic value".

Schumpeter (1997), considered by some authors (*e.g.*, Titu, Raulea and Titu, 2015; Bayarçelik, Tassel and Apak, 2014; Tidd *et al.*, 2005) as a pioneer in innovation studies, states that innovation would be a spontaneous and discontinuous change in the flow channels, disturbance of equilibrium, which forever changes and shifts the pre-existing state of equilibrium, a new combination of elements in the economic system, a "creative destruction", as the result of this combination would break with the existing standards giving rise to new standards that would be followed by all the economic agents who could adapt to the new circumstances. It's a dynamic process in which new technologies replace old ones.

For OCDE and FINEP (2005) innovation can be understood as the implementation of a new or significantly improved product (product or service), or a process, or a new marketing method, or a new organizational business practices, the organization of the workplace or in external relations. The minimum requirement for defining an innovation is that the product, process, marketing method, or organizational are new (or significantly improved) for the company. This includes products, processes and methods that companies are the pioneers to develop and those that have been adopted by other companies or organizations (OCDE & FINEP, 2005).

2.2 Innovation and Competitive Advantage

The concept of competitive advantage is related to any characteristic of the company that differentiates it from the others, placing it in a position of relative superiority to compete. Martín and López (2007), explain that a competitive advantage must meet three criteria, must be related to a key factor of success in the market, must be substantial enough to give the company a differential and be sustainable in the face of changes in the environment. Although in the long run none is totally free from attacks by competitors.

In today's economy, which is considered to be a knowledge-intensive economy, innovation management is becoming one of the main drivers of change and gaining competitive advantage (Apak and Atay, 2014).

Thus, given the current competitive conditions in the markets, the only form of competitive advantage is continuous innovation at a faster pace than rival organizations (Toivonen, 2015).

Rusu (2016, pp. 166-167) states that "successful companies to survive and thrive introduce innovations that generate change within companies by implementing processes that have consequences on their business model enabling profit generation".

It's clear that the company of the present century is operating in an increasingly globalized environment, and that resources and capabilities and innovation should be considered as key elements in the strategy and in the maintenance and development of competitive advantages (Molano and Campo, 2014). For Seo and Chae (2016, p. 708), "the business world harbours a number of threats and uncertainties requiring a high degree of innovation as a factor of success. A strong degree of innovation can cover several risks when facing the market".

Specifically, innovation means efforts by companies to create economic value for consumers by positively increasing the difference between the perceived value of consumers and the economic costs incurred by companies. Companies will have a competitive advantage when they can create marginal economic value greater than their competitors. Thus, innovation can be a source of competitive advantage (Hamdani and Wirawan, 2012).

The competitiveness of a company in the market depends on the ability to "capture the market" using ideas and marketing innovation through business relationships. In this way, the competitiveness of the markets demands of the companies an innovative position, especially in what concerns the marketing (Gupta, Malhotra, Czinkota and Foroudi, 2016).

2.3 Innovation in Micro and Small Enterprises

Innovation and the development of innovative capabilities in MSE entails a number of difficulties, as Rovere (2001, p. 22) states “the innovative capacity of MSE depends on several factors related to the organization of the sector and the system of innovations in which they meet”. Paula (2014) says that for MSE it’s possible to notice a greater difficulty in the innovation process, because they have less access to sources of information on technologies and sources of financing, complemented by the lack of resources, few or non-existent investments in Research and Development (R&D), strong dependence on technology acquisition (Machinery and equipment) and limited managerial capacities (Demonel and Marx, 2015; Reichert *et al.*, 2015; Taborda, Estevão and Nunes, 2013), which leads them to operate with equipment and technologically outdated facilities, carrying out low investment in Research and Development, being slow and reluctant to adopt managerial and organizational innovations (Rodrigues, 2003).

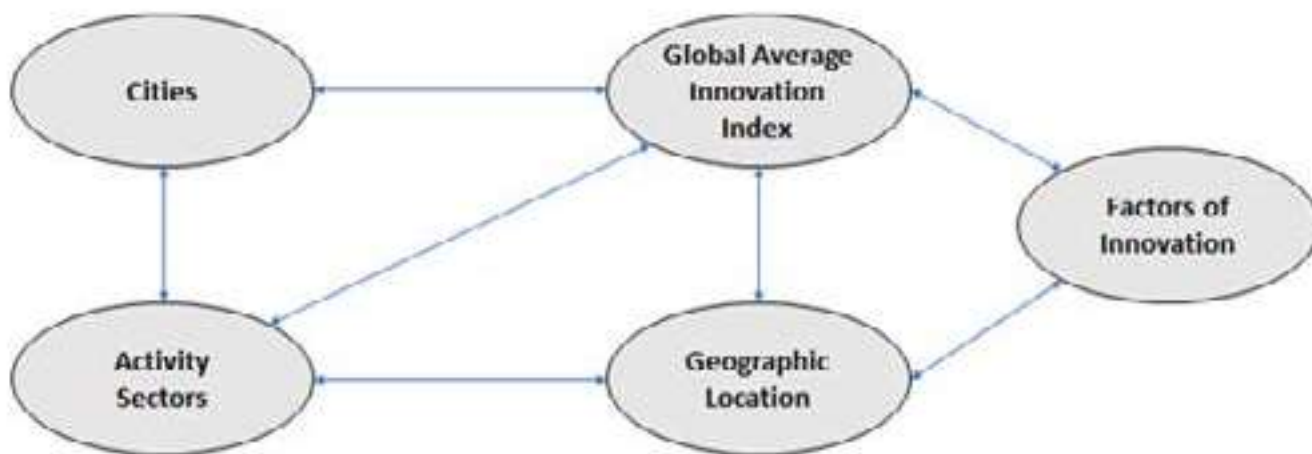
Pereira, Grapeggia, Emmendoerfer and Três (2009) argue that, even though MSE have difficulties in assimilating managerial professionalization, precarious levels of control, financial problems such as lack of working capital and incipient knowledge of the market in which they operate, most MSE entrepreneurs associate innovation less with the differentiated elaboration of products and services and more as a business model.

As a result of this context, innovation in MSE presents itself as the result of simple actions, in some cases with its own development, acquisitions of new equipment, adoption of innovation management practices and, usually, incremental innovations, presenting as an alternative types of advantages, resulting from attributes such as quality, processes, offer of new products that promote the differentiation of the organization, since they have particularities that are presented as sources of competitive advantage when compared to large companies. They usually have a leaner and more flexible organizational structure, placing them in closer contact with their clients, as well as carrying out activities with low capital intensity and high labour intensity, which can lead to differentiated production conditions (Rodrigues, 2003; Paula, 2014).

2.4 Conceptual Model and Research Hypotheses

The Figure 1 presents the conceptual research model proposed to evaluate how innovation presents itself in Commercial MSE. The proposed model was developed based on recommendations of the Oslo Manual (OECD & FINEP, 2005), considering innovation as a system of interactions and interdependencies.

Figure 1. Conceptual Model



The justification of the model is based on Skibinski and Sipa (2015). They claim that MSE because they have limited internal resources should make use of external knowledge sources. In this way, the ability to exploit and use the knowledge that comes from abroad becomes a key element and predictor of successful innovation, which makes the environment in which they are located and the development of appropriate tools to exploit it. The general and classic models of innovation presented by Rothwell (1994) define innovation as a set of processes that should be undertaken by the organizations in isolation for the development of innovations, especially in the development of new products. Recent models of innovation such as Cooper (1988), Khurana and Rhosental (1997), Koen *et al.* (2001), Flynn, Dooley, O’sullivan and Cormican (2003), Boeddrich (2004), Reid and Brentani (2004), Wihitney (2007), Brem and Voigt (2009) and Kurkkio, Frishammar and Lichtenthaler (2011), besides being strictly theoretical, focused on large companies and on processes that companies must undertake in isolation, they also emphasize the development of products to the detriment of the development of other types of innovation, such as services, processes, marketing and organizational. The theoretical model presented in this paper differs from the models listed by (i) being a model that seeks to investigate how the degree of innovation is configured to the detriment of the business environment, having a more comprehensive perspective than the company object alone, as is the case with the above mentioned models; (ii) to characterize itself as a suitable model for the investigation of innovation in Micro and Small Enterprises by presenting a system of interactions between Micro and Small Enterprises and their business environments, thus enabling the investigation of the degree of innovation according to location geographical; (iii) to provide information on Micro and Small Enterprises innovation in a global way, not limited solely to the development of products.

Accordingly, with the main objective of the study the conceptual model, the following research hypotheses were established:

H₁: The Micro and Small Commercial Enterprises of the State of Piauí present themselves as little innovative.

The conceptual framework of the research hypothesis 1 is based on Demonel and Marx, (2015), Reichert *et al.* (2015) and Taborda *et al.* (2013), because they say that innovation in MSE entails greater difficulties related to lack of resources, scarce or nonexistent investments in Research and Development (R&D), strong dependence on technology acquisition (Machinery and equipment) and limited managerial capacities. Nevertheless, in developing countries (DC), as Rojas and Carrillo (2014) point out, market failures such as imperfect competition, externalities and information asymmetries have a negative impact on companies' capacity for innovation, that they assume defensive and merely reactive strategies

H₂: Innovation in Micro and Small Commercial Enterprises in the State of Piauí presents itself differently due to its business environments.

H_{2,1}: The Global Average Innovation Index is different by cities;

H_{2,2}: The Global Average Innovation Index is different by geographic location.

The conceptual framework of the 2nd research hypothesis is based on Aarstad, Kvitastein and Jakobsen (2016), since they point to the geographic environment as an important factor influencing growth, profits and business development, including survival and innovation performance. In this sense, as established by Skibinski and Sipa (2015), innovation in MSE may be associated with its ability to explore and use the knowledge that comes from its environment.

2.5 Methodology

The instrument used for data collection was a questionnaire survey. The instrument is composed of 32 items that evaluate 13 dimensions of the innovation, resulting from an adaptation made by Bachmann (2011) for application in MSE of the Innovation Radar, of Sawhney, Wolcott and Arroniz (2006), originally constituted of 12 (Twelve) dimensions. The innovation dimensions assessed by the Innovation Radar are: (1) Supply; (2) Platform; (3) Brand; (4) Customers; (5) Solutions; (6) Relationship; (7) Value Aggregation; (8) Processes; (9) Organization; (10) Supply Chain; (11) Presence; (12) Network and (13) Innovative Ambience.

The study was conducted with a sample of 213 Micro and Small Commercial Enterprises of the State of Piauí, Brazil, during the months of October 2014 to October 2015. For the treatment, analysis and interpretation of the data were used the software SPSS Statistics in its version 22 and Numbers in its version 3.1. The statistical techniques used were descriptive, exploratory and inferential in order to describe, analyse and interpret the behaviour of the attributes under study. Thus, in the first phase we chose to calculate the Global Average Innovation Index (GAI), obtained by means of the simple arithmetic mean of the above mentioned 13 (Thirteen) dimensions of Innovation Radar (Equation 1).

$$GAI = \frac{1}{n} \sum_{i=1}^n X_i \quad [1]$$

Where, n , corresponds to the number of independent variables of the Innovation Radar;
 X_i , corresponds to the independent variables of the Innovation Radar ($i = 1, \dots, 13$)

$$GAI = \frac{1}{13} \sum_{i=1}^{13} X_i \quad [2]$$

Where,

X_1 , Supply; X_2 , Platform; X_3 , Brand; X_4 , Customers; X_5 , Solutions; X_6 , Relationship; X_7 , Value Aggregation; X_8 , Processes; X_9 , Organization; X_{10} , Supply Chain; X_{11} , Presence; X_{12} , Network; X_{13} , Innovative Environment.

A sample error of 6,71% and a significance level of 5% was used to calculate the sample size.

In order to make the decisions regarding the differences of research hypotheses, a 5% of significance level was assumed throughout the analysis.

2.6 Analysis and Presentation of Results

The study sample consists of 213 Commercial MSE distributed among six cities in the State of Piauí, as follows: Teresina 118 (55,4%); Bom Jesus 24 (11,3%); Floriano 11 (5,2%); Piri-piri 21 (9,9%); Picos 18 (8,5%) and Parnaíba 21 (9,9%).

Regarding the location, 55,4 % of the Commercial MSE in the sample are located in the state capital, while 44,6% are located in the interior of the State. In order to answer the first research hypothesis, the Global Average Innovation Index (GAI) was calculated by means of the simple arithmetic mean of the 13 dimensions of the Innovation Radar, whose overall mean value was 2.00 points (deviation standard of 0.93), denoting globally that the Commercial MSE of the study sample have innovation capacity between “Little Innovative” and “Occasional Innovative”, according to the adapted classification of Neto and Teixeira (2011), in which the final average score 1 (One) means “Little Innovative”; The final average score 3 (Three) means “Occasional Innovative” and the final average score 5 (Five) means “Systemic Innovative”. The mean standard deviation of 0.93 indicates that the firms analysed responded to questions related to the Innovation Radar in the same sense, that is, there was little variability around them.

Since the Commercial MSE of the sample have a GAI of 2,00 points (standard deviation of 0,93), indicating that they are between “Little Innovative” and “Occasional Innovative”, responding to research hypothesis 1, we intend to verify if there are differences in the GAI average for cities and geographic location to answer the research hypothesis 2.

The verification of the existence of differences in the GAI average for the cities is done through the application of One-Way ANOVA. In order to be a parametric test, some assumptions need to be validated, namely if the variables follow the normal distribution in the different independent groups (using the Kolmogorov-Smirnov test), homogeneity of variances (Levene test), and Independency between groups, assuming a significance level of 5%. Considering the normality test, Kolmogorov-Smirnov test, it was concluded that at a significance level of 5% there is enough statistical evidence to state that the study variable does not follow a normal distribution in the independent groups under study.

Given the violation of the first assumption for the application of the parametric test, the non-parametric alternative, in the case in question, was immediately applied to the Kruskal-Wallis test, in order to compare the GAI distributions in the six cities (Independent groups).

Using the Kruskal-Wallis test, considering that the obtained value was less than 0,001, it can be concluded that there is statistical evidence at the significance level of 5% to state that at least one of the GAI distributions is different for the six cities.

In order to verify if there are differences in the GAI mean for the Geographic Location, the t-Student parametric test was used for two independent samples, where application assumptions are normal population or $n \geq 30$ observations and unknown standard deviation.

However, once the sample size is different in both groups, the Levene test was applied to verify if the variances were homogeneous assuming a significance level of 5%. From the results obtained it's concluded that there is not enough statistical evidence to affirm that the variances are significantly different for a level of significance of 5%, since the obtained value was 0,930, higher than the level of significance assumed. In relation to the t-Student, considering that the test value is 0,132, higher than the level of significance assumed, it is concluded that there is enough statistical evidence to affirm that the average GAI is equal for the Commercial MSE comparing the interior and the capital, at a level of significance of 5%.

Based on what has been presented previously, it's concluded that the first research hypothesis have not been validated, that is, since the Average Global Innovation Index obtained through the average of the 13 dimensions of the Innovation Radar applied in the 213 Commercial MSE of the State of Piauí was 2.00 (standard deviation of 0.93), the Commercial MSE of the sample under study had an innovative capacity between “Little Innovative” and “Occasional Innovative”, resulting in a non-validated research hypothesis 1. Because the GAI distribution is the not the same among cities, but though the GAI average is the same for geographical location, the research hypothesis 2 is valid since there is sufficient statistical evidence to affirm that the innovation not presents itself totally homogenized for the Commercial MSE of the study, using the control variables City and Geographic Location.

Šoltés and Gavurová (2014) argue that the effective development of innovation requires a functional innovation system composed of institutions, policies and tools to create conditions that promote innovation. After all the inferential analysis carried out, contrary to the literature on the subject (*e.g.*, Demoneil and Marx, 2015; Taborda *et al.*, 2013) that present Commercial MSE as not very innovative, it is possible to state that there are indications that the functional innovation system that promotes the promotion of innovation by Commercial MSE is to a certain extent present in the State of Piauí, although in an incipient form, since Commercial MSE have innovation capacity between “Little Innovative” and “Occasional Innovative”, leaving room for fundamental improvements in the degree of innovation, and that this capacity is homogenized for the Commercial MSE of the study.

2.7 Research Contributions

As mentioned above, the main objective of the present investigation was to verify how the innovation presents itself in the Commercial MSE of the State of Piauí, so that the following hypotheses of investigation were established: H_1 : The Micro and Small Commercial Enterprises of the State of Piauí present themselves as little innovative; H_2 : Innovation in Micro and Small Commercial Enterprises in the State of Piauí presents itself differently due to its business environments (Cities and Geographical Location).

Overall, the Commercial MSE of the sample under study has innovation capacity between “Little Innovative” and “Occasional Innovative”, since the Average Global Innovation Index (IGMI) obtained through the average of the 13 dimensions of the applied Innovation Radar in the 213 Commercial MSE of the State of Piauí was 2.00 (standard deviation 0.93). Since the classification usually adopted establishes that the final average score 1 (One) means “Little Innovative”; The final average score 3 (Three) means “Occasional Innovative” and the final average score 5 (Five) means “Systemic Innovative”, it can be affirmed that the Commercial MSE of the sample under study have innovative capacity between “Little Innovative” and “Occasional Innovative”, resulting in a non-validated the research hypothesis 1.

In order to verify in a general way how the GAI of the Commercial MSE presents as a result of the variables of control City and Geographic Location, using inferential analyzes, it was observed that the distribution of GAI is not the same between Cities and that the GAI average is the same for geographic location. Because the GAI distribution is not the same among cities, but though the GAI average is the same for geographical location, the second research hypothesis is validated, since there is sufficient statistical evidence to affirm that the innovation not presents itself totally homogenized for the Commercial MSE of the study, using the control variables City and Geographic Location.

The results obtained provide an important practical contribution to the management and monitoring of innovation in Micro and Small Enterprises in a given region by presenting an indicator that reflects how much innovation is present, serving as a parameter for potential improvements both by companies and by the public power. As theoretical contributions, the presented model leads to useful and systematic information on how innovation presents itself in Micro and Small Enterprises in a global way as a result of its business environments, and can thus be useful as a model that serves as a parameter for the Improvement of innovation through public policies aimed at improving the business environment that increase the degree of innovation of the companies that constitute it, and therefore validate the theoretical model in the case in question. Possible public policies are the establishment of partnerships with universities and local research institutes, with a view to obtaining the necessary resources for innovation, the formation of innovation networks between Micro and Small Enterprises and financial subsidies by the government for companies that join the innovation networks.

The limitations of the study are the unavailability of information on the number of employees, turnover, investments in R&D and training efforts, which would be useful for more detailed analyses of the innovation capacity of the companies studied. In addition, although the theoretical model presents useful information of the global form as the innovation presents itself, it does not make it possible to identify in detail the types of innovation developed by the companies studied, considering the innovation as a homogeneous whole within a given business environment.

As future research, we intend to develop studies that identify the factors that serve as obstacles or that facilitate innovation in Commercial MSE, the relationship between innovation and economic development, and how the quality of human resources influences Commercial MSE innovation capacity.

REFERENCES

- Apak, S., & Atay, E. (2014). Global Innovation and Knowledge Management Practice in Small and Medium Enterprises (SMEs) in Turkey and the Balkans. *Procedia - Social and Behavioral Sciences*, 150, 1260-1266.
- Akis, E. (2015). Innovation and Competitive Power. *Procedia - Social and Behavioral Sciences*, 195, 1311-1320.
- Aarstad, J., Kvitastein, O., & Jakobsen, S. (2016). Related and unrelated variety as regional drivers of enterprise productivity and innovation: A multilevel study. *Research Policy*, 45, 844-856.
- Bayarçelik, E., Tasel, F., & Apak, S. (2014). A Research on Determining Innovation Factors for SMEs". *Procedia - Social and Behavioral Sciences*, 150, 202-211.
- Bachmann, D. L. (2011). *Metodologia para determinar o radar da inovação nas pequenas empresas*. Curitiba: (s.n.).
- Boeddrich, H. J. (2004). Ideas in the workplace: a new approach towards organizing the fuzzy front end of the innovation process. *Creativity & Innovation Management*, 13, 4, 274-285.
- Brem, A., & Voigt, K.I. (2009). Integration of market pull and technology push in the corporate front end and innovation management-insights from the German software industry. *Technovation*, 29, 5, 351-367.
- Cooper, R. G. (1988). The new product process: a decision guide for management. *Journal of Marketing Management*, 3, 3, 238-255.
- Drucker, P. (1987). *Inovação e Gestão: uma nova concepção de estratégia de empresa*. Lisboa: Editorial Presença.
- Demonel, W., & Marx, R. (2015). Gestão da Cadeia de Valor da Inovação em ambientes de baixa intensidade tecnológica. *Production*, 25, 4, 988-999.
- Flynn, M., Dooley, L., O'sullivan, D., & Cormican, K. (2003). Idea management for organisational innovation. *International Journal of Innovation Management*, 7, 4, 417-442.
- Gupta, S., Malhotra, N., Czinkota, M. & Foroudi, P. (2016). Marketing innovation: A consequence of competitiveness. *Journal of Business Research*, 69, 5671-5681.
- Hamdani, J., & Wirawan, C. (2012). Open Innovation Implementation to Sustain Indonesian SMEs. *Economics and Finance*, 4, 223-233.
- Koen, P. A., Ajamian, G., Burkart, R., Clamen, A., Davidson, J., D'amore, R., Elkins, C., Herald, K., Incorvia, M., Johnson, A., Karol, R., Seibert, R., Slavejkov, A., & Wagner, K. (2001). Providing clarity and a common language to the "fuzzy front end". *Research Technology Management*, 44, 2, 46-55.
- Khurana, A., & Rosenthal, S. R. (1997). Integrating the fuzzy front end of new product development. *Sloan Management Review*, 38, 2, 103-120.

- Kurkkio, M., Frishammar, J., & Lichtenthaler, U. (2011). Where process development begins: a multiple case study of front end activities in process firms. *Technovation*, 31, 9, 490-504.
- Martín, L. A., & López, J. M. (2007). *La Dirección Estratégica de la Empresa: teoría y aplicaciones*. Pamplona: Editorial Aranzadi.
- Molano, C., & Campo, J. (2014). Gerencia estratégica e inovação empresarial: referentes conceptuales. *Revista Dimensão Empresarial*, 12, 1, 107-116.
- Neto, A., & Teixeira, R. (2011). *Mensuração do Grau de Inovação de Micro e Pequenas Empresas: Estudo em Empresas da Cadeia Têxtil-Confeção em Sergipe*. XXXV ENANPAD, Rio de Janeiro, Setembro.
- OCDE & FIEP. (2005). Manual de Oslo. (3.ed.). Retirado de: <http://www.mct.gov.br/upd_blob/0011/11696.pdf>. Acedido em 02 de setembro de 2016.
- Paula, C. (2014). *Análise do grau de inovação das Micro e Pequenas Empresas do segmento alimentício atendidas pelo programa Agentes Locais de Inovação na Região Oeste do Estado de Goiás*. (Dissertação de Mestrado, Faculdades Alves Faria, Goiânia, GO, Brasil).
- Pereira, M., Grapeggia, M., Emmendoerfer, M., & Três, D. (2009). Fatores de inovação para a sobrevivência das Micro e Pequenas Empresas no Brasil. *RAI - Revista de Administração e Inovação*, 6,1, 50-65.
- Reichert, F., Camboim, G., & Zawislak, P. (2015). Capacidades e Trajetórias de Inovação de Empresas Brasileiras. *Ram-Revista de Administração Mackenzie*, 16, 5, 161-194.
- Rodrigues, A. (2003). *Cluster e Competitividade: um estudo da concentração de Micro e Pequenas Empresas de Alimentos no município de Marília/SP* (Tese de Doutorado, Universidade de São Paulo, São Carlos, SP, Brasil).
- Rothwell, R. (1994). Towards the fifth generation innovation process. *International Marketing Review*, 11, 7-31.
- Reid, S. E., & Brentani, U. (2004). The fuzzy front end of new product development for discontinuous innovations: a theoretical model. *Journal of Product Innovation Management*, 21, 3, 170-184.
- Schumpeter, J.A. (1997). *Teoria do Desenvolvimento Económico: uma investigação sobre lucros, capital, crédito, juro e o ciclo económico*. São Paulo: Editora Nova Cultura.
- Seo, Y., & Chae, S. (2016). Market dynamics and innovation management on Performance in SMEs: Multi-agent simulation approach. *Computer Science*, 91, 707-714.
- Šoltés, V., & Gavurová, B. (2014). Innovation policy as the main accelerator of increasing the competitiveness of small and medium-sized enterprises in Slovakia. *Economics and Finance*, 15, 1478-1485.
- Sawhney, M. Wolcott, R. C., & Arroniz, I. (2006). *The 12 Different Ways for Companies to Innovate*. MIT, Spring.
- Skibinski, A., & Sipa, M. (2015). Sources of Innovation of Small Businesses: Polish Perspective. *Economics and Finance*, 27, 429-437.
- Rusu, B. (2016). The Impact of Innovations on the Business Model: Exploratory Analysis of a Small Travel Agency. *Procedia - Social and Behavioral Sciences*, 221, 66-175.
- Rovere, R. L. (2001). Perspectivas das Micro, Pequenas e Médias Empresas no Brasil. *Revista de Economia Contemporânea*, 5, 20-38.
- Rojas, S., & Carrillo, A. (2014). Sistema para la evaluación de capacidades de innovación en pymes de países en desarrollo: caso Panamá. *Revista Facultad de Ciencias Económicas*, XXII, 2, Diciembre, 109-122.
- Tidd, J., Bessant, J., & Pavitt, K. (2008). *Gestão da Inovação*. (3.ed.). Porto Alegre: Bookman.
- Titu, A., Raulea, A., & Titu, S. (2015). Innovation a Challenge for the 21st. Century Managers. *Economics and Finance*, 27, 126-135.
- Toivonen, T. (2015). Continuous innovation-combining Toyota Kata and TRIZ for sustained innovation. *Engineering*, 131, 963-974.
- Taborda, C., Estevão, C., & Nunes, S. (2013). A gestão da inovação nas PME's da Beira Interior: as perspetivas dos gestores. *Tourism & Management Studies*, 9, 2, 124-129.
- Whitney, D. E. (2007). Assemble a technology development toolkit. *Research Technology Management*, 50, 5, 52-58.