The innovation challenge in micro and small enterprises (MSE)

An exploratory study at São Paulo metropolitan region

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Abstract

Purpose – This study aims to measure the degree of innovation of micro and small industrial companies in the West and Southwest metropolitan regions of the city of São Paulo, through a survey with 203 firms in the metallurgy sector.

Design/methodology/approach – The research had a quantitative and descriptive focus and used as methodology the validated and international approach known as Innovation Radar.

Findings – The degree of innovation in these micro and small companies is low; thus, the authors could not characterize them as systemic innovators. Most of them are little innovative, although some were classified as occasional innovators. The dimensions organization, processes, presence, supply chain and added value were the least developed.

Research limitations/implications – To carry out similar studies in other Brazilian regions, to compare results and draw new conclusions, or even check if the degree of innovation present in micro-firms of these regions would not be even lower; to monitor the evolution of companies through a longitudinal study, to detect improvements in the degree of innovation; and to conduct a qualitative research that can deepen questions on the results of our study, such as the reasons why this type of company does not adopt innovative practices, or even the real suitability of the Innovation Radar model for micro and small enterprises (MSEs). We observed that some dimensions proved to be too sophisticated for these companies, such as R&D investments and the adoption of technological advances.

Practical implications – The study shows that the degree of innovation measured by the Innovation Radar is a useful and initial measure to check an innovative attitude in micro and small companies. It can also drive the actions that should be prioritized to stimulate the culture of innovation in SME. However, it does not allow to answer why this type of organization does not adopt innovative practices as a management attitude. Regarding its contribution, the authors expect that the paper may bring an awareness of managers and owners of micro and small companies for the need to foster innovative practices that can help increase the competitiveness and survival of this type of organization.

Social implications – In Brazil, despite the fact that MSEs represent 98 per cent of the existing companies, and are mainly responsible for job creation, their leaders have a low concern for innovative practices.

Originality/value – The study contributes to identify the degree of innovation of these firms, which comprise a representative and strategic segment of the city's economy, by checking to what extent an innovative attitude is effectively present in this sector. The theoretical contribution of this study regards the appropriateness of mechanisms or methodologies created to measure the degree of innovation in large organizations. Dimensions such as technological platform, brand, innovative ambience, degree of organization or systematization of processes, which are frequently considered for companies in general, and especially for large ones, are not sufficient or, instead, too sophisticated to allow an effective measurement of the degree of innovation in MSE. Thus, this study provides information for designing more effective ways to evaluate the degree of innovation that take into account MSE's specificities, which can be considered innovation efforts, such as simple process improvements, professional development of teams, and actions to seize ideas and opportunities, among others.

Keywords Innovation, Degree of innovation, Micro and small enterprise

Paper type Research paper

1. Introduction

This article aimed to identify the practices and degree of innovation of micro and small enterprises (MSEs) based on the assumption that innovation contributes to improve competitiveness and, consequently, the longevity of smaller companies.

Innovation indicators enable the understanding and monitoring of the processes of production, dissemination and use of scientific knowledge and new technologies. There is a growing awareness of the need to improve and consolidate innovation indicators in micro and small- enterprises in the State of São Paulo (Bachmann & Destefani, 2008), mainly due to the relevance of these companies for the country's economic development.

On the other hand, when investigating the degree of business innovation of Brazilian entrepreneurs, we noticed that it is below the average of the great majority of countries, that is, innovation is generally incipient in companies, and smaller Brazilian firms are those with the least innovative content (Serviço Brasileiro de Apoio às Micro e Pequenas Empresas [Sebrae], 2014).

In times of economic or social crisis, the innovation process assumes greater relevance due to market shrinking and the increased competition between companies. Therefore, those that are more innovative and aware of the needs of change can achieve a competitive advantage regarding the provision of a better service to their customers. MSEs with a different mindset do not innovate and, for this reason, end up by losing business opportunities that arise during periods of instability (Serviço Brasileiro de Apoio às Micro e Pequenas Empresas [Sebrae], 2009).

The practice of innovation does not necessarily relate to a great discovery; innovation, as a competitive differential, can also comprise practices for continuous improvement of processes and services, or new management practices (Organization for Economic Co-operation and Development [OECD], 2005). More specifically, to innovate in the context of MSEs can mean, for example, searching for new markets, solving customers' problems, developing new pricing systems, improving the information flow in the supply chain, and also the creation of mechanisms to promote innovation, such as suggestions of programs that encourage employees to develop new ideas (Morgado, 2011).

The general assumption of this article is that innovation is a critical factor for any organization, especially for small ones; it is one of the variables that enable a company to adapt to the new demands of the environment, thus ensuring a competitive advantage and, consequently, its own organizational survival.

In contrast to large companies, the ease of innovating in MSEs is higher (Organization for Economic Co-operation and Development [OECD], 2006; Serviço Brasileiro de Apoio às Micro e Pequenas Empresas [Sebrae], 2009); due to their smaller size, there is greater proximity between managers and employees, which facilitates the decision-making process, the communication, the commitment of teams and, consequently, the receptivity to innovation. In addition, MSEs are the companies that can most benefit from open innovation, in which external sources of knowledge become a substitute for internal R&D activities (Silva & Dacorso, 2013). If MSEs know how to use these differentials, they can consolidate a culture focused on innovation.

In view of the described context, we propose the following research question:

RQ1. Do micro and small metallurgical companies of the West and Southwest metropolitan regions of the city of São Paulo have an innovative attitude in managing their businesses?

We chose these regions for the field research because of their segment representation, both in the city and in the State of São Paulo, as well as the ease of access to these companies for sampling purposes.

The study contributes to the identification of the degree of innovation of these firms, which comprise a representative and strategic segment of the city's economy, by checking to what extent an innovative attitude is effectively present in this sector.

The theoretical contribution of this study regards the appropriateness of mechanisms or methodologies created to measure the degree of innovation in large organizations. Dimensions such as technological platform, brand, innovative ambience, degree of organization or systematization of processes, which are frequently considered for companies in general, and especially for large ones, are not sufficient or too sophisticated to enable an effective measurement of the degree of innovation in MSEs. Thus, this study provides information for designing more effective ways to evaluate the degree of innovation that takes into account MSEs' specificities that can be considered innovation efforts, such as simple process improvements, professional development of teams, actions to seize ideas and opportunities, among others.

To answer the research question, we defined as general objective the identification of the degree of innovation of metallurgical MSEs in São Paulo's West and Southwest metropolitan regions. And as a specific objective, we propose the classification of the firms in our sample according to the internationally validated model known as the Innovation Radar (IR) (Sawhney, Wolcott, & Arroniz, 2006), by ranking them in the following categories: systemic innovators, occasional innovators and little innovative companies.

2. Theoretical background

2.1 Innovation

Innovation is the introduction of novelty or improvement in the production or social environment, resulting in new products, processes or services (Act n. 10.973/2004- "The Innovation Act"). According to the Oslo Manual (OECD, 2005), it is also the implementation of a new or significantly improved product (good or service), or a process, or a new marketing method, or a new organizational method in business practices, in the organization of the workplace or in external relationships.

However, despite the importance of innovation for a nation's economic development and competitiveness, there is no clear consensus on its definition. Innovation has been mostly related to new technologies and/or new knowledge, which must be different from everything else created so far (Kotey & Sorensen, 2014).

To explore the concept of innovation, Table I summarizes the main definitions and their respective authors.

Analysis of Table I shows that the concept of innovation comprises a process that involves some kind of change, whether of small or high impact. This can mean very unusual creations, or improvements in organizational functions or activities. Hence, we can conclude that innovation is the successful introduction of products, services, processes, methods and systems that did not exist before, and contain new attributes that are different from the current standards.

2.2 The innovation radar
For the innovation process to occur, to be triggered or developed within an organization, it is necessary to know its innovative stage. The challenge is to access a reliable methodology that enables the evaluation of the degree of organizational innovation. One of the possibilities is the tool known as IR (Sawhney *et al.*, 2006).

This tool is a diagnostic that aims to measure the firm's degree of innovation and to point out which innovative activities it develops, as well as those that need to be stimulated. The IR uses 13 dimensions through which a company can look for opportunities to innovate. The development of such instrument was based on interviews conducted with managers responsible for activities related to innovation in several large companies, and achieved international validity. In Brazil, it led to a significant increase of academic publications.

At first, the IR had four key dimensions that served as business anchors:

(1) the offerings that a company creates;

(2) the customers it serves;

(3) the processes it uses; and

(4) the points of presence, where it places its offerings in the market.

To these four anchors, eight more dimensions were added: platform, brand, solutions, relationship (customer experience), value capture, organization, supply chain and network.

To these 12 dimensions, Bachmann and Destefani (2008) added another one, called innovative ambience, because they believed that an organizational culture conducive to innovation is also a prerequisite to facilitate the adoption of innovation. Table II presents such dimensions.

The IR admits that innovation is not an isolated event, but the result of a process. The focus is to assess not only the number of innovations, but also the maturity of the companies' innovation management process in a holistic way.

The indicator of the degree of innovation results from the average of the values for each of the 13 dimensions of the model, and it is useful to measure the degree of innovation in micro and small companies. As a diagnostic, the IR enables the observation of the firms' strengths and weaknesses regarding these dimensions.

2.3 Innovation radar and other ways of measuring the degree of business innovation
In Brazil, the main innovation indicators are collected by the Ministry of Science, Technology, Innovation and Communications (MCTIC) and the National Association of Research and Development of Innovative Companies (ANPEI). We present below other forms or methodologies that intend to evaluate the level of innovation in Brazilian companies (Paredes, Santana, & Fell, 2014).

The measurement of the degree of innovation aims to understand the growth of a company, country, study centers and technological institutions. However, despite many

Author	Definition
Thompson (1965)	Innovation is the creation, acceptance and implementation of new ideas, processes, products and services
Rogers (2003)	An innovation is an idea, practice or object that is perceived as new by an individual or other adoption unit
Rothwell and Gardiner (1985)	Innovation does not only entail the commercialization of major technological advances, but also includes the use of small-scale technological know-how changes (improvement or incremental innovation)
Drucker (2002)	Innovation is a tool by which entrepreneurs explore change as an opportunity for a different business or service
Porter (1990)	Companies achieve competitive advantage through acts of innovation, in its broadest sense, including both new technologies and new ways of doing things
Mezias and Glynn (1993)	Innovation is a non-routine, significant and discontinuous organizational change that incorporates a new idea, which is not consistent with the organization's current concept of business
Smith (2006)	It is the creation of something qualitatively new, through processes of learning and knowledge building
OECD (2005)	It is the implementation of a new or significantly improved product (good or service) or process, a new marketing method or a new organizational method in business practices, in the organization of the work environment, or in external relationships
Sawhney *et al.* (2006)	Innovation is the creation of new value for customers and for the firm through the creative change of one or more dimensions of the business system
Bessant and Tidd (2009)	Innovation is the process of translating ideas into useful and usable products or services
De Bes and Kotler (2011)	Innovation is the development of an innovation culture inside the firm, which allows producing and bringing to the market a constant flow of minor and incremental innovations
Financiadora de Inovação e Pesquisa (2011)	It is the introduction of products, services, processes, methods and systems that did not previously exist, or possess a new or different attribute from the current standard; they comprise several scientific, technological, organizational, financial, commercial and marketing activities
Kumar (2014)	Six are the dimensions that translate the concept of innovation: (1) speed and form; (2) propensity to adopt; (3) geographical characteristics; (4) marketing aspects; (5) learning effect; and (6) links with organizational functions
Kotey and Sorensen (2014)	It regards the improvement of existing products, services and processes in search of new markets, by using new sources of supply and development and new forms of organization
Massis, Frattini, Kotlar, Petruzzelli and Wright (2016)	They consider the possibility of creating innovation from tradition, taking advantage of the existing tacit and codified knowledge in the organization; they understand innovation as new functionalities or new meanings of products and services
Duran, Kammerlander, Whu, Van Essen, and Zellweger (2016).	Innovation involves two essential concepts: innovation *input* – financial investment to seize opportunities; and innovation *output* – patented knowledge or new products and services that lead to a higher organizational performance

Source: Based on bibliographic survey

Dimension	Variables/definitions	Score
Offerings	Offerings refer to products. This dimension considers as innovative the firm whose substantial part of revenues is associated to new products/services. For the calculation, it considered the variables: a) new markets; b) new products; c) daring; d) answer to environment; e) design; and f) technological innovation	30
Platform	It evaluates the company's ability to use the same infrastructure resources to offer different products/services. For the calculation, it considers the variables: a) production system; and b) product versions	10
Brand	Innovation in this dimension means taking advantage of the brand to leverage other business opportunities, or to use other businesses to value the brand. Trademark also indicates the company's innovative potential. The calculation considered the following variables: a) brand protection; and b) brand leverage	10
Customers	It identifies customers' needs, new markets, and listens to customers' suggestions. The proper use of this information is an innovative differential for companies in a competitive market. For the calculation, the following variables were considered: a) identification of needs; b) identification of markets; c) use of customers' expressions – processes; and d) use of customers' expressions – results	20
Solutions	It deals with the customized and integrated combination of goods, services and information that can solve customers' problems. It involves the offer of some complementary product/service to the public, creating new revenue opportunities. For the calculation, it considered the variables: a) complementary solutions; and b) resource integration	10
Relationship (Customer experience)	It deals with the ease of access provided to the customer by the company. For the calculation, it considered the variables: a) facilities and amenities; and b) computerization	10
Value capture	It reflects the company's adoption of new ways to generate revenues from information analysis or interaction with customers, suppliers and partners. For the calculation, the following variables were considered: a) use of existing resources; and b) use of opportunities for interaction	10
Processes	Use of modern administration methods and instruments, such as certifications, management practices or change of procedures to achieve higher efficiency, quality, flexibility, shorter production cycle or benefits for third parties. For the calculation, it considered the variables: a) process improvement; b) management systems; c) certifications; d) management software; e) environmental aspects; and f) waste management	30
Organization	It analyzes the way the company is structured, the partnerships it establishes and the reorganization of responsibilities. For the calculation, it considered the variables: a) reorganization; b) partnerships; c) external vision; and d) competitive strategy	20
Supply chain	It covers logistical aspects of the business, such as transportation, storage and delivery. For the calculation, it considered the variable "supply chain"	05
Presence	Distribution channels that the company uses to place its products/services on the market, and in places where consumers can purchase them. For the calculation, it considered the variables: a) points of sale; and b) new markets	10
Network	It assesses elements related to the network that connects the company and its products/services to the customers. For the calculation, it considered the variable "dialogue with the customer"	05
Innovative ambience	It deals with how innovative practices are stimulated within the firm's internal environment. For the calculation, the following variables were considered: a) external sources of knowledge; b) intellectual property; c) innovative daring; d) innovation funding; and e) collection of ideas	40
Total		210

Source: Sawhney *et al.* (2006)

attempts, there is still not a complete and universally accepted methodology, or a pattern of studies to evaluate such degree (Pinto, 2004; Rios & Pinto, 2004), which makes it a complex topic. As early as 1993, Matesco (1993) observed that academic publications neither agreed on the indicators and their variations used to highlight innovation efforts, nor on the origin of the correlation between the variables, or on the most appropriate method to check the implemented innovation.

The debate around this issue confirms Smith (2006), who considers that measuring the new poses some difficulties, since it is complex to identify exactly which innovative practice has brought better quality or generated more impacts in the market (Paredes *et al.*, 2014).

Although there is no specific standard to be followed for measuring the degree of innovation, there is an agreement on the need for tools that can constantly improve the performance and management of companies (Hronec, 1994).

Hence, the degree of innovation must be constantly monitored to achieve the benefits of innovation, such as the improvement of processes and the incentive to enhance knowledge and organizational learning, which increasingly favor the adoption of other innovative practices. However, companies, and especially MSEs, seek immediate results rather than long-term outcomes, making it difficult to adopt indicators that only make sense if they are continuously measured (Paredes *et al.*, 2014).

On the other hand, there are models for measuring the intensity of innovation within an organization. Our study draws on the comparison carried out by Garcia (2008) between five models developed by renowned researchers on this topic.

Among these models, the Oslo Manual is the most applied one for checking the degree of organizational innovation. It considers that innovation can result not only in products, but also in processes, in marketing and within the company's management (OECD, 2005). The Berreyre model (1975, *apud* Garcia, 2008) predicts that the dissemination of innovation is due to four main factors that seek to integrate the commercial, organizational, institutional and technological dimensions.

According to the results presented by the Industrial Survey of Technological Innovation (PINTEC, 2005), developed by the Brazilian Institute of Geography and Statistics [IBGE] and the Financing Agency for Innovation and Research [FINEP], which measures the level of innovation within organizations in Brazil, innovation do not result only from the Berreyere model indicators. They also arise from the knowledge resources used to improve existing products and services.

Another subsidy of great relevance is Schumpeter's model (1984, *apud* Garcia & Costa, 2009). It takes into account five dimensions of innovation that are essential to analyze the appropriate degree of innovation in an organization. These factors are the creation of new products; investment in better production processes; relationship with markets; creation of new inputs; and generation of a new market structure.

According to the model proposed by the IR, 12 dimensions characterize the degree of innovation of an organization: solutions, organization, platform, offerings, customers' experiences, customers, processes, value capture, presence, supply chain, network and brand (Sawhney *et al.*, 2006). These dimensions are based on the conceptual model of the 5W2H tool, which enables data collection from the most relevant routines of a production process or project.

Table III shows similarities and differences between the innovation dimensions in the five models considered. By examining these models, we observed that IR covers a larger number of dimensions, thus favoring, in theory, a more careful assessment of the adoption of innovation by an organization.

Figure 1 compares the IR with the other models previously mentioned.

Berreyre	IR	Pintec	Oslo manual	Schumpeter
Technological Dominance	Offerings	New products; Improved products	Products	Products
Technological Dominance	Processes	New processes; Improved processes	Processes	New methodology for manufacturing
Technological Dominance	Supply Chain			New sources of raw materials and inputs
Company Dominance; Institutional Dominance	Organization	Management	Organizational	
Commercial Dominance	Presence; Solution; Brand; Customers' experience		New markets; New channels; Offerings' customization; Brand management; Relationship with customers	Winning new markets; New market structures
	Customers; Value capture; Network; Platform			

Source: Adapted from Paredes *et al.* (2014)

Table III.
Dimensions of
innovation models: a
comparison
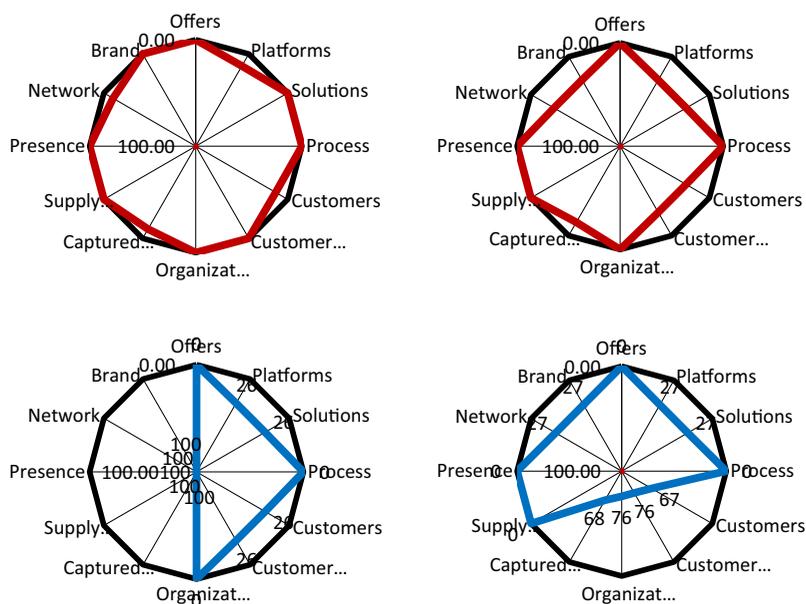
Source: Adapted from Garcia (2008) and Sawhney *et al.* (2006)

As the IR model enables a better view and measurement of innovative practices, Sebrae started to use it as a tool for its evaluations of the degree of innovation in Brazilian MSEs.

Given the relevance of IR, this diagnostic model has been widely used in academic research whose objective is to measure the degree of innovation, especially in Brazilian MSEs operating in different segments (Alves, Gonçalves, & Martins, 2014; Alzate, Hurtado, & Lopez, 2015; Carvalho, Silva, Póvoa, & Carvalho, 2015; Cavalcanti, Oliveira, & Cavalcanti, 2012; Dickel & Moura, 2016; Hillen & Machado, 2015; Lima & Müller, 2018; Oliveira, Cavalcanti, Paiva, & Marques, 2014; Paredes, Santana, Cunha, & Aquino, 2015; Paredes *et al.*, 2014; Silva, 2012; Silva & Teixeira, 2014).

3. Methodological procedures

This is a descriptive research, with the basic objective of presenting an exact characterization of a group – MSEs in the metallurgy sector – (Neuman, 1997), and a quantitative study, since data collected were significant (203 cases) and submitted to a descriptive statistical analysis. The chosen method was a survey, whose goal was declared by Freitas, Oliveira, Saccol and Moscarola (2000, p. 105) as "to produce quantitative descriptions of a population by using a pre-defined instrument".

To define the target population of the study, we carried out a preliminary survey of a Sindicato da Micro e Pequena Indústria do Estado de São Paulo [Simpi] (2016)/Datafolha publication on MSEs of the metallurgical sector, which listed 786 firms in the covered region, corresponding to 54 per cent of the total metropolitan area of the city of São Paulo. From this population, 203 agreed to take part in the research, making up an intentional sample according to the accessibility criterion. Data collection was carried out between

November 2014 and January 2015, using the IR as the instrument (Bachmann & Destefani, 2008; Sawhney *et al.*, 2006), as explained in the theoretical background section of this article.

The IR used to measure the degree of innovation was composed of three parts:

(1) Part I: questions related to the company's profile, such as corporate name, trade name, National Register of Legal Entities [CNPJ], address, telephone, National Register of Economic Activities [CNAE], number of employees and size of customer base.

(2) Part II: called "calculation of the degree of innovation", is formed by the 13 dimensions of the IR version, with 42 objective questions. Each dimension is made up by a set of indicators that receive scores 1, 3 or 5, according to the criteria adopted in the model.

(3) Part III: includes open questions that can contribute to the process of analysis of the existing innovation environment in the companies of the sample.

The 13 dimensions of Part II represent the ways a company can look for opportunities to innovate, namely, offerings, platform, brand, customers, solutions, relationship, value capture, processes, organization, supply chain, presence, network and innovative ambience.

The measurement of a company's degree of innovation is based on the analysis of the scores of these 13 dimensions, described in Table II, and the scores are given according to the following criteria:

• five points when the indicator happens systematically or is usual;

• three points when the indicator is present occasionally; and

• one point when the indicator is not present or does not exist.

The IR methodology states that the innovative company cannot show scores lower than 3 in any of the 13 dimensions considered. Firms that present an innovation process are those that have innovated over the last three years; however, the process is not systematic, thus the scores are between 2 and 3 in the 13 dimensions. Firms with a score 1 in all dimensions do not have any concern for innovation. For this classification, we used the nomenclature defined by Silva (2012), shown in Table IV.

4. Results

The survey carried out with the 203 MSEs of the sample showed a higher incidence of firms located in the West metropolitan region (Table V), comprised by the cities of Osasco,

Type of company	Definition	Score of the degree of innovation (DI)
Systemic Innovator	The firm practices innovation management systematically	DI is equal or higher than 4
Occasional Innovator	The firm has innovated in the last 3 years, but it is not a systematic process	DI is equal or higher than 3 and below 4
Little or not Innovative	The firm innovates little or does not innovate at all	DI is equal or higher than 1 and lower than 3. If the score is 1, the firm is not innovative

Table IV.
Classification of MSEs according to the scores of the degree of innovation

Source: Silva (2012, p. 71)

Barueri, Carapicuíba, Santana de Parnaíba, Cotia and Taboão da Serra (61 per cent), compared to the Southwest metropolitan region. This is explained by the concentration of industrial poles in the western region.

Table VI shows the number of employees in the firms, with a higher concentration of those with up to 19 employees (83 per cent), which characterizes our sample as effectively belonging to the MSE category.

We calculated the degree of innovation for the set of micro enterprises in the sample for each of the 13 dimensions considered in the model. We divided the sum of the average values of all dimensions by the total number of dimensions, as suggested by the IR methodology.

The value of the average degree of innovation achieved was 2.01 (considering the 13 dimensions), characterizing these industries as little innovative. Table VII presents the statistical distribution measures for the dimensions of the IR.

By analyzing the average values of each dimension, we observed that only one presented a high result – Platform – indicating that the researched MSEs take advantage of their infrastructure resources appropriately. Eight of the 13 dimensions foreseen in IR (62 per cent) – Processes, Value Capture, Presence, Network, Innovative Ambience, Organization, Supply Chain and Relationship – presented an average value lower than 2.00, therefore belonging to the category "little innovative". These dimensions require an immediate focus of attention, in case these firms wish to improve their respective degrees of innovation.

Table VIII shows the number of MSEs in each of the IR categories.

Among the 13 dimensions of the IR, only the "platform" dimension has a frequency from 3.00 to 3.99; for all the other dimensions, the highest frequency of MSEs is concentrated in the lowest category of innovation, from 1.00 to 2.00, confirming their low degree of innovation.

| | No. of micro firms | | | | | |
| | Metropolitan West | | Metropolitan Southwest | | Total | |
Sector of activity	N	(%)	N	(%)	N	(%)
Industry	124	61	79	39	203	100
Total					203	100
Source: Based on data from Sebrae/SP (2013)						

Table V.
Number of micro
firms according to
geographical
distribution by
sector – 2013

| | No. of industrial MSEs | |
No. of employees	N	(%)
Up to 4	101	50
From 5 to 19	69	33
From 20 to 99	31	16
From 100 to 499	2	1
TOTAL	203	100
Source: Based on data from Sebrae/SP (2013)		

Table VI.
Number of industrial
companies according
to the number of
employees

| Dimensions | Average | Degree of innovation | | Mode | SD |
		Minimum	Maximum		
Offerings	2.11	1.00	4.33	1.67	0.06
Platform	3.01	1.00	5.00	5.00	0.11
Brand	2.73	1.00	5.00	3.00	0.14
Customers	2.45	1.00	5.00	2.00	0.06
Solutions	2.05	1.00	5.00	1.00	0.13
Relationship	1.99	1.00	5.00	1.00	0.09
Value Capture	1.69	1.00	5.00	1.00	0.16
Processes	1.63	1.00	4.20	1.00	0.07
Organization	1.65	1.00	4.50	1.00	0.09
Supply Chain	1.68	1.00	5.00	1.00	0.04
Presence	1.77	1.00	5.00	1.00	0.10
Network	1.69	1.00	5.00	1.00	0.08
Innovative Ambience	1.68	1.00	3.75	1.25	0.07
Average Degree of Innovation	2.01				

Table VII.
Degree of innovation
of MSEs according to
IR dimensions

For a consolidated view of the results, we built the IR chart (Figure 2). The closer the average score of the dimension is from the center of the graphic, the lower the degree of innovation in that dimension; conversely, the further the line is from the center, the more innovative will be the set of companies in that dimension.

5. Discussion of results and final remarks

The results of the study showed that MSEs in our sample are not systemic innovators. We ranked most of them as little innovative (96.43 per cent), and a very small number as occasional innovators (3.57 per cent).

This finding is consistent with other research results that indicate that the degree of innovation in micro firms is practically zero, also stressing that Brazilian micro-entrepreneurs start their business activities without knowing about market conditions and the real possibilities of success, being more imitators than innovators (GEM, 2015).

For most MSEs, the innovation process is complex, which increases their trouble to innovate. According to Caron (2004), the main difficulties for MSEs to innovate are a weak relationship with technology centers, lack of physical infrastructure and suitable personnel, as well as financial resources. These reasons confirm the low degrees achieved in the dimensions Innovative Ambience, Value Capture and Relationship.

The tools and results of our study can serve as a basis or incentive for new studies on innovation in MSEs, especially with respect to the dimensions Organization, Processes, Presence, Supply Chain and Value Capture, since these were the less developed in our sample.

Thus, a first challenge for these micro-entrepreneurs would be to improve their companies' management, trying to make it more professional by adopting, for example, mechanisms for planning and monitoring activities, improvement and rationalization of working methods and a concern with higher levels of efficiency. The second challenge is to enhance the marketing function by essentially seeking to develop new distribution channels for products to get closer to consumers, or even start a formal process of searching new markets. The third challenge relates to the rationalization of policies and practices related to business logistics, such as improvement of transportation, storage and delivery of products.

Dimension	Degree of innovation	No. Firms
Offerings	1.00 to 2.00	100
	2.10 to 2.99	63
	3.00 to 3.99	35
	≥4.00	5
Customers	1.00 to 2.00	110
	2.10 to 2.99	14
	3.00 to 3.99	50
	≥4.00	29
Processes	1.00 to 2.00	125
	2.10 to 2.99	72
	3.00 to 3.99	5
	≥4.00	1
Network	1.00 to 2.00	138
	2.10 to 2.99	62
	3.00 to 3.99	3
	≥4.00	0
Innovative ambience	1.00 to 2.00	147
	2.10 to 2.99	53
	3.00 to 3.99	3
	≥4.00	0
Platform	1.00 to 2.00	16
	2.10 to 2.99	10
	3.00 to 3.99	179
	≥4.00	3
Brand	1.00 to 2.00	136
	2.10 to 2.99	65
	3.00 to 3.99	2
	≥4.00	0
Solutions	1.00 to 2.00	135
	2.10 to 2.99	64
	3.00 to 3.99	4
	≥4.00	0
Relationship	1.00 to 2.00	124
	2.10 to 2.99	72
	3.00 to 3.99	4
	≥4.00	3
Value capture	1.00 to 2.00	154
	2.10 to 2.99	45
	3.00 to 3.99	4
	≥4.00	0
Organization	1.00 to 2.00	128
	2.10 to 2.99	70
	3.00 to 3.99	3
	≥4.00	2
Supply chain	1.00 to 2.00	131
	2.10 to 2.99	69
	3.00 to 3.99	2
	≥4.00	1
Presence	1.00 to 2.00	147
	2.10 to 2.99	50
	3.00 to 3.99	4
	≥4.00	2

Table VIII.
Degree of innovation
ranges and number
of firms for each
dimension
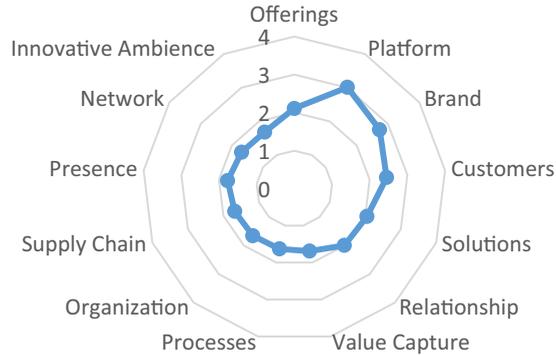
Another point of reflection regards the generation of higher revenues, based on the analysis of market information and operational costs, or through a better interaction with customers, suppliers and partners, to identify best practices of innovation, of performance, or their own way of operating in the market.

This is a study of regional coverage, therefore we cannot generalize its results to the universe of Brazilian MSEs; however, we used scientific mechanisms that allow, at least, a statistical generalization to the population surveyed, i.e. micro and small companies in the industrial sector of the West and Southwest metropolitan regions of the city of São Paulo.

We emphasize that, although the research dealt with the universe of MSEs located in these regions, the extrapolation of the results for the whole State of São Paulo, in the same segment, has limited potential. However, it is important to remember that the very model adopted by Sebrae (IR) presents some limitations because its dimensions do not always capture all fundamental aspects of innovation, such as risk tolerance, creativity and people.

In terms of contribution to the theoretical field of innovation, the results enabled us to conclude that it is necessary to develop a new tool or methodology that better reflects MSEs' characteristics, since certain dimensions of the IR, besides being sophisticated, are more significant and mainly designed for large companies. In addition, the number of IR dimensions is excessive for the MSEs environment, and it seems more coherent to direct efforts on the dimensions Offerings – focus on products, market and services – Platform – focus on resources balance – Processes – focus on improving management – and Organization – focus on the competitive strategy.

Innovation theory also states that, in a globalized economy, innovation should be part of the business strategy (Serviço Brasileiro de Apoio às Micro e Pequenas Empresas [Sebrae], 2009); this is another point of divergence with the study results, mainly because of the low averages achieved for the dimensions Organization and Processes.

Considering that the theoretical assumptions on innovation assign commercial relevance to this process due to the potential to increase the efficiency and profitability of companies (Gunday, Ulusoy, Kilic, & Alpkan, 2011), the research results show that MSEs do not benefit from these aspects, since dimensions Value Capture and Processes were little significant.

Innovation theory also states that the most innovative companies are the most competitive ones (Porter, 1990); however, our results question the validity of this statement for MSEs, since the dimensions Organization, Value Capture and Presence were little significant.

Although innovation theory recommends that a company should adopt a systematic and planned approach for this process, and take advantage of the available knowledge and

internal synergy, this is also harmed in the case of MSEs due to the bad results achieved for the dimensions Value Capture and Innovative Ambience.

The results still fail to confirm the suggestion of Rothwell and Gardiner (1985), who draw attention to incremental and small-scale aspects that can be considered as innovation. Thus, the use of technological expertise or process improvements are types of innovation that could be better employed by small companies, but are not, as shown by the low average values in Processes, Organization and Solutions.

It is worth noting that, for MSEs, the theoretical field known as "development of an innovation culture" represents another challenge for researchers who intend to shed light on how to implement measures or practices with this specific objective (De Bes & Kotler, 2011).

Kumar (2014) considers six dimensions that translate the concept of innovation:

(1) speed and form;

(2) propensity to adopt;

(3) geographical features;

(4) marketing aspects;

(5) learning effect; and

(6) connection with organizational functions.

The results of our study do not support most of these dimensions, since the dimensions approached herein, such as Offerings, Brand, Logistical Aspects, Relationship, Organization and Processes, received very low scores.

In addition to these theoretical aspects, Massis *et al.* (2016) consider the possibility of generating innovation from tradition, taking advantage of existing tacit knowledge, by understanding innovation as new functionalities or new meanings for products and services. This element shows a gap in the tool used in the research (IR), and is an opportunity or a research line to be taken by researchers concerned with encouraging the development of innovative practices, especially in MSEs.

It is worth remembering that most of the surveyed MSEs are run by owners, business founders or by professional managers. Thus, it is important to stress that behavioral aspects also affect the innovation process. When we try to understand entrepreneurship through the variable called Entrepreneur Profile, we assume that one of the behaviors of the entrepreneur is to innovate or to seek new opportunities for his/her company (Coda, Krakauer, & Berne, 2018). However, a recent research that tried to map behavioral profiles in MSEs revealed that one of the less frequent is the innovative profile. Hence, the theoretical implication that requires further investigation is how to stimulate significant degrees of innovation in SMEs; in fact, the innovative profile accounted for 8.6 per cent of the 12 different profiles mapped in that study.

As suggestion for future studies, we indicate some proposals:

• to carry out similar studies in other Brazilian regions, to compare results and draw new conclusions, or even check if the degree of innovation present in micro firms of these regions can be even lower;

• to monitor the evolution of companies through a longitudinal study, to detect improvements in the degree of innovation; and

• to conduct a qualitative research that can deepen questions on the results of our study, such as the reasons why this type of company does not adopt innovative practices, or even the real suitability of the IR model for MSEs.

We observed that some dimensions proved to be too sophisticated for these companies, such as R&D investments and the adoption of technological advances.

Finally, the study shows that the degree of innovation measured by the IR is useful as an initial measure to check an innovative attitude in micro and small companies. It can also drive the actions that should be prioritized to stimulate the culture of innovation in SMEs. However, it does not explain why this type of organization does not adopt innovative practices as a management attitude.

Regarding its contribution, we expect that the article may bring an awareness of managers and owners of micro and small companies for the need to foster innovative practices that can help increase the competitiveness and survival of this type of organization.

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