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PRACTICES OF MANAGEMENT ACCOUNTING ADOPTED BY INNOVATIVE COMPANIES

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ABSTRACT

Objective of the study: This study aims at verifying the relationship between innovative characteristics of organizations and the adoption of practices of management accounting.

Methodology/approach: Through an applied research, as survey type, with quantitative approach applied to a population of 787 companies that received financial assistance to the innovations development, a sample of 79 companies was obtained and the data of the survey were submitted to descriptive and cluster analysis.

Originality/Relevance: Studies related to management accounting (MA) and innovation tend to identify how MA can influence the innovation capacity of organizations, either positively or negatively, thus, this study seeks to advance the theme, with a relationship in another sense, analyzing how Innovation can influence the adoption of practices of management accounting.

Main results: Most of the organizations have, formally constituted, a department responsible for the management accounting information, the majority of companies were small size or medium companies. Regarding to the adoption of practices of management accounting (MA), it was identified the traditional practices of second stage usage with greater intensity, as breakeven point, budgeting and product profitability analysis. There was also a differentiation in the usage levels of the practices between organizations with innovative characteristics, with the most innovative companies using more modern MA practices.

Theoretical/methodological contributions: This research contributes to the understanding that there may be a gap between the needs of the organizations and what is developed and employed by MA besides showing that innovation can be a factor which can positively influence the adoption of more recently emergent practices.

Social/management contributions: In the social perspective, it is understood that this study presents a broader view on the applicability of management accounting practices in environments involved with innovation, expanding the field of knowledge about AM, as well as innovation environments.

Keywords: Accounting. Management accounting. Innovation.

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1 Introduction

The management accounting (MA) went through an evolutionary process over time, due to changes in the environment and, consequently, in organizations (IFAC, 1998). In the 1950s and 1960s, competition for quality and price was low, the technology of production processes was relatively simple and performed mainly by manual operations (Ashton, Hopper & Scapens, 1995; Abdel-Kader & Luther 2006). Since the 1970s, advances have been made in terms of production and data processing technologies, with the expansion of World-Wide Web and the development of e-commerce, increasing global competition (Ashton et al., 1995; Abdel-Kader & Luther, 2006), with greater emphasis on quality improvement, customer satisfaction and cost reduction (Arabi & Kavianifard, 2013).

Thus, as a result of the needs arising from competition among organizations (Reis, 2008), as well as criticisms related to the relevance loss of the management accounting (Johnson & Kaplan, 1987), several innovations have emerged in recent years like Activity-Based Costing (ABC), Activity-Based Management (ABM), Balanced Scorecard (BSC), Target Costing, and others (Chiwamit, Modell, & Yang, 2014).

In recent years, researches have identified a low implementation on new practices of management accounting by organizations (Green & Amenkhienan, 1992; Fullerton & Mcwatters, 2004, Abdel-Kader & Luther, 2006; Leite, Diehl, & Manvailer 2015), which may indicate a disconnection between the need of organizations and what is employed by the management accounting.

In addition, as a result of economic, technological and competition changes, organizations need to continually adapt to the new scenarios (Arabi & Kavianifard, 2013), seeking to gain competitive advantages to maintain their current

position and, moreover, stand out in relation to their competitors, with innovation being an ally in this process (Tidd, Bessant, & Pavitt, 2008). In this context, according to Andreassi and Sbragia (2002, p. 72), in order to remain competitive, the organization must continually insert "new products in the market, with greater cost-benefit to the customer, better quality and faster of its competitors".

Due to the strategic changes of organizations, mainly influenced by the competitive environment in which they operate and the need to insert innovations in the market, organizations need to adopt practices of MA that are aligned with their needs and interests (Espejo, Costa, Cruz, & Almeida, 2009). Chenhall and Moers (2015) also affirm that technological innovation (in products and processes) has a direct influence on management accounting, creating the need to adopt different practices from those used when the organization does not have the innovative characteristic.

Innovation should not be present alone in the research and development area (R & D), but should involve the whole organization (Rothwell, 1980; Volpato & Cimbalista, 2002). Therefore, an environment conducive to its evolution is necessary, from the commitment to a culture of innovation that encompasses the organization as a whole in a creative atmosphere (Tidd et al., 2008), thus influencing the behavior of the whole company and encompassing the various elements of an innovative organization, such as the stimulus to creativity, interest in innovation, broad communication (Rothwell, 1980; Oliveira, 2006; Tidd et al., 2008), among others.

In this sense, considering the contextual changes that lead to technological innovations in organizations and the changes that these innovations can cause in management accounting, as well as the low adoption of practices of

management accounting, especially those developed in recent years, already evidenced in previous studies (Green & Amenkhienan, 1992; Fullerton & Mcwatters, 2004; Abdel-Kader & Luther, 2006; Leite *et al.*, 2015). This study aims at answering the following research question: what is the relationship between innovative characteristics of organizations and adoption of management accounting practices? To answer this problem question, the objective is to verify the relationship between innovative characteristics of organizations and the practices of management accounting adoption in organizations.

2 Theoretical framework

2.1 Practices of management accounting

In order to be able to perform their function, helping to reduce risks in decision making (Atkinson, Banker, Kaplan & Young, 2000), in achieving the organizational objectives (Atkinson *et al.*, 2000; Souza, Lisboa & Rocha, 2003; Espejo, 2008) and to add value to clients, it is necessary for managers to use mechanisms that will assist in providing information (Morais, Coelho & Holanda, 2014).

These mechanisms have been treated in the literature in different ways, in Brazil the terms artifacts (Soutes, 2006; Espejo, 2008), practices (Souza *et al.*, 2003; Aleixo, 2005; Imlau, 2015), tools (Teixeira, Gonzaga, Santos & Nossa, 2011; Melo Segundo, 2012) and instruments (Santos, Rengel, Paterno & Beuren, 2009; Bertol, 2012). In the international literature, the most frequently used term is management accounting practices, according to Imlau (2015). In this research, it will adopted the term practices to refer to methods, artifacts, practices, tools and instruments used by management accounting.

Over time, management accounting has gone through several periods and new practices have emerged in response to new

demands (Chenhall & Langfield-Smith, 1998; Souza *et al.*, 2003; Costa, 2010).

The practices of management accounting are classified in different ways, from their characteristics, among the evolutionary stages defined by the International Federation of Accountants (IFAC) and in traditional and modern. In international studies, the predominant classification is the categorization of practices of management accounting among budgeting, costs, information for decision making, performance measurement and strategic analysis (Imlau, 2015). In national studies it is more common to classify practices of management accounting according to the stages defined by IFAC, segregating them between first, second, third and fourth stages (Imlau, 2015).

The evolutionary stages of management accounting, defined by IFAC (1998) in its document entitled IMAP 1, have been segregated according to the needs and events of each period, as follows:

- ✓ Stage 1 (prior to 1950) - "the focus was on cost determination and financial control, through the use of budgeting and cost accounting technologies" (IFAC, 1998).
- ✓ Stage 2 (by 1965) - "the focus had shifted to the provision of information for management planning and control, through the use of such technologies as decision analysis and responsibility accounting" (IFAC, 1998).
- ✓ Stage 3 (by 1985) - the "attention was focused on the reduction of waste in resources used in business processes, through the use of process analysis and cost management technologies" (IFAC, 1998).
- ✓ Stage 4 (by 1995) - the "attention had shifted to the generation or creation of value through the effective use of resources, through the use of technologies which examine the drivers of customer value, shareholder value,

and organizational innovation" (IFAC, 1998).

Despite this segregation between stages, the change occurred through an incremental process, and therefore each stage is the combination of the old and the new, representing an adaptation to the new environment conditions (IFAC, 1998).

The practices of management accounting are also classified according to the period in which they arose and the information provided. The term traditional practices refers to those that emerged in the early years of the twentieth century (Chenhall & Langfield-Smith, 1998, Sulaiman, Ahmad & Alwi, 2004, Pavlatos & Paggios 2009, Joshi 2001, Abdel-Kader & 2006), but when it comes to the most recent practices, internationally, the terms used are

contemporary (Chenhall & Langfield-Smith, 1998; Sulaiman et al., 2004; Pavlatos & Paggios, 2009) and new (Joshi, 2001; Kader & Luther, 2006), while Brazilian literature uses the term modern (Soutes, 2006).

In this research, the most widely used practices of management accounting in Brazilian and international research are used, according to Imlau (2015), being classified in traditional and modern according to the evolutionary stages of IFAC, from Sulaiman et al. (2004), Soutes (2006) and Abdel-Kader and Luther (2006), as presented in Table 1. In this study, it was opted by classifying the benchmarking practice as modern of fourth-stage, according to Abdel-Kader and Luther (2006).

Table 1 - Practices of management accounting used in this study

Practices	Tradit.	Mod.	Stages				Authors
			1	2	3	4	
Budgeting	X			X			Sulaiman <i>et al.</i> (2004), Soutes (2006)
Breakeven point	X			X			Sulaiman <i>et al.</i> (2004), Abdel-Kader and Luther (2006)
Absorption costing	X		X				Soutes (2006)
Variable costing	X		X				Soutes (2006)
Contribution margin	X			X			Sulaiman <i>et al.</i> (2004), Abdel-Kader and Luther (2006)
Benchmarking		X				X	Abdel-Kader and Luther (2006)
		X			X		Soutes (2006)
Product profitability analysis	X			X			Sulaiman <i>et al.</i> (2004), Abdel-Kader and Luther (2006)
Balanced Scorecard (BSC)		X				X	Sulaiman <i>et al.</i> (2004), Soutes (2006)
Target costing		X			X		Sulaiman <i>et al.</i> (2004), Soutes (2006)
Just in time		X			X		Soutes (2006)
Strategic planning		X			X		Soutes (2006)
Customer profitability analysis	X			X			Sulaiman <i>et al.</i> (2004), Abdel-Kader and Luther (2006)
Activity-based costing (ABC)		X			X		Sulaiman <i>et al.</i> (2004), Soutes (2006), Abdel-Kader and Luther (2006)

Economic value added (EVA)		X				X	Abdel-Kader and Luther (2006), Soutes (2006)
Standard costing	X		X				Sulaiman <i>et al.</i> (2004), Soutes (2006)
Cash flow	X			X			Abdel-Kader and Luther (2006), Soutes (2006)
Simulations		X				X	Soutes (2006)
Capital budgeting	X			X			Soutes (2006)
Cost of quality		X			X		Sulaiman <i>et al.</i> (2004), Abdel-Kader and Luther (2006)
Activity-based management (ABM)		X			X		Soutes (2006)
Kaizen		X			X		Sulaiman <i>et al.</i> (2004), Soutes (2006)
Transfer pricing	X			X			Soutes (2006)
Theory of constraints (TOC)		X			X		Soutes (2006)
Constant currency	X			X			Soutes (2006)

Source: Sulaiman *et al.* (2004), Soutes (2006), Abdel-Kader and Luther (2006), Imlau (2015).

Despite the emergence of new practices in the area, criticisms to the management accounting and, in contrast, to the low adoption of these practices by companies, several studies, including those presented in the sequence, have been carried out over time in order to identify the causes the adoption and diffusion of innovations in management accounting.

Abernethy and Bouwens (2005), researching production managers in Australian industries, have identified that delegating decision-making authority through decentralization can reduce resistance to adopting innovations in management accounting, in the sense that managers will have greater decision-making capacity. Thus, managers will be able to adapt to the innovations according to the environment which they belong to, in which they have the capacity for decision. Additionally, acceptability is improved as managers become involved in the choice and design of the Management Control System (MCS).

Askarany e Smith (2008), in a two-stage study, the first in 1997 and the second four years later with companies affiliated with the Plastics and Chemicals Industries Association (PACIA) in Australia, found that company size is positively related to ABC implementation, thus influencing, in this innovation in management accounting adopting.

Naranjo-Gil, Maas e Hartmann (2009) have found that companies with low-performance prospecting strategies are more likely to use innovative MCSs. In addition, regarding to *Chief Financial Officer* (CFO) characteristic, the results of the CFO showed that the fact they were young, formerly CFO, and more business oriented, positively influences the adoption of innovative MCSs.

Halbouni and Nour (2014) identified three factors that influence the change in practices of management accounting: globalization, information technology and company size. They also identified that customer and supplier relationships, regulatory milestones, accountant qualification, as well as the type of business, do not influence the adoption of innovations in management accounting.

Therefore, it is observed that the choice of practices of management accounting adopting, including the adoption of modern practices, can occur for several reasons, as internal, such as the characteristics of the organization's people, company size, decentralization or technology used, or external, such as globalization.

2.2 Innovative companies

In 1934, Joseph Schumpeter, was one of the first authors to deal with

innovation, starting from the distinction between invention and innovation: invention is something new, an idea, a new product or improvement project, which becomes innovation from the moment in which this novelty results in economic benefits for those who implemented it (Schumpeter, 1988). Tidd et al. (2008) define innovation as an aggregator of social value or wealth, either through something new or renewal, and may occur through the adoption of new technologies, organizational processes, and new or improved marketing practices.

Thus, in order the innovation occur, the organization needs a supportive structure and, in this sense, Costa (2011) points out that becoming an innovative company requires profound changes in its operational structure. Volpato and Cimbalista (2002) position people as a central element of an innovative organization: a form of obtaining competitiveness and innovative ideas. Innovative organizations need an innovative context, which according to Tidd et al. (2008), is necessary to creative ideas emerge and be implemented.

In the international literature, it was identified studies that deal with the characteristics of innovative organizations, like Rothwell (1980), who evidenced such characteristics from previous empirical studies and Galbraith and Kazanjian (1986), who segregated them in terms of structure, processes,

reward systems and people. In addition, it was identified studies that highlight the components of the innovative organization, like Tidd et al. (2008), who deal with the innovative organization in a broader way in relation to those mentioned above, encompassing more characteristics.

In Brazilian researches, Oliveira's (2006) model was identified, developed from two other models in the national literature about the subject, by Mendel, Oliveira and Mendel (2004) and, Cunha and Santos (2004), both constructed from national and international literature.

The characteristics or aspects of an innovative organization converge among the authors cited, even in some cases, they are considered in different dimensions. It is also observed a complementarity among the studies, with the adoption of new aspects that characterize the organization as innovative. Rothwell (1980), for example, cites the attraction of talented and skilled people, whereas Galbraith and Kazanjian (1986 *apud* Grant, 2010) add the rewards system, thus considering that, in addition to attracting talented and skilled people, it is necessary create mechanisms to motivate and retain these people.

In this sense, an innovative organization has the aspects presented in Table 2, constructed as a synthesis of the mentioned studies.

Table 2 - Innovative organization aspects

Dimensions	Innovative organization aspects	Authors
Commitment to innovation	Strategy and management focused on innovation. Focus on quality and customers. Partnership with suppliers and research laboratories, in search of the innovations development.	Rothwell (1980); Oliveira (2006); Tidd <i>et al.</i> (2008)
Communication	Communication in a broad way, where employees are aware of the organization's goals, mission and vision. Internal communication vehicle usage and an environment in which information can circulate freely. Communication with the scientific community.	Rothwell (1980); Oliveira (2006); Tidd <i>et al.</i> (2008)

Physical environment	Conducive physical environment to the income of the employee, without noise and with adequate space to carry out the activities.	Oliveira (2006);
Innovation and technology	Easy access to material resources needed for its activities. Patent policy. Investment in R & D and structure that allows its development (R & D department and laboratory).	Rothwell (1980); Oliveira (2006)
People	Positive encouragement, training, recognition and formal and informal encouragement. Openness for people to get involved with the organization, to suggest and to question. Flexible environment regarding the time and place where the activities will be carried out.	Oliveira (2006); Tidd <i>et al.</i> (2008)
Organizational learning	Sharing knowledge within the organization, encouraging people to share their knowledge, experiences and new ideas.	Oliveira (2006); Tidd <i>et al.</i> (2008)
Environment	Compliance to the environmental legislation. Concern with the environment as part of the organization's context, producing environmentally safe products, recycling materials and promoting environmental awareness.	Oliveira (2006)
Team performance	The organizational climate of trust and team spirit.	Galbraith e Kazanjian (1986 <i>apud</i> Grant, 2010); Oliveira (2006); Tidd <i>et al.</i> (2008)
Organizational structure	Decentralized hierarchical control, with flexibility and open to new ideas. Continuous process improvement.	Galbraith e Kazanjian (1986 <i>apud</i> Grant, 2010); Oliveira (2006); Tidd <i>et al.</i> (2008)

Source: Prepared by the authors (2018).

From the above, an innovative organization has aspects that allow the innovation development and that has a conducive environment to its continuity and expansion, influencing people to be creative and innovative.

3 Research methodology

3.1 Research design

The present research is characterized as descriptive, because it proposes to describe the characteristics of the sample researched, as advocated by Triviños (1987).

In terms of nature, this is an applied research, which according to Castro (2006), is related to a study focused on solving concrete problems.

The approach to the problem is quantitative, since the answers obtained through the questionnaire are interpreted and analyzed using statistical methods, characterized by quantification (Richardson, 2012).

Regarding to the technical procedures, this research is characterized in a data survey that collects information from interrogation to the participants of the selected sample (Cooper & Schindler, 2011).

3.2 Population and sample

The research was carried out through a survey, with a quantitative approach, operationalized from the application of a questionnaire to a sample of 787 companies that received financial assistance for the innovations development among the years 2009 and 2016, through programs and support institutes for the development of innovations:

- ✓ Synapse of Innovation Program, from Certi and Fapesc Foundation
- ✓ Senai Institute of Innovation, Senai - SC
- ✓ Finep's Economic Subsidy Program, passed on directly to companies and
- ✓ Finep's TecNova Program, through foundations for research support and Brazilian secretariats and institutes

The list of companies benefited was obtained through direct contact or on the website of the support agencies and institutes.

The selection of companies that

received financial support for the innovations development is justified to characterize them as innovative, given that they have been helped to develop innovations and in terms of outputs tend to be innovative to some degree. The intensity of the organizations' innovative characteristics was identified from the research instrument usage.

After completing the data collection stage, a total of 88 responses to the questionnaire were obtained, eliminating 09. Thus, 79 responses were used for data analysis.

3.3 Research Instrument

The questionnaire, used to carry out the research, consists of 4 blocks. Block 1 (Innovative organization dimensions), built from the synthesis of the aspects from the innovative organizations evidenced in the theoretical framework, aims at the identification of innovative characteristics in organizations. Table 3 shows the composition of the 9 blocks related to the innovative organization and the corresponding assertions.

Table 3 - Innovative organization construct

Nº	Related Aspects	Assertive used in this research	Source
1	Commitment to innovation		
1.1	Strategy and management focused on innovation.	Leading in terms of innovation is part of the organization's plans and goals.	Oliveira (2006)
1.2	Focus on quality and customers.	The company adopts rules and certification criteria (ISO 9001, for example).	
1.3		Market research is done to identify customer interests in products and services terms.	The authors
1.4	Partnership with suppliers and research laboratories, in search of the innovations development.	The products/services are developed in partnership with the suppliers.	Oliveira (2006)
1.5		The organization has partnerships with development laboratories and/or universities.	The authors
2	Communication		
2.1	Communication in a broad way, where employees are	Communication memos fixed in the organization are used.	The authors

2.2	aware of the organization's goals, mission and vision.	The vision, mission and goals are fixed in the place of the employees' movement.	
2.3	Use of an internal communication vehicle and an environment in which information can circulate freely.	Internal communication vehicles (radio and internal newspapers, for example) are used.	Oliveira (2006)
2.4		Communication tools (such as Skype or similar) are used for employees to communicate internally.	
2.5		Interaction spaces are used in the organization (such as coffee room, games, etc.).	The authors
2.6	Communication with the scientific community.	Scientific research is developed based on the innovations developed by the organization.	
3	Physical Environment		
3.1	Conducive physical environment to the income of the employee, without noise and with adequate space to carry out the activities.	Each employee has defined work space and suits their activities and needs.	Oliveira (2006)
3.2		The job environment is free of noise or noise.	
3.3		Maintenance is performed on the ventilation structure and on the furniture where the employees perform their duties.	The authors
3.4		The physical space (of the work environment) has adequate lighting, furniture and ventilation.	
4	Innovation and Technology		
4.1	Easy access to material resources needed to activities.	The superior's authorization is required to have access to new material and technological work resources (such as computer, telephone, among others).	Oliveira (2006)
4.2		Use information technology (e-service, e-commerce, e-business, intranet, online purchase and sale, internet service and etc.) in the operational activities.	
4.3	Investment in R & D and structure that allows its development (R & D department and laboratory).	Investments are made in R & D (research and development).	
4.4		In the organization there are department and/or laboratories of R & D (research and development).	
4.5	Patent policy.	The innovations produced by the organization are patented.	
5	People		
5.1	Openness for people to get involved with the organization, to suggest and to question.	People are motivated to propose innovative ideas when carrying out their daily activities.	Oliveira (2006)
5.2	Flexible environment regarding to the time and place where the activities will be carried out.	There is flexibility in working time and place for the performance of activities such as being able to develop part of job at home.	
5.3	Positive encouragement, training, recognition and	There is a climate that allows people to develop their creativity without fear of making mistakes.	
5.4		The company provides training to employees.	

5.5	formal and encouragement.	informal A financial incentive policy is used for people to contribute in suggestions for innovations.	
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Source: Prepared by the authors (2018).

In Block 2 (Practices of management accounting), it was tried to identify the adoption of practices of management accounting by the researched organizations, using the most approached practices in Brazilian and in international research, as identified by Imlau (2015). The traditional and modern MA practices

classification was made according to the evolutionary stages of IFAC, based on Sulaiman et al. (2004), Abdel-Kader and Luther (2006) and Soutes (2006). Table 4 presents the practices of management accounting used in the research, as well as the corresponding assertions.

Table 4 - Construct for the the adoption of practices of management accounting

Nº	Practice of management accounting	Assertive used in this research	Source
1	Budgeting	Use budgeting as the basis for decision making.	Imlau (2015)
2	Breakeven point	Know how much the company needs to sell in the month/year to cover the fixed costs.	
3	Absorption costing	Determine the cost of products/services based on the method of absorption costing	
4	Variable costing	Determine the cost of products/services based on the variable costing method.	
5	Contribution margin	Use the contribution margin concept (revenue minus variable costs) in managers' decision making.	
6	<i>Benchmarking</i>	Compare its indicators to those of other organizations (benchmarking).	
7	Product profitability analysis	Know the profit generated by the product/service marketed by the organization.	
8	<i>Balanced scorecard</i>	Adopt the balanced scorecard performance evaluation system.	
9	Target costing	Adopt the practice of target costing, defining the target cost from the market-defined price and the desired profitability in the business.	
10	<i>Just in time</i>	Adopt just in time concept.	
11	Strategic planning	Elaborate the strategic planning.	
12		Implement the strategic planning.	
13	Customer profitability analysis	Know the profit generated by the customer.	
14	ABC	The company uses the activity-based costing (ABC).	
15	EVA	Use the economic value added (EVA) to evaluate the economic performance.	

16	Standard costing	Determine a standard cost to be achieved by the organization and make comparisons with the actual cost for controlling costs.
17	Cash flow	Know the amount of the receipts and payments expected for the coming months (forecasted cash flow).
18	Simulations	Perform products rentability simulations (revenues, costs and margin).
19	Capital budgeting	Adopt investment analysis practices for capital budgeting.
20	Cost of quality	Raise the cost of quality (prevention, appraisal, internal failure and external failure).

Source: Prepared by the authors (2018).

In order to collect data on the innovative organization, each assertion of the questionnaire was measured using a 5-point Likert scale, with "1" totally disagreeing and "5" totally agreeing. As for the analysis of the adoption of management accounting practices, assertions were also measured using a 5-point Likert scale, "not applicable" corresponding to the non-use of the practice, "1" related to low intensity use and "5" for heavy use.

Block 3 (General information about the organization) sought to characterize the organization from basic information and in Block 4 (Respondent Information) respondents were asked about their profile, such as gender, scholarship and position effectively occupied, as well as experience in the activity. The research was intended for the controller of the organization or for the person responsible for management accounting/controllership or managerial information.

Before starting the application of the questionnaire, an analysis was made with specialists in the area, seeking to identify possible problems and necessary adjustments for a better understanding. After this step, a pre-test was carried out with two accounting professionals, who are responsible for management information in the companies where they operate, in order to identify possible flaws in the research instrument. From the pre-test it was identified that the questionnaire addressed the terms clearly

and accurately, and no changes were required.

3.4 Collecting and analyzing data procedures

The questionnaires were placed on the Google Forms platform and initially sent to the general contact e-mail of the organizations, obtained on the sites or provided by the foundations, then telephone contact was made with the organizations to obtain the direct e-mail from the responsible person management information. In addition, contact was made by LinkedIn social network with accountants and controllers of some of the organizations to expand the research sample.

Data collection was performed until March 01st, 2017 and a total of 88 responses were obtained, of which 79 were used for data analysis, which represents 10% of the initial population.

The data were tabulated in a spreadsheet and analyzed by means of descriptive statistics and cluster analysis, to group the homogeneous companies into the innovative characteristic, allowing a better visualization of the relation of this characteristic with the MA practices usage. For this analysis, the IBM SPSS Statistics version 23 software was used.

For the clusters determination the Ward Hierarchical Method was used, with the square Euclidean distance as measurement interval. For the construct

of the innovative organization, Cronbach's alpha was calculated in order to analyze the internal consistency of the questionnaire and its reliability, where values for each dimension remained among 0.614 and 0.903.

4 Results

4.1 Respondents profile

Most of the respondents work as director (22%), manager (18%) and controller (9%). The other respondents hold various positions, such as fiscal, accounting, financial, Chief Executive Officer (CEO), accountant, administrative and project manager, among others. Of the professionals whose has graduation as the last instruction level (35%), the areas that prevail among the respondents are accounting and administration, with 21% and 18%, respectively. In this sense, it was identified that the elaboration of the managerial information is in charge, in the majority, of people of other departments than of the management accounting, and with professionals of diverse areas of knowledge.

4.2 Organizations profile

On the surveyed, 70% have less than 100 employees, 44% with up to 20 employees, which may be due to the majority of these companies being technology.

When comparing the number of employees with the starting year of the activities, it can be seen that organizations with fewer employees were constituted from the year 2000. This relationship is reversed when analyzed the companies that have the largest number of employees, constituted, in their majority, before 2000.

It was verified that most of the companies analyzed (66%) have a department responsible for management accounting information, and among these, the majority (56%) are, according to the Sebrae classification (2013), small companies or medium-sized enterprises, while among companies that don't have this department, 56% are micro-enterprises. Among the companies that have a formal accounting and management department, 52% are industrial, mainly medium and large, while 48% are commercial or services, most of which are small and large.

4.3 Practices of management accounting adopted by organizations

Regarding to the traditional practices of first stage, it is observed that variable costing is the practice used with greater intensity among the companies analyzed, like obtained by Joshi (2001). Among the industrial organizations, the most widely used practice is the absorption costing, while in the commercial and services is the variable costing.

In relation to the traditional practices of second stage, the one used with greater intensity is the breakeven point, as much among the industrial companies as among the companies of commerce and services. It was also identified the greater usage of product profitability analysis in relation to customer profitability analysis, similar to that identified by Abdel-Kader and Luther (2006) and Pavlatos and Paggios (2009), indicating that the analyzed companies are more concerned with the product profitability than the customer profitability.

In relation to the modern practices of third stage, the elaboration of strategic planning is the most intense one, while ABC is the one used with less intensity. This result resembles with that obtained by Naranjo-Gil et al. (2009), where 31% of companies did not use ABC and 49% used this practice with low intensity. In the sample of this study, only 4 companies

affirmed not to elaborate and not to implement the strategic planning, being that of the companies that elaborate and implement it, 72% do both steps with the same intensity of usage.

Regarding to the modern practices of fourth stage, the one used with greater intensity among all the analyzed companies is simulations, related to the creation of scenarios for analysis of

product rentability (revenues, costs and margins) and, in contrast, the practice used with less intensity is the economic value added (EVA).

As evidenced in Table 7, the practices with the greatest intensity of usage are traditional, especially those of second stage, especially breakeven point and budgeting, which are widely researched and disseminated practices.

Tabela 7 - Practices of management accounting classification as regards the average intensity of usage and the percentage of companies in the sample that use

Position	Practice	Stage ¹	Classification ¹		Average ²	% of usage ³		
			Tradit.	Mod.		N or Low	M	I
1	Breakeven point	2	X		4,42	3%	11 %	86 %
2	Budgeting	2	X		4,09	6%	15 %	78 %
3	Product profilability analysis	2	X		3,97	6%	20 %	73 %
4	Cash flow	2	X		3,97	9%	18 %	73 %
5	Strategic planning - Preparation	3		X	3,84	6%	25 %	68 %
6	Contribution margin	2	X		3,81	5%	30 %	65 %
7	Strategic planning - Implement.	3		X	3,58	10%	30 %	59 %
8	Simulations	4		X	3,34	19%	23 %	58 %
9	Customer profilability analysis	2	X		3,32	23%	20 %	57 %
10	Benchmarking	4		X	3,18	20%	32 %	48 %
11	Constant currency	2	X		3,09	22%	27 %	52 %
12	Variable costing	1	X		3,08	20%	34 %	46 %
13	Absorption costing	1	X		3,04	25%	25 %	49 %

14	Capital budgeting	2	X		2,78	32%	24 %	44 %
15	Standard costing	1	X		2,56	38%	23 %	39 %
16	Cost of quality	3		X	2,52	37%	28 %	35 %
17	ABM	3		X	2,51	30%	38 %	32 %
18	Target costing	3		X	2,46	37%	29 %	34 %
19	Kaizen	3		X	2,42	37%	30 %	33 %
20	Just in time	3		X	2,41	38%	28 %	34 %
21	TOC	3		X	2,2	38%	38 %	24 %
22	BSC	4		X	2,19	43%	32 %	25 %
23	Transfer pricing	2	X		2,16	42%	29 %	29 %
24	EVA	4		X	1,9	49%	27 %	24 %
25	ABC	3		X	1,8	48%	34 %	18 %

Source: Search Data (2018).

Legend: ¹Classification according to IFAC stages (1998); ² Average intensity of usage calculated on the basis of a 5-point Likert scale, being 1 low intensity and 5 intense use; ³Percentual of usage calculated based on the number of companies that use the practice according to the intensity and in relation to the total of companies, being: N or Low companies that do not use or usage with low intensity; M companies that use with moderate intensity; I companies with heavy usage.

Some modern practices have high utilization intensity, such as strategic planning, (elaboration and implementation), simulations, and benchmarking, which are among the 10 most used practices.

Regarding to the percentage of companies that use the practices, breakeven point and budgeting are practices used with high intensity by most of the companies in the sample. Traditional practices remain among the most used and strategic planning and

simulations, which are modern practices of MA, are also among the 10 most widely used.

4.4 Innovative organizations

In order to group the organizations according to their similarities in terms of innovation, cluster analysis was used, and three clusters were identified from the dendrogram generated by the usage of Ward's Hierarchical Method. Table 8 presents the profile of the three clusters defined for innovative organization.

Table 8 - Clusters's profile for innovative organization

<i>Clusters</i>	<i>N</i>	<i>Profile</i>
<i>Cluster A</i> Low innovative characteristics	07	Include the grouping of organizations with low commitment to innovation, low use of patenting practice and investment in R & D, low incentive for people to be innovative, as well as sharing of knowledge and ideas, low compliance with environmental legislation and concern for the environment, with the development of the team spirit and with the flexibility and improvement of organizational processes, however, with moderate concern for the physical environment where employees are allocated and with internal communication.
<i>Cluster B</i> Moderate innovative characteristics	42	Include the grouping of organizations with a moderate commitment to innovation and communication, a moderate use of the practice of patenting and investment in R & D, a moderate incentive for people to be innovative, as well as the sharing of knowledge and ideas, compliance with environmental legislation and concern for moderate environment and moderate concern with the flexibility and improvement of organizational processes, however, with a high concern with the physical environment where the employees are allocated and with the team performance.
<i>Cluster C</i> High innovative characteristics	30	Include the grouping of organizations with a high commitment to innovation and communication, high concern with the physical environment where employees are allocated, strong encouragement for people to be innovative, compliance with environmental legislation and concern for the environment, encouraging the development of team spirit and concern with the flexibility and improvement of organizational processes, however, moderate attention to the practice of patenting and investment in R & D and the sharing of information and knowledge among employees.

Source: Search Data (2018).

In cluster A, 7 companies were classified, of which 57% formally constituted an accounting-management department. The companies in this cluster are mostly commerce and service, for less than 30 years in the market and small. In cluster B, 42 companies were classified, mostly micro-enterprises and small businesses of commerce and services and founded from the year 2000. In this cluster, approximately 55% of the companies have an accounting-management department.

Cluster C has 30 companies, of which 83% have a formal accounting-management department. This cluster has, in its majority, industrial companies, of medium size, founded since 1990 and

with high technological intensity. Most large companies (67%) are classified in this cluster.

4.5 Relationship between innovative characteristics and modern practices of management accounting

In order to verify the relationship between innovative characteristics and the innovative practices adoption of MA, the analysis of clusters has identified the intensity of adoption in such practices by companies that have innovative characteristics at different intensities. Table 9 shows the usage of each modern practice by the companies classified in the three identified clusters.

Table 9 - Use of modern management accounting practices by companies in each cluster

Practices	Cluster A						Cluster B						Cluster C					
	ÑB	%	M	%	I	%	ÑB	%	M	%	I	%	ÑB	%	M	%	I	%
Benchmarking	4	57	3	43	0	0	11	26	14	33	17	40	1	3	8	27	21	70
BSC	5	71	2	29	0	0	23	55	13	31	6	14	6	20	10	33	14	47
Target costing	5	71	2	29	0	0	16	38	16	38	10	24	8	27	5	17	17	57
Just in time	5	71	2	29	0	0	16	38	15	36	11	26	9	30	5	17	16	53
Strategic planning - Prepar.	2	29	2	29	3	43	2	5	13	31	27	64	1	3	5	17	24	80
Strategic planning - Implem.	2	29	4	57	1	14	3	7	16	38	23	55	3	10	4	13	23	77
ABC	4	57	3	43	0	0	21	50	17	40	4	10	13	43	7	23	10	33
EVA	5	71	2	29	0	0	25	60	12	29	5	12	9	30	7	23	14	47
Simulations	3	43	3	43	1	14	11	26	11	26	20	48	1	3	4	13	25	83
Cost of quality	6	86	1	14	0	0	17	40	12	29	13	31	6	20	9	30	15	50
ABM	6	86	1	14	0	0	13	31	16	38	13	31	5	17	13	43	12	40
Kaizen	6	86	1	14	0	0	16	38	14	33	12	29	7	23	9	30	14	47
TOC	6	86	1	14	0	0	19	45	14	33	9	21	5	17	15	50	10	33
Respondents	7						42						30					

Source: Search Data (2018).

Legend: Percentage calculated in relation to the number of companies in the cluster. ÑB: Do not use or use with low intensity; M: Moderate intensity usage; I: Intense usage.

Among the companies classified in cluster A, it is observed that most modern MA practices are not used or are used with low intensity by most companies. It should be noted, however, that strategic planning (preparation, with a medium intensity of 29% and intense of 43% and implementation, used with an average intensity of 57% and intense of 14%) and simulations 43% (used with an average intensity of 43%) and intense by 14%) are used with greater intensity among these companies, perhaps as a result of being widely publicized practices, especially strategic planning, which has relevance in terms of the direction and management aimed at achieving the organization's future objectives.

In addition, the low adoption intensity of modern MA practices may also be related to the characteristics of the cluster companies, which are mostly small businesses and services, where traditional practices may be sufficient for service of needs and, in addition, there may be greater difficulty in implementing modern practices, which require greater investment in terms of time and resources for implementation.

In relation to organizations that have moderate innovative characteristics (cluster B), there was an increase in the percentage of moderate use of practices when compared to cluster A, since in B activity-based management is used with moderate intensity by most companies (38%) and the practices of target costing

and just in time are used with practically the same amount of companies with low intensity (38% in both cases) and moderate (38% and 36%, respectively), while in the first cluster these were not used or were used at low intensity by 86%, 71% and 71%, respectively. Such behavior may be related to the characteristics of the companies in this cluster, which, although similar to those of cluster A, are more recently founded (since 2000). In addition, these companies are the ones that have the most constituted accounting-management department, which can also assist in the adoption of modern MA practices.

In this way, it is possible to perceive that the organizations of the cluster B use with greater intensity the modern practices of MA, when compared to the cluster A.

Concerning cluster C, it is observed that only one practice is not used or is used with low intensity (43%) or is used with moderate intensity (23%) by most organizations, being ABC, which indicates that although organizations use more complex managerial practices, when it comes to measurement and costing, they choose to use traditional methods.

It is also identified that the modern practices of MA are used intensively by most of the organizations belonging to cluster C, being benchmarking, strategic planning (preparation and implementation) and simulations used with high intensity by more than 70% of the companies analyzed in this group. This result may be related to the fact that the cluster is mostly made up of industrial companies, with medium size, where the business characteristic imposes greater difficulties on management and by companies with high technological intensity, which may be easier to adopt modern MA practices, since they already have intense usage of technology, necessary, in general, for the application of these practices.

From these results it can be inferred that the more the organization

has an environment with aspects that allow the development of innovation and a conducive environment to its continuity and expansion, influencing people to be creative and innovative, more this organization tends to use modern practices of management accounting.

5 Conclusions

This study discusses the adoption of management accounting practices in innovative companies in order to identify the relationship between innovative characteristics of organizations and the adoption of management accounting practices. The literature on the subject shows that as a result of the new demands, new practices of management accounting have been developed in recent years, however, studies also identify, in different contexts and countries, the low adoption of such practices by companies.

As in Green and Amenkhienan (1992), Fullerton and Mcwatters (2004), Abdel-Kader and Luther (2006) and Leite et al. (2015) studies, it was observed that the practices used with greater intensity among the companies analyzed in this study are the traditional ones, mainly of second stage, indicating, therefore, that the practices which arose from the second half of the XX century are not being introduced in an intense way in the management of the companies analyzed.

Regarding to the adoption of MA practices among companies with different innovation intensities, it was observed that the stronger the innovative characteristic, the more companies tend to use modern MA practices, in this way it is possible to identify that despite the low adoption of modern practices in the analyzed sample, when the innovative characteristics are inserted in the analysis, a change of behavior occurs, in which organizations that have high innovative characteristics use modern MA practices with greater intensity, indicating a relation between innovative characteristics in organizations and the

adoption of modern MA practices.

Based on these findings, this study presents a complement to the researches already developed in management accounting, which show that companies generally adopt a large number of traditional MA practices, contributing to the understanding that there may be a gap between the needs of organizations and what is developed and employed by MA. At the same time, it contributes to the analysis of firms with different innovative characteristics intensities and to identify that innovation may be a factor that tends to positively influence the adoption of more recent practices.

This study also provides insights to researches in the area that the low adoption of modern MA practices can be related not only to the characteristic of the practice itself but, above all, to the organizations characteristics that adopt them or the environment where they are inserted, indicating the need for joint analyzes of adoption with other factors influencing this relationship.

The results of this study and previous ones, which evidenced the low adoption of more recently developed MA practices, also lead to a reflection on the training of the professionals who work in the organizations, especially exercising the functions of controllers or other accounting executives involved in supporting the decision-makers. The low adoption of modern practices by companies may also be related to the training of these professionals. Previous studies such as Marques, Sell, Lavarda and Zonatto (2016) show that in Accounting Sciences graduation courses, in Brazil, there is predominance in the menus of practices of MA subjects that refer to the first and second stages of management accounting. This finding may also be one of the explanations for what is observed in companies, both in the sample of this study and in others: if professionals have more limited knowledge about more sophisticated and recent practices, they may prefer to employ those who are more familiar and simpler, showing flaws in the process of accounting training in

graduation courses.

When analyzing the results of this research, it must take into account some limitations that may indicate gaps for future investigations on the subject. In this sense, in future researches, it is suggested to use a different sample of the studied one, analyzing companies that have received innovations awards, for example, in order to identify in which level they attend the characteristics of innovative organizations and which practices of MA they use. It is also suggested that a different methodology for the application of the research be used, with the questioning of the information for more people within the same organization, allowing to identify the effectiveness of applying the MA practices in companies as well as innovative characteristics from the several collaborators perception.

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