Mediating Effect of Management Control Systems in The Interaction Between Ambidexterity and Organizational Learning in Brazilian NPO

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Abstract: This paper investigates the mediating effect of management control systems in the interaction between ambidexterity and organizational learning in Brazilian non-profit organizations. Organizational learning is addressed in the literature as an antecedent of ambidexterity, whereas the use of management control systems finds dichotomous evidence in the literature as to its effect concerning those previous constructs. This descriptive research with a quantitative approach was carried out through a survey. The research sample comprised 227 valid responses collected from the presidents of the organizations. This work reveals the positive relationship between organizational learning and ambidexterity, as well as observing that the use of management control systems tends to inhibit innovation through a mediating effect. The approach of these constructs in nonprofit environments contributes to the need for sustainability of these organizations. Findings highlight the innovative panorama of these organizations between exploitation and exploration strategies and the achievement of ambidextrous skills, also pointing out the use of management control systems, as well as the evidence of organizational learning.

Keywords: management control system, ambidexterity, organizational learning, nonprofit organizations

1. Introduction

Ambidexterity, organizational learning and management control systems are addressed in several surveys in the fields of applied social sciences (Cyert & March, 1992; Dibella & Nevis, 1999; Berry, Broadbent & Otley, 2005; Markides, Oyon & Schnegg, 2018) for being related to the sustainability of organizations, as well as how the managers of these companies conduct them, through organizational learning, and with their strategies aimed at incremental and radical innovation.

The balance between the skills of incremental innovation (exploitation) and radical innovation (exploration) is what characterizes a company as ambidextrous (Dunkan, 1976; Tushman & O'Reilly, 1996). According to Jansen, Bosch & Volberda (2006), exploitation is, in essence, the refinement and extension of existing skills, technologies and paradigms. Their returns are positive, immediate and predictable. Exploration, on the other hand, is the experimentation of new alternatives. Their returns are uncertain, distant and often negative. Therefore, maintaining a balance between exploration and exploitation is a dilemma in many contexts. Since spending on exploitation is earlier, this trend can stifle learning, leaving organizations vulnerable to environmental changes – hence, it evidences the importance of ambidexterity (Levinthal & March, 1993; O'Reilly & Tushman, 2008; Markides, Oyon & Schnegg, 2018).

The organizational learning present in the innovation process is classified as adaptive behavior of organizations over time (Cyert & March, 1992). In this way, the learning organization, according to Dibella and Nevis (1999), is in constant metamorphosis and, due to this, it becomes adapted to changes, be they incremental or transformative. The uncertainty of the environment increases the need for learning on the part of the organization, therefore organizations must keep their strategies aligned to their environment, adapting to changes to remain in the market in a competitive and innovative way (Huysman, 2001).

In this sense, to ensure that the strategy established by the organization is put into practice and that the defined objectives are achieved efficiently and effectively, with the possibility of improving them when necessary, managers use the management control system (Beltrami, Gomes & Araújo, 2013). Malmi & Brown (2008) highlight the drivers: planning, cybernetic, reward / compensation, administrative and culture elements to guide people's behavior in a way that ensures alignment with the organization's strategy and the achievement of its objectives. The ultimate goal of a control system is not to control people's specific behavior, but to influence them to take actions and decisions that are consistent with organizational objectives (Flamholtz, 1996; Malmi & Brown, 2008; Guenther, 2013).

Previous studies (Beuren & Oro, 2014, Arantes & Soares, 2020) indicate that management control systems contribute to the innovation management process by providing information on various financial and operational aspects that can result in the implementation of differentiation strategies and product innovation.

However, other studies (Davila, 2009; Roberts, Campbell & Vijayasarathy, 2016; Markides, Oyon & Schnegg, 2018) show that management control systems have been associated with obstacles to innovation, as well as organizational change efforts, because they can direct the organization towards the priority resolution of internal problems, and can stifle innovation through some myopia created by the control systems.

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This study investigates the role of the mediating effect of management control systems in the interaction between ambidexterity and organizational learning in nonprofit organizations (NPO). The data collection instrument was sent to 2,200 managers of the Brazilian NPO APAE, resulting in 227 valid responses.

The theoretical contribution of this work is due to the evidence of the use of management control systems by NPO and their contribution to innovative strategies in the industry studied, highlighting exploitation and exploration skills, in addition to demonstrate the level of ambidexterity and organizational learning in this environment. The practical contribution of this study to the work environment occurs through the presentation of an overview in NPO of the use of management control systems and the degree of ambidexterity of the organizations, as well as the existence of organizational learning, an environment that is involved in altruistic causes and that also need to be sustainable over time.

It also contributes to the improvement of control mechanisms, the improvement of innovation policies, in addition to the contribution in training managers and in the preparation of workshops and lectures.

2 Theoretical framework

2.1 General definitions of organizational learning, ambidexterity and management control systems

For Cyert & March (1992), organizational learning (OL) presents itself as the adaptive behavior of organizations over time. Although some authors indicate that there is no consensus on the concept of OL (Scorsolini-Comin, Inocente & Miura, 2011), there are several approaches to OL from different theoretical perspectives. Regardless of the notion of OL, it will always be guided by the learning of the organization´s employees, which happens from their experiences and singularities (Steil, 2002).

OL must consider 4 sub-processes: 1) intuition, 2) interpretation, 3) integration and 4) institutionalization, which occur at 3 ontological levels: 1) individual, 2) group and 3) organizational. Intuition and interpretation occur at the individual level, interpretation and integration at the group level and integration and institutionalization at the organizational level. Therefore, it is observed that there is a permeability of the processes between such levels (Crossan, Lane & White, 1999).

Intuition is related to individual cognitive, emotional and physical characteristics acquired over the course of life experiences. The interpretation considers the explanation through the actions and words of ideas for some individual or for the group. Integration consists of shared understanding and the execution of coordinated and combined actions between individuals. Institutionalization is the process that ensures that routines, systems and processes happen in the organization (Crossan, Lane & White, 1999).

Kim's (1998) approach is also in the sense that OL is influenced by individual learning that involves the beliefs of individuals, that is, their mental models and their worldviews that are constantly changing. Individual members contribute to the development of group learning, which in turn helps OL.

Dodgson (1993, p. 387) informs that OL is stimulated "both by environmental changes and by internal factors, in a complex and iterative way". Learning resulting from motivations such as the desire for new levels of performance, changes in the environment to make organizational processes satisfactory can result in innovation, therefore, OL precedes ambidexterity (March, 1981; Miner & Mezias, 1996). Thus, recent research suggests that OA is preceded by individuals in the organizational environment who engage in exploitation and exploration (Birkinshaxw & Gupta, 2013; Schnellbächer, Heidenreich & Andreas, 2019). Widener (2007) highlights that interactive control increases OL, which is consistent with innovation.

Economic growth with the use of innovation influences economic and social relations, altering the existing state of equilibrium, thus forcing a collective improvement in favor of development (Schumpeter, 1985). The occurrence of innovation stands out as a factor of interaction and exchange due to various organizational situations (Freeman, 1991; Schumpeter, 1985).

Innovating is essential for the survival of organizations in a competitive scenario, and innovation strategies, regardless of type, can at times support the business (Davila, Epstein, & Shelton, 2009). In this sense, several empirical studies have shown the simultaneous search for exploitation and exploration, thus reaching organizational ambidexterity (OA), which results in superior organizational performance (Blindenbach-Driessen & Van Den Ende, 2014). Based on the contribution of the types of innovation addressed by Schumpeter (1985), the OECD, through the Oslo 2018 manual, brings as types of innovation: product, process, marketing and organizational innovation.

Innovation has already proved its importance as a source of redefinition not only in competitive markets, but also in the areas of philanthropy, as well as in the governmental area. The example of the creation of microcredit by the Grameen Bank of Bangladesh is quite evident, as it has changed the lives of people who previously fell into the vicious cycle of high-interest loans, keeping them permanently in poverty (Davila, Epstein & Shelton, 2009).

The innovation approach related to form is classified as exploitation when it comes to incremental innovation, designed to satisfy the needs of existing consumers or markets. Incremental innovation makes the organization develop activities related to refinements, choices and improvements in processes, routines and personnel (March, 1991; Popadiuk, 2015).

Still in terms of form, innovation is considered exploration when it is considered radical, and is essentially geared to development at once, through new solutions, in the sense that companies will obtain solid technological advances, resulting in profound changes to their components (products or services), productive processes, and even in their business (Tushman & O'Reilly III, 2008). Popadiuk (2015) complements these fundamentals by highlighting that the exploration actions in an organization refer to research, procurement, discovery, study, observation, entrepreneurship, probing, prospecting and experimentation.

Exploration and exploitation strategies compete for resource allocation, inhibiting each other (Popadić, Pučko & Černe, 2016). Consequently, an organization that concentrates greater efforts on exploration will not obtain returns associated with the incorporated knowledge, whereas if the concentration occurs at the level of exploitation, in the long run, the organization will suffer the possible impact of obsolescence. Therefore, the organization's survival requires a balance between strategies (Levinthal & March, 1981). The best decision for an organization would be to maintain a balance in its position concerning the use of its knowledge (March, 1991).

The balance between the skills of incremental innovation (exploitation) and radical innovation (exploration) is what characterizes a company as ambidextrous (Dunkan, 1976; Tushman & O'Reilly, 1996). In this context, as highlighted by Soares (2016), there is an important contribution of Schumpeterian theory, as the author points out that organizations that innovate have higher performance than companies that do not innovate, and ambidextrous organizations tend to have higher performance than companies that innovate in just a single perspective, be it exploitation or exploration.

The innovation environment finds in the literature studies that seek to identify the extent to which management control practices support or hinder the innovative process in organizations (Henri & Wouters, 2019). Bedford (2015) shows that the balance and combination of uses of diagnostic control and interactive control of accounting information by the management team are positively associated with performance in companies that seek ambidextrous skills. In light of this, he demonstrates that an imbalance between the uses of diagnostic and interactive control can interrupt the dynamic tension necessary to manage the paradoxical objectives.

The management control system (MCS) is seen as the process that exists in a changing environment with the ability to guide the organization towards viable patterns of activities consistent with organizational objectives (Berry, Broadbent & Otley, 2005). The theme is also addressed by Flamholtz (1996) who highlights that to interfere in people's behavior, companies use a range of techniques such as personal supervision, rules, standard operating procedures, job description, accounting measurements and systems for assessing performance. The set of these techniques is part of an invisible system that consists of achieving the objectives established by its owners for the company.

Management controls consider formal mechanisms to be those that involve effectively defined practices such as the budget and other reports and informal mechanisms, those that consider the company's culture and other aspects that happen voluntarily without formal manifestations (Barney & Hesterly, 2011). In this sense, to structure these practices in MCS, models are used to describe such processes (Flamholtz, 1996). The literature brings several structures of managerial control, among them the models of Simons (1995) and Malmi and Brown (2008), models that gave rise to those discussed below, as well as the collection instrument, for adapting to the environment of research.

Simons (1995) highlights the theoretical model called levers of control. It balances the tensions resulting from competing objectives of managers and subordinates, through 4 levers: (1) belief systems, (2) restriction systems, (3) diagnostic control systems and (4) control systems interactive control.

Malmi & Brown's (2008) approach to MCS is configured as a package that adopts 5 forms of control approaches: planning, cybernetic, reward / compensation, administrative and culture elements. In the approached model, the authors indicate that instead of the depth of their discussion of individual systems, the strength of the typology is in the broad scope of controls in the MCS.

One of the main benefits of using MCS properly is to detect when an organization needs to act. Through this type of system, companies collect and analyze market information to make decisions about how to react to market changes. There are several tools used by MCS developed to help companies execute their strategies. In this sense, Widener (2007) highlights that the interactive control of MCS increases OL, which is consistent with innovation.

However, despite the many benefits it brings to companies, MCS is also criticized for several shortcomings, including the criticism that control systems stifle innovation through some myopia created by control systems that guide the organization to correct critical internal problems (Davila, 2000; Roberts, Campbell & Vijayasarathy, 2016; Markides, Oyon & Schnegg, 2018). OL occurs when there are questions of beliefs described by organizations in their control systems (Pacheco, Tosta & Freire, 2010).

In this same sense, ambidexterity understood as an orientation for OL (March, 1991; Popadiuk 2015) occurs when individuals, in an organizational experience with a problematic situation, question the organizational beliefs Argyris & Schön (1996). An organizational culture that inhibits knowledge sharing can undermine OL and crystallize existing routines (Cohen & Levinthal, 1990).

2.2 Contextualization and presentation of hypotheses

The positive relationship between MCS and product innovation was found in previous studies (Davila, 2000; Davila, Epstein & Shelton, 2009), as well as in Arantes & Soares (2020), which also found a positive and significant relationship between the use of MCS and ambidexterity within Brazilian NPO industry.

However, there are several shreds of evidence of the existence of a mediating effect in the relations between the interactive use of the MCS and product innovation, as demonstrated by Bisbe & Otley (2004) in which the results showed that the interactive use of the MCS does not favor the innovation. Mundy (2010) also adds in her work that cyber controls need to be used with care. Too much emphasis on cyber controls can hinder innovation and endanger the balance between exploitation and exploration.

The research by Mannes, Beuren & Pazetto (2018) was carried out in Brazilian companies recognized as innovative, characterized by pre-incubated, incubated and graduated companies. For companies that

had a great capacity for radical innovation, MCS make this relationship significantly inverse, resulting in the information that the greater the radical innovative capacity, mediated by MCS, the lesser the innovation. Haustein, Luther & Schuster (2014) highlight in their study, in which they used 11 contingency factors, whose positive impact in the use of results control demonstrated a negative association concerning to technological complexity and the ability to innovate.

In the work of Henri & Wouters (2019), the authors sought to examine the extent to which the interdependence of management control practices provides information for decision making, whether they support or hinder product innovation. The findings showed that both the diversity of non-financial performance measurement and the functionality of cost information, understood as management control practices, positively and significantly influence product innovation, except in companies that face low environmental unpredictability.

As for the relationship between OL and innovation, recently, the research by Frizzo & Gomes (2017) analyzed the influence of learning and innovation on the organizational performance of companies in the wine sector, the quantitative study carried out on a sample of 54 respondents found a positive relationship of the influence of OL on the innovation of organizations in this industry.

The work of Bedford, Bisbe & Sweeney (2019) demonstrates that cognitive conflict has a significant positive role in achieving ambidextrous results. Conflict is generated from performance measures. Results also found in the work of Monteiro & Beuren (2020) a moderating effect of cognitive conflicts, present in organizational learning processes, in 124 companies listed on the Brazilian stock exchange (B3) in the list of performance measures and ambidextrous innovation.

Schnellbächer, Heidenreich & Andreas (2019) examined the influence of the background of OA on the ambidextrous behavior of individuals to obtain all the benefits of OA. The findings show a positive relationship between individual ambidexterity and the team's performance, corroborating previous research in the scope of OL, indicating that teams benefit from the concentration of knowledge and its sharing.

From the alignment with previous studies, the intention was to prove that there is a mediating effect in the interaction between OL and OA through the following hypothesis:

Research hypothesis: *the use of MCS plays a mediating role in the interaction between OL and OA.*

3. Research methodology

The methodological approach of this work is presented as follows: research characterization, contextualization of the research hypothesis, tests used in the research and operational aspects.

The methodological scope of the research is presented in Box 1, which indicates categories and respective descriptors.

Box 1. Research planning descriptors

category	descriptor
degree of research crystallization	exploratory study
data collection method	communication / self-administered instrument
power of the researcher	*ex post facto*
study object	descriptive
time dimension	transversal
time horizon investigated by construct	MCS 2019; OL 2019; OA 2016 a 2019
topic scope	statistical study
research environment	field environment
participants perceptions	real routine
research subject	managers (presidents) of APAE units
data collection period	September and October 2019
population & sample	classified as adherence census

Source: Cooper & Schindler (2016, p. 128, adapted).

It is believed that there is mediation in the interaction between OL and OA, as in some studies the results demonstrate that the use of MCS does not favor innovation (Bispe & Otley, 2004; Haustein, Luther & Schuster, 2014; Mannes, Beuren & Pazetto, 2018). The graphical representation of the research is shown in Figure 1. The complete structure of the research is presented in Appendix A.

As for the statistical tests undertaken, in addition to descriptive statistics (mean, standard deviation), the hypothesis was tested by linear regression analysis and mediation test.

The population and the sample are composed of the units of the Association of Parents and Friends of the PwD (APAE). The institution is characterized by promoting the defense of the rights of people with intellectual and multiple disabilities. It stands out for its pioneering spirit and capillarity, organized in 2,200 units present throughout Brazil. The sample is census by adherence.

The pre-test was carried out at the APAE unit in the city of Anapolis. It was categorized among the 100 best NPO in Brazil in 2017, 2018 and 2019, according to evaluations carried out by consultancies that consider aspects such as if the NPO has published bylaws, its accounts are opened, the way that origins of resources are analyzed and how NPO evaluates its results.

The main variables of the questionnaire are found in Appendix A. It consists of affirmative questions in which the respondent assesses their agreement using an 11-point Likert scale, and the questionnaires were sent by email. The structure of the questionnaire is divided into 5 blocks, distributed according to Table 1.

Table 1. Questionnaire structure

construct	factors	variables	source journal
respondents profile		04	
institution profile		08	
MCS	diagnostic control	04	Bedford, Malmi & Sandelin (2016)
	interactive control	02	
	control flexibility	04	
	performance measures categories	05	
	structure	02	
	input control	04	
OA	exploitation	10	Lubatkin et al. (2006)
	exploration	10	Bedford, Bispe & Sweeney (2019)
OL	clarity of purpose and mission	03	Goh & Richards (1997)
	leadership commitment and empowerment	04	
	experimentation	03	
	knowledge transmission	06	

4. Data presentation

There were 446 responses to the questionnaire, obtaining a 35.45% response rate. After the incomplete answers had been discarded, 269 responses remained, and subsequently answers with scale repetitions were excluded, reaching a total of 227 valid responses, representing a valid response rate of 18.04%.

To confirm the consistency of the data collection instrument, and thus confirm the quality of the findings, Table 2 presents the coefficients of that instrument.

Table 2. Scale quality

	test	description	outcome
VALIDITY Accurate representations of the characteristic to be measured.	content		The data collection instrument received several contributions in the pre-test phase of researchers of the referred constructs. In this phase, the items were adjusted: unit of measurement in the profile block of the institution, terms appropriate to the environment of the organizations surveyed regarding the constructs of MCS and OL.
	construct	The degree to which a measurement instrument relates consistently to other measurements derived from the same theory.	**Discriminant validity** for first-order factors was performed. No factor in the investigated constructs has a correlation ≥ 0.730. In **convergent validity**, it was identified that all factors of each construct are related to each other (≥ 0.774).
RELIABILITY It is the consistency of the results when the same individual or object is evaluated more than once.	Cronbach's alpha	Measures the internal consistency of the items that make up the scale.	The results of Cronbach's Alpha tests are shown below: | construct	quantity	coefficient
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OA	20	0.970
MCS	19	0.963
LO	16	0.931	 It is shown that the instrument has a high degree of reliability (above 0.70).
SENSITIVITY O objetivo é perceber se a capacidade de medida é capaz de para discriminar indivíduos estruturalmente diferentes.	distribution tests	Kurtosis (Ku) A value above 7 represents serious problems.		construct	construct Ku
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OA	2.518
MCS	1.414
LO	4.826	 Value below the critical value, certifying normality in the data distribution.
		Asymmetry (Sk) A value above 3 represents serious problems.		construct	construct Ku
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OA	-1.480
MCS	-1.298
LO	-1.911	 Value below the critical value, certifying normality in the data distribution.

Source: Fávero & Belifiore (2017), Martins & Domingues (2017).

It is important to note that the behaviors of the variables meet the assumptions of normality and, thus, parametric tests were used. Therefore, based on the data above, the results obtained are presented.

4.1 Respondents´ profile

As for the respondents' profile, it is based on the premise that the data collection instrument was intended for the managers of the organizations. The average age of managers is 54.63 years with a standard deviation of 12.379 years. As for the gender of the research participants, it is highlighted that 64% are women and 36% are men. As for the educational background of managers, 37.5% have completed high school; 34.4% are graduated; 26.4% are specialists; 2.2% have MSc degrees and 1.3% have PhD degrees. When asked how long (in years) they worked as managers of the institution, the average was 4.32 years with a standard deviation of 3.437 years.

4.2 Institution profile

As for the institution profile, such as the age of foundation of its regional units, an average of 30.45 years was observed with a standard deviation of 13.071. The youngest unit is 2 years old and the longest-running one is 60 years old. Regarding geographic location in Brazil, of the 227 valid responses, Southeast accounts for 113 units (49.8%), South for 55 (24.2%), North for 21 (9.3%), Northeast for 20 (8.8%) and Midwest for 18 (7.9%).

The average number of workers assigned by the municipality or state is 13.09 workers with a standard deviation of 12.33, with the minimum and the maximum number of workers being 0 and 65. The average number of regular volunteers in organizations is 7.84 with a standard deviation of 28 volunteers, the minimum and the maximum number of volunteers is 0 and 400. The average number of employees working in these organizations is 26.78 employees, the organization with the largest number has 325 employees and the one with the lowest number has no employees.

4.3 Level of OA, MCS and OL

The MCS construct is composed of the following factors: a) diagnostic control, b) interactive control, c) control flexibility, d) measurement categories, e) structure and f) input control. The factor with the highest average was the input control factor, accumulating 7.79 points with a standard deviation of 2.27 points. In the structure factor, the lowest average factor, 6.04 with a standard deviation of 2.81, stands out. Table 3 presents the averages of the factors, with the respective standard deviation.

Table 3. Degree of use of MCS

factors	mean	SD
diagnostic control	6.96	3.025
interactive control	7.34	2.959
control flexibility	7.31	2.474
measurement categories	7.69	2.407
structure	6.04	2.817
input control	7.79	2.271
origin of MCS	7.19	2.213

In the OA construct, the factor with the highest average was exploitation, with 8.21 points and a standard deviation of 1.919 points. In the exploration factor, a lower average of 7.08 points is observed. The overall mean of the construct was 7.65 points with a standard deviation of 2.052.

The scale used to measure the level of factors related to OA was initially used by Lubatkin et al., (2006), as well as in later works (Soares, Cunha & Steiner Neto, 2018; Soares & Reis, 2020; Soares et al., 2020). The means of the variables are shown in Table 4.

Table 4. Degree of OA

factors	mean	SD
exploitation	8.21	1.919
exploration	7.08	2.442
OA	7.65	2.052

In the OL construct, it is observed that the factor with the highest average was the clarity of purpose and mission, with 8.67 and a standard deviation of 1.714. The lowest average factor was leadership, with 7.13 and a standard deviation of 1.853. The second-order factor shows that the OL obtained an average of 7.95 and a standard deviation of 1.69, as shown in Table 5.

Table 5. Degree of OL

factors	mean	SD
clarity of purpose and mission	8.67	1.714
leadership	7.13	1.853
experimentation	7.86	2.196
knowledge transmission	8.16	1.912
organizational learning	7.95	1.692

4.4 Hypothesis tests

To evaluate the research hypothesis, tests of linear regression analysis and mediation test were used, using the macro PROCESS from the SPSS software. The mediation test serves research whose objective is to establish or test how X (OL) exerts its effect on Y (OA) employing a model in which one or more intervening variables M (MCS) are usually located between X and Y (Hayes, 2017).

In this sense, Figure 1 shows that the total effect of the relationship between OL and OA, that is, without the presence of the MCS factor as a mediator, is 0.9484. In the presence of the mediating factor, a direct effect of 0.5582 is observed, resulting in an observed indirect effect of 0.3902 (0.9835 x 0.3968). Therefore, the strength of the mediating factor in the data studied was 0.3902.

Figure 1. Mediation test
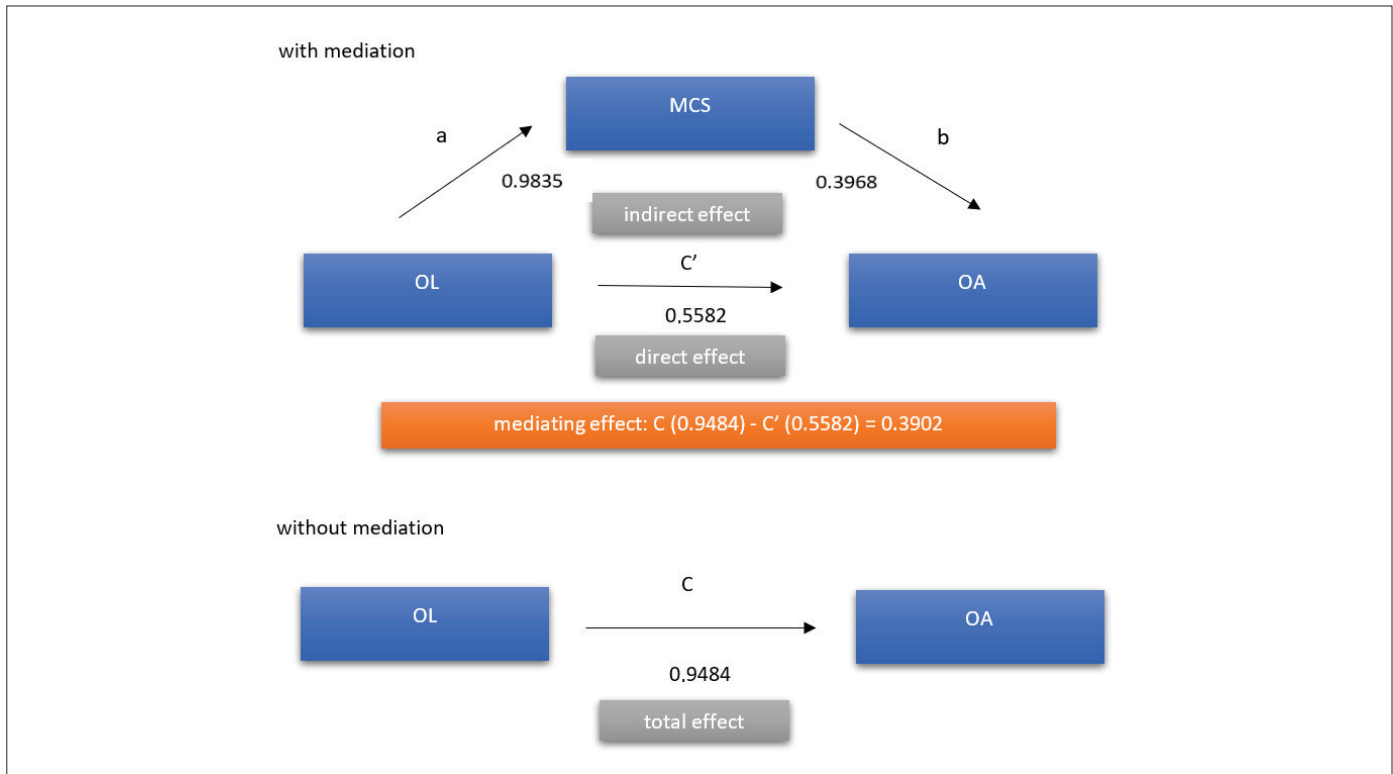
The mediating effect is considered significant, since the use of the bootstrapping method highlights, in a 95% confidence interval, the lower and upper limit between 0.2675 and 0.5323. For the indirect effect to be significant, there can be no signal exchange between these 2 limits (Hayes, 2017).

5. Discussions

The analysis obtained by the linear regression between OL and OA shows a coefficient of 0.9484 and an R^2 of 61.20%, at a p-value of 0.01, showing a positive relationship with r = 0.783. This corroborates the studies by Frizzo & Gomes (2017), whose work demonstrated a positive relationship between OL and organizational innovation in the wine industry.

The research hypothesis was proven through the observation of the mediating effect of the use of MCS in the relationship between OL and OA, analyzed through the mediation test. The size of the mediating effect was 0.3902, as the statistical test found a total effect of 0.9484 without mediation and a direct effect of 0.5582 with mediation.

The mediating effect of the use of MCS, which indicates a decrease in the relationship between OL and OA, is supported by the previous literature. In the sense that OA is conceived as an OL guideline (March, 1991; Popadiuk, 2015) and that OL requires disputes of beliefs and values practiced by the organization (Pacheco, Tosta & Freire, 2010). However, the work of Bispe & Otley (2014) demonstrated that the use of interactive controls in management control systems does not favor innovation. Mundi (2010) also noted that cyber controls hinder

the innovation process, putting the balance between exploitation and exploration at risk. The studies by Mannes, Beuren & Pazetto (2018) found an inverse relationship between the use of MCS and the innovative capacity in companies that had a great capacity for radical innovation.

This research also corroborates the results demonstrated by Haustein, Luther & Schuster (2014), which point to a negative association between the use of results control and technological complexity with the ability to innovate, in particular, the results controls as performance measures.

The effect identified in this work is confirmed even though the observation of a positive effect between the use of MCS and OA. This relationship finds support in previous studies such as Arantes & Soares (2020) which, when investigating the relationship between the use of MCS and OA, identified 59.8% of explained variance, and also Berry, Broadbent & Otley (2005) in which the MCS is seen as the existing process in a changing environment with the capacity to guide the organization towards viable patterns of activities consistent with the organizational objectives.

6. Concluding remarks

The research confirms the hypothesis that there is a mediating effect of the use of MCS on the relationship between OL and OA. This study theoretically contributes to the finding of the mediating effect of using MCS also in NPO, considering that such systems inhibit the relationship between OL and OA.

The practical contribution is found in the presentation of a perspective in NPO of the relationships between the use of MCS, OL and OA. This fact often goes unnoticed in this type of organization due to its altruistic character, but which, like any company, needs to remain sustainable over time.

It also contributes to the practical aspect of innovation and OL policies aligned with levels and forms of management controls, serving as support for training for managers in the preparation of workshops and lectures.

As for the research limitations, the fact that the collection instrument was directed to the main manager of the APAE units stands out, therefore, the opinion impresses the respondent's point of view. Thus, the interactions proven by this study cannot be generalized. Finally, it is also considered as a limitation the fact that the research deals with a cross-sectional study, since the phenomena were investigated in 2019.

Regarding future research, it is suggested that the limits in which the relationships between MCS in OL and in OA become negative could be investigated. For this purpose, quantitative and qualitative approaches are suggested. Furthermore, it is suggested that the same constructs be associated with other theoretical currents, especially those associated with the adaptability of organizations, such as organizational knowledge and dynamic capabilities.

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Appendix A - Data collection instrument

ORGANIZATIONAL AMBIDEXTERITY

factor	key question	variables
exploitation	As for the institution's actions, related to the IMPROVEMENT and EXPLOITATION OF CURRENT TECHNOLOGIES, in the period from 2016 to 2019, with what INTENSITY does your company:	**4.1.1** Seeks to gradually *improve the quality* of its products and services?
		4.1.2 Seeks to gradually *reduce the productive costs* of its products and services?
		4.1.3 Seeks to gradually *increase the degree of reliability* of its products and services?
		4.1.4 Seeks to *increase the levels of automation* (automatic processes) in its operations?
		4.1.5 Frequently surveys *current customer satisfaction*?
		4.1.6 Do you develop your product or service offerings, carefully observing the *characteristics of its current customers*?
		4.1.7 Seeks to strengthen and deepen *relations with its current customers*?
		4.1.8 Has there been an *update* of current knowledge and skills for familiar products / services and technologies?
		4.1.9 There was an *improvement* in skills in product / service development processes in which the company already has significant experience?
		4.1.10 Has there been a *strengthening* of knowledge and skills for projects that improve the efficiency of existing product / service innovation activities?
exploration	As for the institution's actions, related to the DEVELOPMENT and PROSPECTION OF NEW TECHNOLOGIES, in the period from 2016 to 2019, with what INTENSITY does your company:	**4.2.1** *Search for technological solutions* thinking "outside the box", that is, outside the limits of the company, researching technologies different from current ones?
		4.2.2 Explains the company's performance due to the *exploration of innovative technologies*, that is, it bases its success on its ability to explore new technologies?
		4.2.3 Focuses on *creating new products*?
		4.2.4 Focuses on *creating new services*?
		4.2.5 *Search for creative and differentiated ways* to satisfy the needs of its customers?
		4.2.6 Uses new products and / or services to *operate in new markets*?
		4.2.7 Uses innovation to *satisfy its customers' needs*?
		4.2.8 *Acquires entirely new* skills that are important for product / service innovation (such as to identify technologies; coordinate and integrate research and development, manage product development process)?
		4.2.9 *Learns* skills and processes for the development of totally new products / services for its industry (such as product design, prototyping new products, scheduling new product launches)?
		4.2.10 There was a *strengthening* of product / service innovation skills in areas where there was *no previous experience*?

ORGANIZATIONAL LEARNING

factor	variables
clarity of purpose and mission	**5.1.1** Do I understand how the organization's *mission* is to be achieved?
	5.1.2 Does the organization's mission *identify* values that all employees must abide by?
	5.1.3 Do we have (formal) opportunities for *self-assessment* in relation to achieving goals?
leadership commitment and empowerment	**5.2.1** Do the senior[1] employees in that organization *resist change* and are afraid of new ideas? [1]Consider as senior managers those with 10 years or more in the company.
	5.2.2 Do the senior[1] and junior[2] employees in that organization share a *common view* of the work to be done? [1]Consider as senior managers those with 10 years or more in the company. [2]Consider as junior employees those who do not have a managerial position and who have been with the company for up to 10 years.
	5.2.3 Do superiors generally provide useful *feedback* that helps to identify possible problems and opportunities?
	5.2.4 Do superiors often *involve* employees in important decisions?
experimentation and reward	**5.3.1** *Can* the team often bring new ideas to the organization?
	5.3.2 In my experience, are junior[2] employees in that organization encouraged to *question* the way things are done? [2]Consider as junior employees those who do not have a managerial position and who have been with the company for up to 10 years.
	5.3.3 Do superiors encourage team members to *try* new ideas to improve work processes?
knowledge transmission	**5.4.1** Do I often have the opportunity to talk to peer presidents about successful programs or work activities to understand why they are successful?
	5.4.2 Are failures often *discussed* constructively in the institution?
	5.4.3 Is there information *sharing* with other employees, when new processes arise in our facilities that can be useful to everyone?
	5.4.4 Do we have a program / method that allows us to *learn* successful practices from other institutions?
	5.4.5 In my experience, are new ideas from employees taken *seriously* by managers / coordinators / supervisors?
	5.4.6 Does current organizational practice encourage employees to *solve* problems *together*?

MANAGEMENT CONTROL SYSTEM

factor	key question	variables
diagnostic control	To what extent does the board use BUDGETS (as performance measurement systems) for the following?	**3.1.1** Identify critical variables of achieving goals (*factors that indicate the realization of the current strategy*)
		3.1.2 Monitor *progress* towards goals.
		3.1.3 *Provide information* to correct deviations from predefined goals.
		3.1.4 Review the main areas of performance.
interactive control	To what extent does the board use BUDGETS (as performance measurement systems) for the following?	**3.2.1** Allow for ongoing challenge and *debate* of assumptions and action plans with subordinates and peers.
		3.2.2 Encourage and facilitate *dialogue* and *information sharing* with subordinates.
control flexibility	The following questions are related to SET GOALS for subordinates to the board (for example, coordinators, supervisors or managers who report directly to the board). These goals can be financial (for example, budget) or related to other performance dimensions.	**3.3.1** How *flexible* are subordinate performance objectives after they are defined? (0 = inflexible, 10 = very flexible)
		3.3.2 How often are subordinates *consulted* about achieving goals? (0 = very frequent, 5 = monthly, 10 = very infrequent / quarterly or more).
		3.3.3 To what extent are *formal explanations* (written) of achieving goals required of subordinates? (0 = never, 10 = always).
		3.3.4 To what extent are *subordinate assessments* predominantly based on achieving goals? (0 = never, 10 = always)
performance measure categories	To what extent are the measures related to the following dimensions used to assess subordinate performance?	**3.4.1** *Users* (e.g., satisfaction, retention).
		3.4.2 *Employee* (e.g., employee satisfaction, turnover, workforce capacity).
		3.4.3 *Operational process* (e.g., productivity, security).
		3.4.4 *Innovation* (e.g., research and development, success of new products / services).
		3.4.5 *Quality* (e.g., product / service quality).
structure		**3.5.1** Indicate how control information is normally *communicated* on your unit. (0 = through highly structured formal communication channels; 10 = through informal and very open communication channels).
		3.5.2 In general, the philosophy of operational management at my institution favors: (0 = emphasis on giving more voice in decision making for formal line *managers / coordinators / supervisors*; 10 = emphasis on giving the *specialist* a voice in a given situation, even if it means ignoring formal line authority).
input control		**3.6.1** How *extensive* is the recruitment and selection process (e.g., looking for candidates, using tests, multiple interviews) for a managerial position? (0 = not very extensive; 10 = very extensive).
		3.6.2 How much importance is given to the selection of managers who have attitudes and *values aligned* with the institution, not just in competence? (0 = no importance; 10 = extreme importance).
		3.6.3 How much importance is given to the *training and development* of managers in your institution? (0 = no importance; 10 = extreme importance).
		3.6.4 To what extent are training and development processes used to *reinforce the institution's objectives, expectations and standards*? (0 = never; 10 = always).