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NPGA, School of Management

Federal University of Bahia

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Managerial competencies scale in a public management context: development and validation evidences

Luísa Magalhães Coelho Ávila Paz^a

Catarina Cecília Odelius^a

^a University of Brasília, Brasília, Brazil

Abstract

The purpose of the study was to develop and present validation evidences for a managerial competence mastery scale in the context of public management. The development of the initial instrument for data collection was based on literature analysis, and on theoretical and semantic validation made by judges, in addition to a pre-test. The questionnaire was electronically answered by 447 professionals—managers and non-managers—that belong to different public companies that works at the state level, engaged in technical assistance and rural extension. The results of exploratory factorial analysis presented signs of validity and reliability, indicating thirty competency items that were grouped into three factors: contribution for strategy, public service rendering and team management. As conclusion, the evidence indicates the validity of the scale to measure the managerial competence mastery, contributing to the evolution of managerial studies and increasing the reliability thereof. Additionally, the identified competencies reinforce the role of the managers in the alignment and management of organizational strategy, they indicate the existence of common characteristics of managers that work in different organizations and also demonstrate the adequacy of this instrument to the public sector reality. Finally, the use of the scale is suggested in other research contexts in order to confirm its structure and generalization potential.

Key Words: managerial competencies; scale; public sector.

Introduction

The management function plays a relevant role for the functioning of organizations and the development of managerial competencies figures as an element capable of promoting: alignment between strategic guidelines and actions at tactical and operational level (Bianchi, Quishida, & Foroni, 2017; Bündchen, Rossetto, & Silva, 2011; Gloria Jr., Zouain, & Almeida, 2014; Silva, Laros, & Mourão, 2007), an increase in the level of personal and employee engagement (Lara & Salas-Vallina, 2017) and an improvement to the teams and organizations performance (Brandão, Borges-Andrade, & Guimarães, 2012; Freitas & Odellius, 2018; Verle, Markic, Kodric, & Zoran, 2014).

Managerial Competencies (MC) can be understood as a set of capacities built and developed by managers who, when articulated and mobilized in the face of needs or challenges, enable the achievement of business strategies and the consequent organizational sustainability (Godoy & D'Amélio, 2012). This definition satisfies the integrative perspective of competencies that associates individual capacities with the context and willingness of acting to achieve results (Gonczi, 1999).

There is strong evidence that MC are influenced by organizational context (Brownell, 2008). In this sense, the domain analysis of competencies appears as an appropriate alternative to the investigations regarding the theme. According to Dias (2015), domain analysis goes beyond possessing certain knowledge or specialty, but can be understood as the process of identifying and adapting knowledge within a given context, in order to make it ready to be used. Therefore, for the present study, the investigation of mastery of managerial competencies implies not only the possession of certain capacity by managers, but the practical application of these capacities within the organizational context in which they are inserted.

Considering the context of public organizations, the emphasis on the modernization of the state, brought by the paradigm of public sector reform (New Public Management - NPM), and also imposed a greater concern about the development of managerial competencies. This new management model is characterized by the practice of typical market mechanisms, managerialism and customer orientation, whose purpose is to correct some pathologies considered to be inherent to the public sector, such as patrimonialism and excessively bureaucratic and regulatory processes (Alonso, Clifton, & Diaz-Fuentes, 2015). The promotion of a culture of evaluation, added to a results-oriented management policy, challenges public managers to achieve high performance goals in line with the demands of citizens and society in general (Arnaboldi, Lapsley, & Steccolini, 2015). Thus, public managers need to develop a profile of knowledge, skills and attitudes consistent with an environment of constant changes, showing professionalism, integrity, transparency, social maturity and the search for innovation (Lodge & Hood, 2012; Skorková, 2016).

In relation to the Brazilian public sector, despite the efforts to implement policies that adopt the competencies model, such as Decree No. 5,707 of 2006, studies reveal incipient results (Camões & Meneses, 2016) and, also, that few organizations define skills requirements or measure their gaps through questionnaires (Araújo, Fonseca, & Meneses, 2016).

In addition, recent studies show the need to develop research on competencies, specifically covering the public sector, both in Brazil and abroad (Montezano, Silva, & Coelho Jr., 2015; Santos, Coelho Jr., & Moura, 2011; Skorková, 2016; Surdiman, Siswanto, Monang, & Aisha, 2019). The analysis of scientific production on the subject reveals that most studies conducted in the field of administration are qualitative (Brandão, 2007; Santos et al., 2011), with few studies that are

concerned with the use of questionnaires and their statistical validation (Brandão, 2007). On the other hand, when there is greater concern about statistical validity and accuracy of the instruments used, the scales developed are restricted to the realities studied, as can be seen in Brandão, Borges-Andrade, Freitas and Vieira (2010), Fleck and Pereira (2011) or, still, in Freitas and Odélius (2017). In this sense, the need to develop other scales capable of reflecting specific contexts is justified, since different profiles of organizations require different management profiles, which need to be flexible, dynamic and adaptable to multiple organizational realities (Oderich, 2005).

Given the contextualization presented, the objective of this study is to develop and present evidence of validation for a domain scale of managerial competencies in the context of public management. For this, contents about managerial competencies will be addressed, evidencing other models and existing scales, as well as methodological procedures, reports and discussions of the results achieved.

Managerial Competencies in the Public Sector

From the 20th century on, the use of the term competence in the field of organizational management resulted in different meanings, as well as the lack of consensus on its definition (Freitas & Odélius, 2018; Surdiman et al., 2019). Given the diversity of interpretations for the concept, two major theoretical strands related to the theme stand out, the North American strand and the French strand. While the North American perspective emphasizes personal attributes, understanding competence as a set of qualifications inherent to the person, the French one emphasizes the performance presented and the context in which competence is developed (Dutra, 2004). In addition to these two classical strands of competencies, Gonczi (1999) presented a new perspective, called integrator, which associates personal attributes, the context in which they are used and the performance of the person at work, and this perspective became more prominent in the past few years (Brandão et al., 2010), and this perspective is the one that will be adopted as the guiding point of the present study.

The required performance of managers demands, therefore, more than the presence of attributes of knowledge, skills and attitudes, being necessary that these attributes are put into action in order to interfere in the performance of the managers themselves and in the results of the organization to which they belong.

Given the importance of the manager as an element responsible for connecting organizational expectations for results achievement and individual competencies (Bündchen et al., 2011), several studies have been dedicated to the analysis of attributes and functions of these individuals. Based on the assumptions defended by Ruas (2005), Godoy and D'Amélio (2012) define managerial competencies as a set of capacities built and developed by managers, which, when articulated and mobilized in the face of needs or challenges, enable the achievement of business strategies and the consequent organizational sustainability. This set of competencies is also understood as a fundamental instance in change processes, in addition to integrating and mobilizing other organizational competencies, whether essential, functional or individual (Fleury & Fleury, 2001).

Given the new initiatives aimed at the modernization of the State, which are based on management assumptions for results and adoption of management instruments typical of large

private organizations, it is necessary to change the profile of public managers based on the development of competencies that contribute to the achievement of their organizations results (Ésther, 2011; Skorková, 2016). However, the powers required by a public manager are more complex than those required of private sector managers, since the public context encompasses a large number of actors who have diffuse and contradictory interests, and it is up to the manager to balance these interests for the public good (Pacheco, 2002; Salles & Villardi, 2017).

Among the various national and international studies conducted in the last decade, it was identified that those that address managerial competencies deal with: influences of contextual aspects on competencies (Barbosa, Mendonça & Cassundé, 2016; Lan & Hung, 2018); relationship of the managerial competencies construct with other variables (Brandão et al., 2012; Bucur, 2013; Cassol, Cintra, & Ruas, 2016; Freitas, Montezano, & Odélius, 2019; Lara & Salas-Vallina, 2017; Trivellas & Reklits, 2014; Verle et al., 2014); identification of management skills relevant to specific sectors (Ésther, 2011; Gloria Jr. et al, 2014; Liang, Howard, Leggat, & Bartram, 2018; Salles & Villardi, 2017; Surdiman et al., 2019); comparison between the levels of competence demonstrated by public and private managers (Pillay, 2008; Chong, 2013), technicians or politicians (Losada & Esteve, 2018) and different professional formations (Godoy & D'Amélio, 2012); development of MC scales for different contexts (Brandão et al., 2010; Bündchen et al., 2011; Comin, Severo, Dall Agnol, Medeiros, & Guimarães, 2017; Freitas & Odélius, 2017; Santos, 2014); in addition to more theoretical studies aimed at understanding the concept or its different classifications (Freitas & Odélius, 2018).

The national literature on MC in the public sector indicates a predominance of empirical research aimed at managers of public universities (Barbosa et al., 2016; Barbosa, Paiva, & Mendonça, 2018; Ésther, 2011; Fleck & Pereira, 2011; Salles & Villardi, 2017) and public banks, more specifically, Banco do Brasil (Brandão et al., 2010; Brandão et al., 2012; Bündchen et al., 2011). It was also possible to identify a survey in the public security sector (Gloria Jr. et al., 2014), another one aimed at managers of two Brazilian states (Oliveira, Santa'anna, & Vaz, 2010) and one referring to the judiciary (Cassundé, Barbosa, & Souza, 2017).

From the analysis of national studies, it is perceived that most of the studies were aimed at identifying the managerial competencies necessary for each context and only Brandão et al. (2012) proposed to verify the relationship of the construct with other variables. Their results indicate that the variety of managerial competencies classifications is also observed in public sector studies and also that there are similarities between competencies considered necessary to managers whether in the public or private sectors, such as holistic vision, planning, strategic guidance, team management, communication, conflict management, among others. However, corroborating the notes of Ésther (2011), it is still possible to identify a set of competencies that is more aligned with the public reality: the "political skill", which includes the perception of actors and interdependencies existing in the functioning of the public machine; "legal knowledge", which includes not only theoretical knowledge, but also the adherence of the manager and his team to the laws, regulations and procedures established for the exercise of their function; and the "rationalization of scarce resources", which may demonstrate a lower availability of resources in the sector or even a greater difficulty in managing these resources due to bureaucracies of internal processes or budgetary constraints. Similarly, aspects such as "self-development", "career management" and those focused

on concern with their own employability are more consistent with the reality of managers of private organizations.

On the other hand, the analysis of the international literature on MC in the public sector indicates a greater number of studies that relate or compare competencies with other variables, besides investigating the influence of the context on the manifestation of these competencies. Chong (2013), when examining the skills and performance of British private sector managers and public managers in Singapore, concluded that MC are similar in importance despite cultural differences, but differences occur depending on the public or private environment of organizations, as highlighted by Ésther (2011) considering the Brazilian context. According to Chong (2013), the ability to analyze problems, write logically and succinctly and present ideas convincingly are valuable competencies in the public sector. In turn, Noordegraaf (2000) points out that a competent public manager is the one capable of operating successfully in an unstable environment due to political situations.

Lan and Hung (2018) summarized the competencies of Vietnam's public administration leaders into four categories: regional competencies (required by the public administration context of the country); professional skills (job orientation); people management skills (relationship orientation) and self-development skills (orientation to change and orientation to diversity). The results showed that managers perceive the strong impact of the local context on their performance, since the category "Regional context" was considered as the most important one, encompassing the aspects inherent to the knowledge of culture, strategies and policies for local development. Within the scope of competencies itself, change management was the item that received the highest importance evaluation, indicating the concern and awareness of managers regarding the changes in the sector and its need for adaptability.

Bucur (2013), in turn, identified differences between performance predictor competencies depending on the level of complexity of the managerial function (top, intermediate or operational), indicating those of greatest importance for each of them: top managers (influence and collaboration, strategic thinking, learning, motivation and capacity of self-assessing his/her learning), intermediate managers (influence and collaboration, strategic thinking, team management and transformational leadership) and operational managers (team management). Thus, the higher the level of complexity, the more important the learning competence is and the lower the level of complexity, the more important the team management competence happens to be.

Finally, Losada and Esteve (2018), in an empirical study with Spanish public managers, demonstrated that there are unquestionable differences between "technical" and "political" managers in the act of their managerial roles. While the political manager contributes fundamentally to the development of policies and strategies and the creation of an environment favorable to their implementation, the technical manager seems to focus on improving resource management so that policies are actually implemented. The results reinforce that, the management roles of "liaison" (interpersonal skills) and "spokesperson" (external disseminator of information), defined by Mintzberg (1989), are significantly more important for political managers than they are for technical managers, demonstrating that the field of action of political managers encompasses not only their organizational unit, but a much more dynamic social system that includes places in which the manager has no formal authority. In view of the results found, the authors reinforce the

importance of considering these differences in the development of human resources policies (for example, the "tradition" of some government systems that invest in the development of technical managers to assume political roles to avoid failures and increase performance for both technicians and politicians).

In view of the presentation of empirical research that reinforces the importance of MC study in the public sector in Brazil and abroad, as well as the identification of variables that may interfere in the manifestation of these competencies and in the efficiency gain in the public sector, the existing models and scales that supported the elaboration of the research instrument, the object of this study, will be analyzed.

Models and scales of Managerial Competencies

The diversity of concepts about competencies is also perceived in the numerous categorizations present in studies on managerial competencies. The seminal studies on the skills of the administrator developed by Katz (1955), for example, already categorized management skills into three distinct blocks: technical, human and conceptual. Fleury and Fleury (2001) also proposed a categorization in three dimensions: business, technical and social competencies. More recently, Quinn, Faerman, Thompson and McGrath (2003) presented a competencies model based on management roles that are associated with four organizational models: role of director and producer (rational goals model), role of monitor and coordinator (internal process model), role of mentor and facilitator (human relations model) and role of negotiator and innovator (open systems model). Another model was developed by Yukl (2010), which subdivides the skills/characteristics of the leadership profile into two main constructs: managing work and managing relationships. Cripe and Mansfield (2003), in turn, used three categories: relationship skills with people, business-related skills and self-management skills. Morhman and Worley (2009) subdivide MC into: allocate resources, manage staff and contribute to the strategy.

The recent literature review conducted by Freitas and Odelius (2018) identified the MC classifications present in empirical studies, pointing out that the Quinn Model was the most recurrent, besides indicating a set with the ten most frequent MC categories in the other studies analyzed (orientation to results; ability with people and teams; leadership, coordination and motivation; ability with changes; communication; planning; attitudes and values; knowledge management; knowledge and technical skills; and organization and control). The variety of categorizations may be related to different organizational profiles that require distinct management characteristics and competencies adaptable to multiple contexts (Oderich, 2005).

When comparing the realities of public and private organizations, the need to adapt to the context becomes even more visible, since the existence of complex and often ambiguous public sector objectives may require from their managers a differentiated logic of action (Ésther, 2011), in addition to the adoption of methods of description and evaluation of competencies more consistent with their reality (Camões & Meneses, 2016). Thus, considering the competencies as dependent on the context they are inserted, Freitas and Odelius (2018) suggest the realization of empirical studies capable of evidencing basic, transversal or common MC of distinct research locus in order to "simplify or guide the diagnoses of MC, providing that future studies focus on mapping the specific and peculiar behaviors of the research locus studied" (Freitas & Odelius, 2018, p. 46).

The national literature review identified five studies that proposed to develop and validate scales of managerial competences in various research locus, being only one in the context of private organizations: Comin et al. (2017) and Brandão et al. (2010) identified the relevant competencies to managers of Banco do Brasil and the categorization of competencies occurred according to the six perspectives of the bank's management model evaluation (strategy and operations, economic result, customers, organizational behavior, internal processes and society); Fleck and Pereira (2011), based on the theoretical model proposed by Yukl (1998), addressed competencies for course coordinators of higher education institutions covering 20 items such as "In the definitions of schedule for semester/year, activities/tasks are defined according to the priorities and objectives of the course"; Santos (2014) studied the career of Specialists in Public Policy and Government Management, resulting in 38 competencies grouped into five factors, being Public Policies and Improvement of Public Management, Interpersonal Relationship and Professional Behavior, Management Skills, Support to the Formulation of Public Policies and Instruments and Work Support. In this case, the fact that there is a specific factor for "managerial skills" shows that the instrument brings characteristics that go beyond the managerial function, translating the specific reality of professionals who work in the management career and not necessarily leadership; Comin et al. (2017) relied on Quinn's model to identify 19 items of competencies in agribusiness companies, which were divided into six factors called dimensions: hierarchical, innovative, behavioral, managerial, dynamic, communicative; and, finally, Freitas and Odellius (2017) emphasized managerial competencies in the context of research groups, totaling 50 items distributed in two factors: People Management and Research Results and Fundraising and People.

Being presented the concepts of managerial competencies, their particularities in the context of public organizations and the diversity of classifications present in theoretical and empirical studies, the following section addresses the research methods used in this research.

Method

The research used qualitative and quantitative techniques to develop and present evidence of a Managerial Competencies scale, applying a cross-sectional survey design (Hair Jr., Babin, Money & Samouel, 2005; Creswell, 2013). Next, we present the procedures adopted for the construction of the items, the stages of theoretical and semantic validation (Pasquali, 2010), as well as the procedures adopted for data collection and analysis, which allowed exploratory factor analysis.

Preparation of the instrument

Based on the literature review, and in view of the already discussed diversity of classifications present in MC studies, we opted for content analysis with later categorization (Bardin, 2011) to build the set of competencies that based the elaboration of the instrument. Content analysis was performed individually by one of the authors of this study and both theoretical and empirical research and both public (Amaral, 2006; Brandão et al., 2010; Bündchen et al., 2011; Ésther, 2011; Freitas & Odellius, 2017; Gloria Jr. et al., 2014; Santos, 2014; Oliveira et al., 2010) and private contexts (Cardoso, 2009; Comin et al., 2017; Godoy & D'Amélio, 2012). were considered.

Initially, the constitutive and operational definitions of the main MC models identified in the literature review were analyzed: Brandão et al. (2010); Fleury e Fleury (2001); Katz (1955) e Mohrman e Worley (2009). Two categories were common to all models: (a) business or conceptual competencies, which cover the capacity of strategic management, comprehension and business development; and (b) social and human skills, which encompass the development of teams, the mobilization and articulation of people. Another relevant aspect was observed in relation to the categorization of factors such as "clients" and "internal processes" which, despite being pointed out by all authors, did not present homogeneity in classifications, sometimes being presented as a competency related to strategy, sometimes related to technical skills.

Subsequently, all descriptions or attributes of management competencies identified in the studies were listed in a spreadsheet, which were ordered and regrouped by thematic proximity criterion, making the writing adjustments or removing duplicates. From this process, there were 63 descriptions of competencies subdivided into six categories (clients, strategic management, society, internal management, team management and self-development), which are presented in Table 1.

Table 1

List of managerial competencies according to literature review

Categories	Managerial Competencies	Authors
Clients (CLI)	1 Provides excellent customer service, seeking to meet expectations.	Brandão et al. (2010);
	2 Guides actions according to the customer needs.	Bündchen et al. (2011);
	3 Manages customer relationships based on respect, courtesy and ethics.	Fleury and Fleury (2001);
	4 Communicates with the client with clear, objective and accessible language.	Godoy and D'Amelio (2012)
Strategic Management (STR)	5 Establishes a vision of the future and guides the actions towards the result.	Bündchen et al. (2011);
	6 Formulates scenarios, identifying strengths, weaknesses, threats and opportunities for the organization.	Fleury e Fleury (2001); Brandão et al. (2010);
	7 Formulates plans, establishing objectives, goals, assignments, deadlines and priority.	Ésther (2011); Amaral (2006);
	8 Monitors indicators to achieve goals.	Oliveira et al., (2010);
	9 Outlines strategies to achieve long-term results.	Katz (1955);
	10 Acts as an important agent of the changes proposed by the organization.	Quinn et al. (2003); Cardoso (2009);
	11 Quickly adaptation to changing situations.	Yulk (2010);
	12 Pre-identifies future changes in the business environment of the organization.	Godoy and D'Amelio (2012);
	13 Identifies strategic options compatible with organizational reality.	Santos (2014);
	14 Holistic view of the organization.	Comin et al. (2017)

	15	Recognizes the role of the different organizational units, as well as their interdependencies.	
	16	Mastery over the portfolio of products and services provided by the organization.	
	17	Understands the relationship and interdependence of the organization with other spheres of public power.	
	18	Represents the organization or area with partners and other stakeholders of the organization, demonstrating security.	
	19	Evaluates the organizational situation from different angles and perspectives.	
	20	Understands the strategy of the organization, its objectives and its cause-and-effect relationships.	
	21	Analyzes the strategic objectives, unfolding them into coherent individual, group and functional goals.	
Society (SOC)	22	Makes decisions, taking into account the possible impacts on the environment and community.	
	23	Promotes the involvement of society in the actions carried out by the organization.	Brandão et al. (2010); Oliveira et al., (2010);
	24	Promotes actions that contribute to the sustainable development of the community, showing concern for social issues.	Ésther (2011); Gloria Jr. et al., (2014);
	25	Encourages team members to act in accordance with the principles of social and environmental responsibility of the organization.	Godoy and D'Amélio (2012)
	26	Acts under ethical conducts, being an example for the team and other employees.	
Internal Management (INT)	27	Monitors the compliance of processes under his/her responsibility, observing laws, standards and established procedures.	Mohrman e Worley (2009); Bündchen et al. (2011);
	28	Monitors the quality of internal processes to avoid rework.	Fleury and Fleury (2001);
	29	Quickly finds the information you need through the database and systems of the organization.	Brandão et al. (2010)
	30	Organizes activities and tasks, discerning between priorities and routines.	Katz (1955); Quinn et al. (2003);
	31	Continuously improves work processes to optimize the utilization of available resources.	Ésther (2011);
	32	Manages projects under the responsibility of the team, monitoring scope, deadlines and resources.	Gloria Jr. et al., (2014); Yulk (2010);
	33	Controls administrative expenses.	Godoy and D'Amelio (2012); Santos (2014); Freitas and Odellius (2017); Comin et al. (2017)
Team Management (TEAM)	35	Mobilizes and articulates employee efforts around common purposes.	Mohrman and Worley (2009);
	36	Encourages the commitment of people and teams to the objectives of the organization.	Katz (1955);
	37	Collaborates with co-workers to achieve the goals of the organization.	Bündchen et al. (2011);

	38	Maintains a good interpersonal relationship with colleagues and clients, cherishing for a climate of harmony.	Fleury and Fleury (2001);
	39	Adopts preventive and corrective measures to improve the health, well-being and quality of life of the team.	Brandão et al. (2010); Ésther (2011);
	40	Acts impartially when dealing with team members.	Amaral (2006);
	41	Delegates activities, making it clear to the team the roles and objectives to be achieved.	Cardoso (2009);
	42	Guides the performance of the team, clearly communicating their expectations about performance.	Oliveira et al., (2010); Gloria Jr. et al., (2014);
	43	Properly distributes tasks among team members according to each member abilities.	Quinn et al. (2003);
	44	Shares the mission and objectives of the organization in a clear way to its subordinates.	Godoy and D'Amélio (2012);
	45	Encourages the participation of employees in decision-making and values the contribution offered by them.	Freitas and Odelius (2017); Santos (2014); Comin et al. (2017)
	46	Makes decisions, based on the competencies and limitations of the area/function.	
	47	Manages conflicts to maintain cohesion and harmony among employees.	
	48	Promotes the professional development of the team with training opportunities.	
	49	Recognizes and praises the achievement of a good work.	
	50	Practices open and transparent communication, keeping people informed about organizational plans and processes.	
	51	Communicates in ways that can generate enthusiasm.	
	52	Listen to the interlocutors carefully.	
	53	Give feedbacks to the team continuously.	
	54	Has a high degree of dynamism and personal motivation.	
	55	Identifies opportunities for self-development and creates professional differentiation.	Katz (1955);
	56	Reflects on his/her own performance and seeks to learn how to learn.	Bündchen et al., (2011);
	57	Seeks to expand its knowledge through courses, seminars and studies, not only limited to its function.	Fleury and Fleury (2001);
	58	He/She is innovative when presenting unconventional ideas, thinking "outside the box".	Brandão et al. (2010); Ésther (2011); Amaral (2006);
Self-Development (SELF)	59	Keeps the optimism and look for alternatives to try again when things don't work out.	Cardoso (2009);
	60	Demonstrates initiative, acting as a pioneer in the search for results for the organization.	Oliveira et al., (2010); Gloria Jr. et al.; (2014),
	61	Demonstrates balance to manage stress situations at work.	Quinn et al. (2003);
	62	He/She is committed to the provision of public services.	Freitas e Odelius (2017)
	63	Shows effectiveness in negotiations, getting support for his/her ideas in order to establish agreements and commitments.	

Source: Produced by the authors.

Based on Table 1, it is possible to verify that the categories with the highest representativeness are those that were common to the main models analyzed ("Strategic Management" and "Team Management"). The thematic similarity of the items also indicated the existence of categories aimed at "customers" and internal processes, the latter one encompassing aspects of financial management, called "internal management". The factors clients and internal processes also appear as specific categories in the classification of Brandão et al. (2010), thus reinforcing their importance. The category society was also evidenced, bringing elements that relate the activity of the organization and the behavior of its managers in the face of social, environmental and ethical aspects. Studies on competencies of Cheetam and Chivers (1996) also present values and ethics as a category of individual competencies. It is also worth mentioning the importance that the aspect society represents for the public sector, which is the context in which the instrument was applied. Finally, the category "self-development" grouped descriptions related to the capacity of personal motivation, innovation and initiative of managers, whose importance is corroborated by the studies of Cripe and Mansfield (2003) that also present self-management skills as a category of managerial competencies. These descriptions of competencies were frequently pointed out in the literature and are considered foundations for the development of other managerial competencies (Bitencourt, 2005).

The 63 MC descriptions resulting from the literature review (Table 1) were submitted to the preparatory stages of semantic and theoretical evaluation by judges and pre-test (Pasquali, 2010). The evaluation of judges, carried out by five senior researchers in the areas of administration and psychology, was based on the Method of Content Validity Index (CVI) developed by Hernández-Nieto (2002), which evaluates criteria of language clarity, practical appropriateness and theoretical relevance of items based on scores attributed by each one of the judges. The theoretical dimension criterion was evaluated, considering the agreement of judges higher than 80% (Pasquali, 2010).

After calculating the CVI (average of each item divided by the highest possible score), ten items were eliminated because they presented a CVI index lower than 0.8 (Cassepp-Borges, Balbinotti, & Teodoro, 2010; Hernández-Nieto, 2002). The evaluation of the theoretical dimension resulted in the elimination of 13 other items, which demonstrated categorization divergences. The other items were maintained, 3 with category adjustments, 14 with writing adjustments and 23 in original form. The pre-test stage, performed with seven employees of the organization researched who were representatives of different educational, training and hierarchical levels, did not result in new eliminations, but only in writing adjustments of one item.

The final instrument is composed of forty descriptions of competencies, which are presented in the result section. These items had their verbal tenses adjusted to the infinitive in order to provide a better domain assessment by the respondents. The instructions of the scale asked the respondents to indicate their self-assessment of competence domain based on a Likert scale ranging from 1 (no domain) to 5 (complete domain), in addition to the possibility of answering with "Does not apply to my professional performance", since the instrument was made available to both managers and non-managers, and there could also be situations in which competence was not relevant to the reality of the manager. In addition to MC items, the questionnaire also brought a brief presentation of the research, its objectives and information about data confidentiality, and a final part in which socio-demographic and functional information was collected from the respondents.

Population and sample

The study adopted as a context the set of public companies of Technical Assistance and Rural Extension (ATER) of Brazil. ATER is considered the bridge between knowledge production and agricultural production, and acts directly with the public of family producers through public government policies, in the social, productive, environmental, infrastructure, health, education and energy aspects (Asbraer, 2014). After going through a crisis in the 1980s and 1990s, which resulted in the reduction of budget funding, reduction of staff and even extinction of some entities (Ruas et al., 2006), the public ATER has been reorganizing itself based on a new approach of rural extension, which emphasizes its legitimacy based on family agriculture, institutional democratization and sustainable development, in the name of environmental balance (Caporal & Costabeber, 2004). Considering the reality of the people who live in rural areas, according to information collected on the websites of the institutions surveyed, the state organizations of ATER (Emateres) are organized through local offices, decentralized and distributed throughout the territory of the states and have a headquarters unit, usually located in the capitals, responsible for administrative management. In local offices, teams are generally multidisciplinary and composed of agronomists, veterinarians, domestic economists and administrative assistants, and one of these employees performs the role of office manager (Emater-DF, 2018).

Initially, in order to conduct a census research, all Brazilian state public organizations responsible for providing technical assistance and rural extension were invited to participate, presents in the 26 states and the Federal District. However, only four of these organizations presented significant amounts of responses to the research instrument. It is noteworthy that the set of employees of these four organizations totals 4,544 individuals, according to data reported by the people management sectors of each one of them.

The sampling of the research was non-probabilistic for convenience and accessibility, since it did depend on the interest of individuals in participating and answering the questionnaire (Hair Jr. et al., 2005). The questionnaire, distributed electronically through the Survey Monkey software, was accessed by 678 individuals, and 449 individuals presented complete answers. It is worth mentioning that the instrument was made available to all employees, regardless of whether they occupy management positions or not, since non-management employees could present a domain of typical management competencies, besides allowing a greater variability of the data, since a smaller MC domain is expected when compared to those who already work in management functions.

Inicial data processing

For the treatment, the data were exported to the software Statistical Package for the Social Sciences (SPSS), version 22, which allowed the initial treatment and following analyses.

Initially, analyses were performed to identify missing data (missings), and it is important to highlight that, although the instrument was constructed to avoid the absence of answers, the option "does not apply to my professional performance" was set to appear as absent data. In this sense, although 21 of the 40 items presented percentages of absent values higher than the maximum level

of 10% established by Hair Jr., Black, Babin, Anderson and Tatham (2009) and Tabachnick and Fidel (2007), no item was eliminated from the scale under this justification since they corresponded to the option "does not apply" and not necessarily to the absence of answers, besides no signs of subsampling was identified for this set of missing data, being therefore random.

Subsequently, for analysis of extreme data (outliers), techniques for calculating extreme values, stem-and-leaf and boxplot diagrams were adopted, as well as the calculation of mahalanobis distance to identify possible multivariate outliers, which resulted in the exclusion of two cases (one univariate and one multivariate).

The verification of the normality assumption of the distribution was performed by histogram analysis, asymmetry coefficient and kurtosis calculations and, finally, the Kolmogorov-Smirnov test (K-S), all indicating that the data differed from the normal distribution. It should be noted, however, that the absence of normality is not considered an obstacle for exploratory factor analysis (Pasquali, 2010).

Regarding the analysis of assumptions for performing exploratory factor analysis, aspects that confirmed the factorability of the matrix were verified: visual inspection revealed that 91.62% of the correlations are higher than 0.3, according to recommendations made by Pasquali (2010); the determinant presented low and non-zero values; the commonalities did not present extreme values (0-1); and the calculation of the general Kaiser-Meyer-Olkin test (KMO) presented a value of 0.941, and can be interpreted as admirable, according to Hair Jr. et al., 2009.

Results

The data processing and analysis resulted in the consideration of 447 valid questionnaires, which is considered a satisfactory sample for exploratory factor analysis (EFA), since an average of 11.17 respondents was obtained for each of the forty items on the scale, which is a higher amount than the recommendations of Hair Jr. et al. (2009), which establish a minimum sample of 200 subjects and at least five respondents per item of the instrument.

Half of the respondents work in the Southeastern Region of Brazil (50.1%) and are, mostly, men (62.2%) who works in activities related to technical assistance and rural extension (57.9%). The mean age identified was 46 years and the mean time of approximately 17 years in the organization. In addition, only 5.1% of the respondents indicated that they had a high school education and 66.6% reported having postgraduate degrees, especially *lato sensu* (45.9%). Of the total sample, 201 respondents indicated that they worked in leadership/team management positions, representing approximately 45% of the total sample.

Exploratory factorial analysis

To define the number of factors, the eigenvalues with values equal to or greater than 1 were considered, as well as the analysis of the Scree Plot, which indicated the existence of seven possible factors, however, only the first five had a percentage of variance greater than 3%. Therefore, parallel analysis was used to indicate more accurately the number of factors to be extracted (Laros, 2012), and this parallel analysis indicated that from the fifth factor, the empirical eigenvalue became lower

than the random, indicating the maximum extraction of four factors. In addition, initial extractions with three and four factors were tested in order to ensure the identification of the best structure (Hair Jr. et al., 2009), both by statistical and theoretical criteria. The final extraction with three factors was chosen, since it did fit better in the model.

Once the number of factors was defined, the dimension reduction was performed by the method of factoring the main axes (Principal Axis Factoring - PAF) with oblique rotation because it is more flexible, more realistic and represents the grouping of variables with greater precision (Hair Jr. et al., 2009). After the Promax and Oblimin rotations were tested, the Oblimin was chosen because it presented better factor loadings of the items. The criterion of minimum significance of factor loadings was established in the value of 0.3 (Field, 2009), which is adequate for samples greater than 350 subjects (Hair Jr. et al, 2009).

After the factors rotation, seven items had an indicative of exclusion because they had cross loadings in more than one factor with differences of less than 0.1 or items grouped into factors distinct from their theoretical conception ("Guide actions according to customer needs", "Manage projects under the responsibility of the team, monitoring activities, deadlines and resources", "Organize activities and tasks discerning between priorities and routines", "Identify opportunities for self-development by taking advantage of them to stand out professionally", "Guide their actions in ethical conduct, being an example for the team and other employees", "Demonstrate balance to manage stress situations at work" and "Adopt measures to improve the health, well-being and quality of life of the team"). After the elimination of the items, the EFA was processed again to verify the adequacy and, with this, there was an indication of exclusion of three other items: one presented factor loading value lower than 0.3 and two showed theoretical inconsistency with the factor in which they were grouped ("Promoting the professional development of the team with training opportunities", "Stimulating the participation of employees in decision-making, valuing the contributions offered by them" and "Mobilizing the efforts of the work team, articulating them around common purposes").

Thus, of the forty items that comprised the initial MC scale, ten were excluded under the justifications already presented. Given the lack of new adjustments, the scale was now composed of thirty items divided into three factors, which were submitted to reliability analysis measured by Cronbach's Alpha, which is able to indicate how much the items are measuring the same construct (Field, 2009; Rozzett & Demo, 2010).

Table 2 presents the composition of the three factors that integrate the management competencies, eigenvalues and Cronbach's Alphas scale, calculated for each of them, the total variance explained and the items related to each factor, followed by the code that identified the hypothesized category for each item during the literature review and their respective factor loadings.

Table 2

Managerial competencies scale after the exploratory factorial analysis

Factor	Nº	Item	Category of the original item	Facto. Loading
Contribution to strategy Cronbach's Alpha: 0,937 Eigenvalue: 11,636	1	Direct actions to enable the achievement of organizational objectives from the analysis of the role of different functional units and their interactions.	STR	0,819
	2	Monitor the quality of internal processes to avoid rework.	INT	0,788
	3	Analyze strategic objectives, unfolding them into coherent goals for units, teams and individuals.	STR	0,773
	4	Outline strategies to achieve long-term results.	STR	0,724
	5	Identify strategic alternatives compatible with the organizational reality.	STR	0,719
	6	Identify organizational problems in advance, acting proactively to solve them.	SELF	0,704
	7	Continuously improve work processes to optimize the use of available resources (materials, technology and human resources, for example).	INT	0,694
	8	Previously identify future changes in the business environment of the organization.	STR	0,688
	9	Understand how relationships between objectives impact the achievement of the organizational strategy.	STR	0,655
	10	Formulate plans, establishing objectives, goals, assignments, deadlines and priorities.	STR	0,600
	11	Formulate scenarios, identifying strengths, weaknesses, threats and opportunities for the organization.	STR	0,597
	12	Adapt quickly in changing situations.	SELF	0,579
	13	Quickly find the information you need through the database and systems of the organization.	INT	0,532
	14	Manage conflicts to maintain cohesion and harmony among employees.	TEAM	0,498
	15	Monitor the compliance of processes under your responsibility, observing laws, standards and established procedures.	INT	0,479
	16	Guide actions, considering characteristics of the products and services provided by the organization.	STR	0,477
	17	Control administrative expenses, in order to reduce the costs of your unit and organization.	INT	0,474
	18	Give feedbacks to the team continuously.	TEAM	0,457
Provision of Public Services	19	Promote actions that contribute to the sustainable development of the community, demonstrating concern for social issues.	SOC	0,827
	20	Carry out the work in order to ensure the provision of quality public services to society.	SOC	0,638

Cronbach's Alpha: 0,824 Eigenvalue: 1,159	21	Promote the involvement of society in the actions carried out by the organization.	SOC	0,578
	22	Make decisions, taking into account the possible impacts on the environment and community.	SOC	0,537
	23	Manage customer relationships based on respect, courtesy and ethics.	CLI	0,529
	24	Communicate with the client with clear, objective and accessible language.	CLI	0,513
	25	Seek to expand his/her knowledge through courses, seminars and studies, not only limited to your function.	SELF	0,495
	26	Ensure excellent customer service, seeking to meet their expectations.	CLI	0,467
Team Management Cronbach's Alpha: 0,808 Eigenvalue: 0,964	27	Delegate activities, clarifying to the team the roles and objectives to be achieved.	TEAM	0,692
	28	Guide the performance of the team, clearly communicating the expectations regarding performance and results.	TEAM	0,582
	29	Properly distribute tasks among team members according to the abilities of each member.	TEAM	0,550
	30	Treat team members impartially.	TEAM	0,430
Total variance explained: 45,9%				

Source: Created by the authors.

After exploratory factor analysis, the categorization of managerial competencies, initially hypothesized by a set of six categories (clients, strategic management, society, internal management, team management and self-development), began to be composed of three factors, with the nomenclatures and definitions presented in Table 3.

Table 3

Definition of the factors of the managerial competencies scale

	Title of the factor	Definition
Factor 1	Contribution to strategy	It covers competencies related to business understanding and development, alignment between strategy and action, analysis of the environment and process enhancement with a focus on continuous improvement.
Factor 2	Provision of public services	It covers competencies related to the promotion of sustainable development and quality, transparency and reliability in the relationship with society as a direct customer of the services provided by the organization.
Factor 3	Team management	It covers competencies related to the mobilization and articulation of people and teams, including interpersonal and coordination skills, communication and leadership skills to build collaborative effort.

Source: Created by the authors.

Finally, for the extraction of factorial scores related to the domains of management competencies, calculated from the average of the items belonging to each factor (Pasquali, 2010), only the respondents occupying management functions (n=201) were considered. The descriptive measures for the three factors are presented in Table 4.

Table 4

Descriptive analysis of the factors of the management skills scale

Scale	Factor	Mean	Standard Deviation	Median
Management Competencies	Factor 1 – Contribution to strategy	3,78	0,65	3,77
	Factor 2 – Provision of public services	4,15	0,57	4,12
	Factor 3 – Team management	4,08	0,67	4,00

Source: Created by the authors.

Discussion of the results

The three extracted factors revealed high internal consistency since all had alphas higher than 0.8, indicating that they were very reliable, according to Pasquali classification (2010). In total, the factors explain 45.9% of the variance, which, despite being less than 60%, an index recommended by Hair Jr. et al. (2009), is compatible with other behavioral science scales (Fonseca & Porto, 2013). These aspects, added to the high factor loadings of the items (all greater than 0.4), can be considered evidences of the validity of the scale.

The theoretical adequacy of the structure was also adequate, since the definitions of the categories (Table 3) reinforce aspects of MC present in the literature, especially those related to the strategy/development of the business (Factor 1) and team management/human competencies

(Factor 3), which were common categories to all models examined throughout the theoretical review. The findings of Freitas and Odélius (2018) reinforce the predominance of these categories, since "guidance for results" and "ability with people and teams" were the two management competencies with the highest incidence in the studies conducted between 2005 and 2015. The empirical identification of these categories may reinforce the existence of transversal or common competencies for the exercise of management functions despite the different research locus (Freitas & Odélius, 2018).

In an analysis of the items that compose each of the factors presented in Table 2, it is observed that the factor **Contribution to the strategy** (18 items, $\alpha = 0.937$) grouped the largest number of items, mainly those referring to the initial categorization of "strategic management" and "internal management". Thus, the factor encompasses the role of the manager in relation to business development and strategic management and also his role in improving internal processes with a view to the development of the organization (Feringotti & Fernandes, 2014). The EFA indicated the exclusion of two items ("Manage projects under the responsibility of the team, monitoring activities, deadlines and resources" and "Organize activities and tasks discerning between priorities and routines") because they presented cross loadings with Factor 3. There was also the grouping of competencies "Identify organizational problems in advance, acting proactively to solve them" (SELF), "Adapt quickly in changing situations" (SELF), "Manage conflicts to maintain cohesion and harmony among employees" (TEAM) and "Give feedbacks to the team continuously" (TEAM), which can be explained to the extent that they deal with aspects considered essential for the alignment and correct organizational strategic management (Estrada & Almeida, 2007).

The factor **Provision of public services** (8 items, $\alpha = 0.824$) grouped the items related to the initial categories of "society" and "clients", and those related to "society" were those that had the highest factor loadings. The grouping can be justified to the extent that, in the public sector, society is seen as the direct customer of the services provided. Only one item was excluded from this factor during the EFA ("Guiding actions according to customer needs") because it presented cross loadings with Factor 1. The item "Seek to expand his/her knowledge through courses, seminars and studies, not only limited to your function", initially defined as belonging to the category of "self-development", was grouped to the factor, which can be justified by the influence of training in the domain of managerial competencies (Felix, 2005) that are evidenced by the behavior that employees manifest at work (Brandão et al., 2012). The factor indicates, therefore, the adequacy of the instrument to the public reality, highlighting competencies regarding the quality of the provision of services to its customer, the society.

Finally, the **Team Management** factor (4 items, $\alpha = 0.808$) remained composed only of items that had already been developed for this same category. Four items were excluded during the EFA ("Adopt measures to improve the health, well-being and quality of life of the team", "Promote the professional development of the team with training opportunities", "Stimulate the participation of employees in decision-making, valuing the contributions offered by them" and "Mobilize the efforts of the work team, articulating them around common purposes") due to theoretical inconsistencies or factorial loadings lower than 0.3.

The social and relationship skills with the team are unanimous when analyzing management competencies. However, the four descriptions that compose the factor show not only interpersonal skills, but also the profile of organization, delegation and guidance for achieving results,

demonstrating a strong relationship with the definition of team management proposed by Morman and Worley (2009). These results may be related to the research conducted by Bucur (2013), which indicated differences in MC importance depending on the level of complexity of the managerial function (top, intermediate or operational), concluding that the lower the level of complexity of the function, the more important the team management competence. The structure of the identified items could therefore be more consistent with operational level management functions, but it is necessary to conduct further research capable of verifying this correlation, since the scope of this study did not include MC analysis depending on the complexity or hierarchy of positions.

Comparing the final grouping of factors with the categorization resulting from the literature review, as shown in Table 1, it is possible to conclude that the three factors encompassed all aspects defined as relevant by the literature researched, sometimes grouping them ("strategic management" with "internal management" and "society" with "clients"), sometimes keeping them single (team management). The only category that was not relevant for the composition of a specific factor during EFA was "self-development", since its items were dispersed in the other factors and three received an indicative of exclusion. In fact, the literature already pointed out this set of competencies as the foundation for the development of other competencies (Bitencourt, 2005), which is a possible cause of the dispersion verified in the items.

The descriptive analysis of the factors (Table 4) indicated that "Provision of public services" was the factor that presented the highest mean (4.15) and lower standard deviation (0.57), suggesting that, in the self-assessment performed by managers, there is homogeneity and high domain of competencies related to the promotion of sustainable regional development and the provision of public services to society. This factor also groups the item with the highest average (4.5) of the scale, which is: "Manage customer relationships based on respect, courtesy and ethics". This domain may be linked to the characteristic of the organizations surveyed and the profile of the respondents, composed of 51.2% of managers who work in the final area and provide direct care to the public. However, Brandão et al. (2010) identified opposite results regarding the self-assessment of Banco do Brasil managers, who presented in the factor "Society" the lowest mean and highest standard deviation, suggesting the need to improve competencies "related to the promotion of sustainable regional development, socio-environmental responsibility and economic and social development of the country, or for the organization to offer greater support" (Brandão et al. , 2010, p. 180). The difference between studies may be associated with the institutional mission of organizations, since public organizations of ATER have the mission of bringing development to rural areas (Castro, 2013), based on pillars such as family farming, institutional democratization and sustainable development with a focus on environmental balance (Caporal & Costabeber, 2004). Thus, it seems natural that these managers present this group of competencies with greater mastery.

The "Team Management" factor presented similar values, that is, high mean (4.08) and reduced standard deviation (0.67). The values also indicate the homogeneity of the responses and a high degree of mastery of competencies related to the mobilization and articulation of people and teams. Finally, "Contribution to the strategy" presented a lower mean value (3.78) and maintained a reduced standard deviation (0.65), indicating the homogeneity of the answers. The factor also includes the items with lower averages of the scale: "Previously identify future changes in the business environment of the organization", with an average of 3.4; "Formulate scenarios, identifying

strengths, weaknesses, threats and opportunities for the organization" and "Analyze strategic objectives, unfolding them into coherent goals for units, teams and individuals", both with an average of 3.63. These results may also be associated with the hierarchical level of managers who may not be involved with these activities. The occurrence of lower averages for the factor suggests that the managers themselves identify a domain gap of competencies related to business management, strategic alignment and improvement of organizational processes. Previous studies, conducted in the context of the Brazilian public sector, also concluded that competencies related to business development are the ones with the lowest scores when compared to other categories of managerial competencies (Bündchen et al., 2011). These results, added to the widely known importance of managers as elements of connection and strategic operationalization (Floyd & Wooldridge, 1994), reinforce the need for greater investment in training actions and development methods of this set of management skills.

Final considerations

The study achieved its objective by developing and presenting evidence of validity for a managerial competencies scale in the context of public management. The scale revealed good statistical parameters for the extraction of three factors, which presented theoretical adequacy and high consistency indexes that corroborate its reliability: Contribution to the strategy ($\alpha = 0.937$), Provision of public services ($\alpha = 0.824$) and Team Management ($\alpha = 0.808$). The total explained variance (45.9%), compatible with other behavioral science scales (Fonseca & Porto, 2013), also shows validity.

Considering the specific context studied, composed of state public entities of ATER (Emater) that act directly in the care and development of rural communities through the provision of free services of agricultural technical assistance and rural extension, it was possible to identify similarities and particularities between the managerial competencies demonstrated by other public managers. In a comparison with the study conducted by Brandão et al. (2010), for example, management competencies related to team management were common, presenting a high degree of expression/domain in both studies. On the other hand, the competencies involved in promoting regional sustainable development, represented in this study by the factor "Provision of public services", although they are on the MC list of the two sectors, obtained opposite expression/domain measures in both studies. While ATER managers indicate a greater degree of mastery for these competencies, Banco do Brasil managers indicate that they have a lower degree of mastery. Thus, it is perceived that, although both institutions belong to the public sphere, the expression of competencies by their managers presents variations depending on the context/mission of each institution.

The research, however, faced some limitations. Data collection, based exclusively on self-assessment, may have conditioned the results to individual biases, such as the halo effect or overestimated self-evaluation, possibly present in the MC domain results exposed. Furthermore, the results obtained are limited to the organizations surveyed, hindering their generalization to other organizational contexts and even to the total set of Brazilian ATER organizations, since there was, for example, no representativeness of respondents from all regions of the country.

Regarding contributions, the development of an instrument endowed with statistical validity confers greater precision and reliability to the studies of competencies developed in the field of administration. For the organizations surveyed, in particular, the scale, validated and adapted to the context, can enable the diagnosis of competencies of the people responsible for management functions, subsidizing the subsystems of people management, as the internal selection of managers, the development of evaluation programs and, especially, management training, which is pointed out as the main flaw in the management of competencies in the public sector (Pillay, 2008; Salles & Villardi, 2017).

Finally, it is recommended that future studies (a) include hetero-evaluation by superiors and subordinates in order to compare with the results obtained by self-assessment, (b) assess whether managers' personal characteristics (training level, age, gender) or functional and context characteristics of the position held in the organization and the organization itself (end-activity and middle activity, hierarchical level, technical or political requirements for filling management positions) influence the mastery of managerial competences and (c) use the scale developed here in other research contexts in order to confirm its structure, strengthen its reliability and expand the possibility of generalization.

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Yulk, G. (2010). *Leadership in organizations*. (7a ed.). Upper Saddle River: Prentice Hall.

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Authorship

Luísa Magalhães Coelho Ávila Paz

Master in Business Administration by University of Brasilia (UnB). Analyst at Empresa de Assistência Técnica e Extensão Rural do Distrito Federal, acting in management positions of people management, institutional development and modernization areas.

E-mail: luisamagalhaess@gmail.com

ORCID: <https://orcid.org/0000-0002-8589-9128>

Catarina Cecília Odelius

Ph.D. in Occupational Psychology by the University of Brasilia (UnB). Retired associate professor at the University of Brasilia having worked at PPGA-UnB (Graduate Program) in research focused on learning processes in organizations, innovations, competencies (professional, managerial, academic) and social networks, as well as in aspects that influence people management policies and practices.

E-mail: codelius@unb.br

ORCID: <https://orcid.org/0000-0002-2152-5194>

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Authors' contributions

First author: conceptualization (equal), data curation (lead), formal analysis (lead), investigation (lead), methodology (supporting), project administration (equal), supervision (supporting), validation (equal), writing-original draft (lead), writing-review & editing (equal).

Second author: conceptualization (equal), data curation (supporting), formal analysis (supporting), investigation (supporting), methodology (lead), project administration (equal), supervision (lead), validation (equal), writing-original draft (supporting), writing-review & editing (equal).

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