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ORIGINAL ARTICLE

How do learning culture and dynamic capability interfere with team performance?

Como cultura de aprendizagem e capacidade dinâmica interferem na performance de times?

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Abstract: This study investigates the effects of the relationship between the learning culture and the dynamic capability and performance of manufacturing teams in the industrial sector. Several studies propose that dynamic capability is capable of improving the organizational and financial performance of companies, however, little research is focused on simultaneously analyzing the relationship between dynamic capability and learning culture and manufacturing teamwork performance. This study is based on a survey of 201 companies in the Brazilian industrial sector with manufacturing teams, using the partial least squares (PLS) approach to develop structural equation modeling for data analysis. The results indicate that the dynamic capability has a strong positive influence on the team's performance and that, although the learning culture is not directly related to the performance, they offer contributions mediated by the dynamic capability.

Keywords: Teamwork; Dynamic capability; Team performance; Learning; Industrial sector.

Resumo: Este estudo investiga os efeitos da relação entre a cultura de aprendizagem e a capacidade dinâmica e a performance de equipes de manufatura do setor industrial. Diversos estudos propõem que a capacidade dinâmica é capaz de melhorar o desempenho organizacional e financeiro das empresas, entretanto, poucas pesquisas são focadas em analisar simultaneamente a relação entre a capacidade dinâmica e a cultura de aprendizagem e a performance de equipes de trabalho de manufatura. Este estudo é baseado em uma pesquisa survey com 201 empresas do setor industrial brasileiro com equipes de manufatura, utilizando-se a abordagem de mínimos quadrados parciais (PLS) para desenvolver a modelagem de equações estruturais para a análise dos dados. Os resultados indicam que a capacidade dinâmica exerce forte influência positiva no desempenho da equipe e, ainda, que, embora a cultura de aprendizagem não tenha relação direta com o desempenho, oferecem contribuições mediadas pela capacidade dinâmica.

Palavras-chave: Trabalho em equipe; Capacidade dinâmica; Performance de time; Aprendizagem; Setor industrial.

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1 Introduction

The development of team activities is considered by many authors as a critical mechanism to increase the firm's ability to achieve competitive advantage and improve its organizational performance (Li & Huang, 2013; Prayag et al., 2020; Shin et al., 2012). Scholars point out that the maintenance of competitive advantage is a dynamic and infinite process, in which organizations need to develop capacities that support continuous learning (Zott, 2003). A primary interest in organizational research involves understanding the relationship among variables that explain a particular phenomenon. Dynamic capability is an emerging concept in the area of management research, and still needs studies associating it with antecedents and potential results (Wang et al., 2007). According to the resource-based view (RBV) of the firm, organizations in the same industry show different results because they have different resources and capabilities to develop their processes (Zollo & Winter, 2002). In this context, dynamic capability refers to the set of processes and skills specific to a firm that enables it to continuously improve its key processes (Eisenhardt & Martin, 2000). Teece et al. (1997) define dynamic capability as the firm's ability to integrate, build and reconfigure its internal and external competencies in order to respond quickly to external changes. The dynamic capability theory refers to knowledge as the main resource for an organization to achieve sustainable competitive advantage (Teece et al., 1997).

While dynamic capability has become an important and emerging theme in the literature (Gonzalez, 2017; Eisenhardt & Martin, 2000; Zollo & Winter, 2002; Teece et al., 1997; Zott, 2003), it has only recently been explored in greater depth, by looking for associations with other antecedent variables and evaluating the factors promoting this process, as well as the variables impacted by it, particularly organizational and innovative performance (Calabuig et al., 2018; Jones & Knoppen, 2018). There is a lack of empirical studies analyzing how companies develop dynamic capabilities, and how these capabilities are able to improve organizational performance.

Dynamic capability is a theme originated from the vision of RBV and the vision of the knowledge-based firm (KBV) (Teece et al., 1997). In relation to the development of dynamic capabilities, this research is supported by the concept of knowledge-based dynamic capabilities. When studying knowledge absorption capacity, Zahra & George (2002) concluded that it was a concept inherent in the firm's dynamic capability and, from this, proposed the knowledge-based dynamic capability. Based on this view and in line with the theory of the knowledge-based firm (Teece et al., 1997), dynamic capability is seen as a first-level capacity that defines the performance of routines and other competencies of the organization (Hitt et al., 2016).

This research aims to study dynamic capability in association with teamwork. The dynamic capability theory and the RBV point out that firms are repositories of knowledge and expertise, with which they build the essential competencies that differentiate them from their competitors (Eisenhardt & Martin, 2000). The RBV highlights that knowledge is a unique resource due to its important tacit, sticky and non-imitable portion (Grant, 1996). Tacit knowledge is not easily transferred between staff or team members, becoming an institutionalized resource or organizational memory (Grant, 1996). In this context, teamwork features key characteristics in the process of sharing and interacting with tacit knowledge of different members. Within manufacturing teams, team members participate in the processing of information and assimilation of knowledge by promoting reciprocal

exchanges between individuals, which support the team's process of adapting to changes in its primary knowledge base, i.e., achieving continuous learning (Li & Huang, 2013).

This study is built on the theoretical perspective of dynamic capability, KBV and team performance. He contributes to the theory in three ways. First, in line with authors such as Zheng et al. (2011), Gutierrez-Gutierrez et al. (2018), Gonzalez & Melo (2019) and Jones & Knoppen (2018), this work extends previous research on dynamic capability by conceptualizing knowledge-based dynamic capability through four phases: absorption, generation, storage and adaptation of knowledge. Second, this work adopts a theoretical model, empirically evaluated in manufacturing companies, which relates the culture of learning and the dynamic capability to the performance of manufacturing teams. Thirdly, this work assesses the mediating role related to the contribution of the learning culture to the performance of manufacturing teams, that is, the work contributes by analyzing the indirect effects that the learning culture proposes on the team performance. Thus, the aim of this study is to analyze the relationship between dynamic capability and learning culture in relation to the performance of manufacturing teams. It is still the objective of this research, to analyze the mediating role of dynamic capability on the contribution of the culture of learning on the performance of teams.

Although there are several studies associating learning culture and dynamic capability with organizational performance (Hung et al., 2010; Wang et al., 2018; Naqshbandi & Tabche, 2018), there is still no research that simultaneously associates learning culture, teamwork context and dynamic ability with the performance of teams. While Teece et al. (2016) argue that dynamic capabilities are present in organizational processes and routines, Zollo & Winter (2002) consider that these capabilities are built by organizations only when a culture of continuous learning has been previously established. Authors such as Shin et al. (2012), Jamshed & Majeed (2019) and Gonzalez & Melo (2019) emphasize that teams, due to the existing interaction between their members, constitute environments that are conducive to the establishment of a focus on learning that is able to sustain their dynamic capability. Given the above, this study starts from the premise that the teamwork context, characterized by interaction and collaboration between team members, mutual identification and trust and shared identity and objectives, favors the development of dynamic capabilities, consequently improving the team performance.

2 Theoretical framework and hypothesis

Based on a review of the theoretical framework, we propose a conceptual model in Figure 1, which illustrates the interrelationships between dynamic capability, its antecedents, and the outcome variable. This model includes team performance as an endogenous variable, two exogenous variables (learning culture and teamwork context) and a mediating variable (dynamic capability). It proposes six relationships between the four constructs, which are presented in this section as hypotheses to be tested. The model proposes that learning culture is directly related to teamwork context and is an antecedent of dynamic capability, which, in turn, defines the level of performance of teams. In addition, the model includes a seventh hypothesis related to the moderating role of dynamic capability in the relationship between learning culture and teamwork context and the performance of teams. The four constructs included in the model and the evaluated hypotheses are discussed in the following sections.

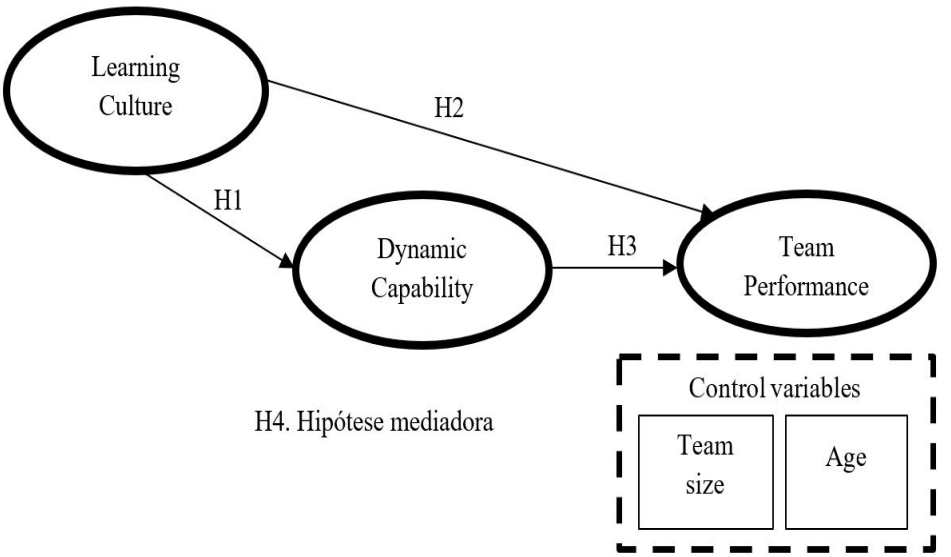

Figure 1. Conceptual framework.

2.1 Learning culture, teamwork and dynamic capability

Recent studies have shown that companies that empower their employees to create and apply new knowledge and that provide an organizational culture focused on learning to support the acquisition, creation, storage and sharing of knowledge, achieve more efficiency regarding the use of said knowledge, consequently improving their innovative, operational and financial performance (Mazur & Zaborek, 2016; Naqshbandi & Tabche, 2018). The theory of organizational learning suggests that learning is capable of changing individual and collective behaviors, promoting organizational adaptations that allow firms to respond more quickly and efficiently to environmental changes (Li & Huang, 2013).

Analyzing culture at the level of teams, and not just at the organizational level, is important for understanding organizational performance, seeing as organizational culture is developed in micro niches, as is the case with teams (Shin et al., 2012). Team members share objectives, purposes, values, standards, procedures and knowledge that dictate their ways of acting, exchanging knowledge, solving problems and innovating, differentiating one group from another (Lowik et al., 2016).

The difficulties encountered in the development of a learning culture highlight the necessary changes in the mental and cognitive structure of the members of an organization and its teams (Donate & Guadamillas, 2011; Corfield & Paton, 2016). The theory of learning culture proposes that the team's interests and the common good take precedence over individual interests (Zheng et al., 2011). As a consequence, it is natural to assume that in teams shaped by a learning culture, individuals are more willing to share their knowledge with other members, intensifying the knowledge flow (Ma et al., 2014).

According to Islam et al. (2014), adopting a learning culture allows organizations to continually seek new knowledge and apply it to their routines, reconfiguring competencies and improving innovative performance. When a firm develops a culture focused on learning, it starts to increase its capability to sustain competitive advantage and improve

its level of organizational performance, as it becomes less susceptible to imitation or replication by competitors (March, 1991).

While some studies identify a direct relationship between learning culture and organizational performance (Skerlavaj et al., 2007), others propose that learning culture acts indirectly in relation to performance, being mediated by dynamic capability (Calabuig et al., 2018). There is a consensus in the literature that organizational learning influences dynamic capability. Zheng et al. (2011) and Wang et al. (2007) propose that dynamic capability is influenced by learning mechanisms related to the organizational capability to absorb, create, retain and adapt knowledge. However, Zollo & Winter (2002) and Skerlavaj et al. (2007) go beyond the issue of organizational learning, arguing that the development of a learning culture is an essential premise for building dynamic capability. In this context, we propose the following research hypotheses:

Hypothesis 1. Learning culture contributes positively to the dynamic capability of teams;

Hypothesis 2. Learning culture contributes positively to the team performance.

2.2 Dynamic capability and team performance

A team can be considered the smallest unit where members of an organization work together (Shin et al., 2012). Team members share and apply common knowledge in order to perform tasks and achieve organizational goals and objectives.

Although dynamic capability is a topic widely explored by scholars, little research is observed on dynamic capability in teams. In the context of team work, individuals need to learn collectively and establish mental models and shared understandings about how to perform tasks (Prayag et al., 2020; Nonaka & Takeuchi, 1995). The team learning process offers the organization the opportunity to transform tacit knowledge into dynamic capability and innovation (Gonzalez & Melo, 2017).

Eisenhardt & Martin (2000) suggested that dynamic capability is the set of integrated and specific processes that promote the reconfiguration and gain of resources. In this context, dynamic capability assumes the role of an organizational process with significant similarities among companies. Zollo & Winter (2002), in turn, explore dynamic capability based on an evolutionary paradigm, defining it as a learned and stable pattern of collective activity to improve operational processes, increasing efficiency. For these authors, learning mechanisms, such as knowledge-related activities, are driving dynamic capability. Zheng et al. (2011) highlight that although this definition for dynamic capability can be explained theoretically, the operationalization and empirical validation of this concept has become quite challenging, taking much of the research on the construct focused on cases. In recent works by Teece, as Teece et al. (2016), the authors try to refine the definition of dynamic capability as the capacity that allows organizations to create, absorb, deploy, store and retrofit the intangible assets that support the superior performance of businesses or business units, as is the case, in this work, from the manufacturing teams.

This current definition used by Teece et al. (2016) has been adopted by several authors, such as Jamshed & Majeed (2019), Jones & Knoppen (2018), Lin et al. (2020) and Lowik et al. (2016), and proposes that dynamic capability refers to the organization's intangible assets, especially knowledge, which will drive changes and innovations. In line with this modern view of dynamic capability, this work proposes that this construct not only

interferes positively in relation to the performance of manufacturing teams, but also acts as a mediator in relation to the learning culture.

Teamwork allows the firm to benefit from synergy through learning and knowledge exchange between team members. Blazevic & Lievens (2004) indicate that learning in teams increases efficiency in the use of knowledge, promoting the firm's organizational results and innovative performance.

According to KBV, organizations are knowledge-carrying entities, and their main function is to integrate and use this asset (Grant, 1996), that is, to use their dynamic capability in order to sustain this knowledge-related process (Gonzalez & Melo, 2018). KBV highlights the value of tacit knowledge due to its characteristic of uniqueness and difficult imitation (Grant, 1996). As teams share values, mental models and primary knowledge, the flow of tacit knowledge becomes more conducive and intense (Lee, 2018). Furthermore, in the teams, the processes of knowledge generation and adaptation are facilitated, since the multidisciplinary and complementary characteristic among the team members promotes the problem solving and work improvement processes.

The RBV proposes that the firm's resources, as well as its heterogeneity, allow it to achieve competitive advantage (Teece et al., 1997). In view of the environmental changes and the challenges posed by competitors, the RBV has been complemented by two concepts: dynamic capability and the KBV (Hitt et al., 2016; Gutierrez-Gutierrez et al., 2018). While Teece et al. (1997) point out that dynamic capability reflects the way in which the firm reconfigures its capabilities and competencies in order to change the business environment, Eisenhardt & Martin (2000) emphasize that this reconfiguration occurs through cross-functional routines, such as the development of new products, coordination processes for internal collaboration, knowledge creation, as well as procurement and alliance processes.

Dynamic capability is developed and incorporated into organizational routines, rather than simply being purchased from the market (Jones & Knoppen, 2018). Winter (2003) points out that the firm's functional activities, i.e., those that allow it to exist within a market, constitute operational capabilities. Dynamic capabilities, in turn, are those that allow the organization to understand its environment and the value of its resources, and to respond appropriately to market changes in order to improve its operational capabilities. For this reason, Winter refers to dynamic capabilities as first-level capabilities.

The KBV proposes that the advantages derived from organizational resources and skills are, in reality, a reflection of the access to and integration of a superior resource, i.e., knowledge (Grant, 1996; Denford, 2013). In this context, the firm can be seen as a repository of knowledge with which competitive advantage and differentiation can be achieved (Grant, 1996). Nielsen (2006) points out that dynamic capability can be understood as a set of knowledge management activities that change, renew and exploit the knowledge-based resources of the firm. Thus, competitive advantage is achieved through continuous adjustments to and improvements in the organization's knowledge base (Wang et al., 2007).

Several studies point to a positive relationship between dynamic capability and organizational and innovative performance. For example, Hung et al. (2010) studied Thai high-tech companies and found that dynamic capability has a positive impact on organizational performance, with learning culture and organizational alignment as antecedents, whereas Najafi-Tavani et al. (2018) studied the Iranian industry and concluded that this type of capability has a positive impact on the development of new

products, with absorptive capability and collaborative network as antecedents. Given the above, the first research hypothesis is proposed:

Hypothesis 3: Dynamic capability contributes positively to the team performance.

2.3 Mediating effect of dynamic capability

From the hypotheses above, we developed a mediation model which proposes that dynamic capability is the mediating construct of the relationship between learning culture and teamwork context and team performance. Many studies propose that developing a learning culture can optimize the acquisition of knowledge by individuals, teams and organization, consequently improving their performance (Wang et al., 2018; Durst et al., 2019; Oyemomi et al., 2019). Based on the RBV's perspective, Wilkens et al. (2004) propose that learning culture is a resource and a dynamic capability of the firm that can contribute to the development of skills, which, consequently, impact performance.

The teamwork context is developed within an organization over time, assuming specific characteristics of cohesion, identification, interdependence, mutual trust, autonomy and sharing of goals between team members (Gonzalez & Melo, 2019; Jones & Knoppen, 2018). These characteristics affect the model of knowledge exchange and interaction followed by teams, impacting their efficiency and effectiveness (Wang et al., 2018). Through interaction and knowledge exchange, team members accumulate a mass of primary knowledge that leverages the process of absorbing external knowledge and exploiting internal knowledge (Li & Huang, 2013; Gonzalez & Melo, 2018).

In this sense, this research assumes that both learning culture and teamwork context contribute to better performance, since the former stimulates decision-making and trial and error processes that result in the development of new skills, and the latter affects the way individuals interact and motivate themselves within the team's structure so as to achieve collective goals. Thus,

Hypothesis 4. Dynamic capability mediates the relationship between learning culture and the team performance.

3 Method

This study uses the survey method in order to examine the hypotheses pertaining to learning culture, teamwork context, dynamic capability and team performance presented above. A self-administered survey was applied to a sample of companies in the Brazilian industrial sector.

3.1 Data collection

The empirical study was carried out using a questionnaire developed to collect data and, later, test the research hypotheses, containing instructions on how to answer the questions, the research variables, and questions about the company's demographics. The primary sample consisted of 7,012 industrial companies registered in the catalog of the Industrial Register of the State of São Paulo of the Center for Industries of the State of São Paulo (CIESP, 2021). The researchers randomly selected a group of 1,200 companies to participate in the survey, and the

data collection procedure, carried out from November 2019 to March 2020, consisted in sending an email to the CEO or managers of the areas of production or engineering in order to explain the research objective and formalize their invitation to participate in the study. In this invitation, the need for the company to have its manufacturing area, or at least part of it, organized in work teams was emphasized. The email included a link to the online questionnaire. By clicking on the link, the respondent could access the questionnaire, fill it out and then send it automatically, saving all answers in the research database. The survey reached a total of 221 questionnaires answered (18.42%). A total of 8 questionnaires were not used for being duplicated, and another 12 questionnaires were discarded because they were answered by teams whose time of existence was less than the 12-month minimum required. The online questionnaire could not be submitted if it were incomplete. Thus, the survey reached a total of 201 valid questionnaires, a response rate of 16.75%. Regarding non-respondents, 46 companies reported not having work teams in their manufacturing areas, and 25 company representatives claimed they did not have time to respond or had already responded to similar surveys in recent months. Although the final response rate is relatively low, which may limit the potential for the study's generalization, it is in line with other research in the area (Gutierrez-Gutierrez et al., 2018; Jones & Knoppen, 2018).

In this study, the non-response bias was also estimated. This test assesses whether there is a significant difference between the initial and final respondents (Armstrong & Overton, 1977), and was performed using the independent samples t-test, with teamwork context, learning culture and dynamic capability as variables. The results obtained showed no significant difference between the two groups.

After data collection, we assessed the common method bias using Harman's single-factor test (Podsakoff et al., 2003). Based on the analysis of unrotated principal components, we found 15 factors with eigenvalues greater than 1.0, the largest of which represented 17% of the total variance. As no isolated factor emerged, and no factor was responsible for most of the variance, we infer that the common bias of the method is unlikely (Podsakoff et al., 2003).

3.2 Measures

The studied constructs were operationalized based on the 41 measurement items that make up the research questionnaire (Appendix A), which were extracted from validated scales observed in the literature and assessed using a 7-point Likert scale. The measurement items of the four constructs of the study are detailed below.

3.2.1 Learning culture

This study assesses learning culture based on the questionnaire proposed by Watkins & Marsick (2003), which addresses the dimensions of learning within the organization. Respondents are asked to determine the degree to which each question reflects their organization's situation regarding the development of a learning culture (1 = strongly disagree to 7 = strongly agree). In this study, learning culture is evaluated at the three levels proposed by Watkins & Marsick (2003): individual, team and organizational. The individual level contains four measurement items; the team level contains five

measurement items; and the organizational level contains has four measurement items. The reliability for each group of measurement items was 0.815, 0.795 and 0.766, respectively; and the overall reliability of the construct was 0.815.

3.2.2 Dynamic capability

This study adopted thirteen measurement items to assess dynamic capability, evaluated on a seven-point scale, which were adapted from previous studies by Wang et al. (2007) and Zheng et al. (2011). Four items were used to assess the ability to absorb knowledge; three items were used to assess the ability to generate knowledge; three items were used to assess the ability to retain knowledge; and, finally, three items were used to assess the ability to adapt knowledge. The reliability measured by Cronbach's alpha for each group was 0.780, 0.796, 0.826 and 0.792, respectively, and the overall reliability of the construct was 0.832.

3.2.3 Team performance

Team performance refers to the results or perceived success of teams regarding the achievement of goals, deadlines, costs and operational efficiency (Li & Huang, 2013; Hung et al., 2010). Wang et al. (2008) propose that the combination of efficiency and effectiveness perceived by the respondents is considered in the assessment of performance. In this study, efficiency is measured by three items, reaching a reliability of 0.819; and effectiveness, in turn, is also measured by three items, reaching a reliability of 0.804. The two groups of items were extracted from the study by Li & Huang (2013), and the overall reliability of the construct was 0.853.

3.2.4 Control variables

The study was statically controlled by two variables: team size and age. To measure the former, the respondents were asked to indicate the average number of members composing their manufacturing teams. In the questionnaire, this question was open-ended so the respondent could enter the average number of employees working in the teams. Regarding the latter, only teams with at least 12 months of life, and thus, with a developed internal context and cultural standards, were considered. The respondents were asked to enter the approximate average time of existence of the manufacturing teams in their companies.

4 Results and analyses

The final sample is made up of companies from different industrial sectors. Of the total 201 companies, 47 are from the machinery and equipment sector (23.38%), 35 are from the automotive sector (17.41%), 29 are from the metallurgy and ferrous metallurgy sectors (14.43%), 25 are from the food industry (12.44%), 18 are from the chemical industry (8.96%), 15 are from the computer and home appliance sector (7.46%), 10 are from the pharmaceutical and cosmetics industry (4.98%), 8 are from the paper and pulp sector (3.98%), 7 are from the textile sector (3.48%), and 7 are from the consumer goods sector (3.48%).

Team size and age were the control variables considered in this study. The mean size of the manufacturing teams reported by the respondents was 9.2 (SD = 4.2), ranging from four to sixteen individuals, while their age ranged from 12 to 90 months (M = 45.20, SD = 12.7).

Of the companies surveyed, 128 (63.82%) had their entire manufacturing area organized in work teams, whereas this division was only partial in 73 (36.18%) of them.

Regarding the respondents, 75.6% (n = 152) are men and 24.4% (n = 49) are women. As for the field of expertise, it was found that 45.8% (n = 92) are engineers and technologists; 26.9% (n = 54) are business administrators; 13.9% (n = 28) are chemists and pharmacists; 8.0% (n = 16) are lawyers and 5.4% (n = 11) are from other fields. The mean age of the respondents was 40.3 years, ranging from 28 to 67 years, with a mean time of professional experience in the area of 12.8 years.

The present study adopted the Partial Least Square – Structural Equation Modeling (PLS-SEM) technique for data analysis, using the Smart-PLS software (version 3.0). PLS-SEM is a technique that has been widely used in management studies, including several studies on dynamic capability, teamwork context, learning culture and organizational learning (Gonzalez & Melo, 2018, 2019; Jamshed & Majeed, 2019). Hair et al. (2013) highlight the use of PLS-SEM because it is a technique with less restrictions regarding the normality of the data, and it is also applied to smaller samples compared to structural equation modeling (SEM). In addition, PLS is also recommended for models with complex relationships (Fornell & Larcker, 1981) and for studies dealing with theoretical development based on constructs (Hair et al., 2013), as is the case with this study, which aims to analyze the relationship between four constructs (teamwork context, learning culture, dynamic capability and team performance).

4.1 Estimation of the measurement model

Firstly, a confirmatory factor analysis (CFA) was performed to assess the reliability and validity of the research model. The reliability measures of the constructs used in this study, based on Hair et al. (2013), are Composite Relibility (CR), Cronbach's α and Dijkstra-Henseler Rho_A, and the minimum value for all three measures is 0.70 (Hair et al., 2013). Table 1 shows that all constructs have an adequate level of reliability.

The evaluation of formative measurement models requires the analysis of multicollinearity between the items making up the constructs, as well as the analysis of the factor loads of the constructs' items in order to validate them (Hair et al., 2013). The amount of multicollinearity was measured based on the variance inflation factor (VIF) and on the tolerance value of the independent constructs. The tolerance values for all constructs were lower than 0.10, as recommended by Cohen et al. (2003), and the value of the items' VIF varied between 1.35 and 2.93 (Table 1), indicating that there is no multicollinearity between them. All of them were statistically significant at a p level of 0.05 after performing bootstrap analysis with 5,000 resamples.

Convergent validity is assessed by estimating the average variance extracted (AVE), which indicates the amount of variance shared by the items making up the constructs. The AVE values of all constructs were higher than the minimum acceptable value of 0.50, as recommended by Hair et al. (2013). In addition, CFA measures the factor load, which indicates the contribution of each item in relation to the variance of the latent construct, in order to complement the assessment of convergent validity. As shown in Table 1, all items

have a factor load greater than 0.70, indicating that they are relevant to the formation of constructs (Hair et al., 2013).

Table 1. Reliability, multicollinearity and convergent validity.

Variable	Items	Loading	α	CR	AVE	ρA	VIF[a]
Learning Culture							
Individual Level	Ind1	0.842	0.815	0.798	0.682	0.801	1.66
	Ind2	0.881					1.78
	Ind3	0.793					2.28
	Ind4	0.822					2.19
Team Level	TL1	0.765	0.795	0.776	0.673	0.798	2.34
	TL2	0.810					2.56
	TL3	0.798					2.31
	TL4	0.774					1.95
	TL5	0.803					1.67
Organizational Level	Org1	0.741	0.766	0.784	0.665	0.775	1.84
	Org2	0.720					1.56
	Org3	0.731					1.35
	Org4	0.755					1.38
Dynamic Capability							
Absorption Capability	Abs1	0.812	0.780	0.816	0.706	0.769	1.66
	Abs2	0.886					2.63
	Abs3	0.838					1.85
	Abs4	0.873					2.56
Generation Capability	Gen1	0.803	0.796	0.804	0.718	0.813	1.90
	Gen2	0.818					2.47
	Gen3	0.773					2.75
Storage Capability	Stor1	0.830	0.826	0.793	0.692	0.831	2.93
	Stor2	0.813					2.36
	Stor3	0.821					2.14
Adaptation Capability	Adap1	0.773	0.792	0.788	0.735	0.775	1.74
	Adap2	0.781					1.68
	Adap3	0.765					2.43
Team Performance							
Efficiency	Ef1	0.818	0.819	0.828	0.819	0.832	2.45
	Ef2	0.806					2.81
	Ef3	0.822					2.74
Effectiveness	Eft1	0.791	0.804	0.844	0.831	0.817	2.67
	Eft2	0.856					2.80
	Eft3	0.883					1.78

Notes: α: Cronbach's α; CR: composite reliability; ρA: Dijstra-Henseler's rho; AVE: average variance extracted; [a]percentage of the item's variance explained by the latent variable.

The discriminating validity of the measurement model, in turn, is used to assess how different from other constructs a latent construct is (Hair et al., 2013). In order to fulfill the

condition of discriminant validity, the square root of each construct's AVE values must be higher than the other correlations (Fornell & Larcker, 1981). Table 2 shows that all constructs are statistically different from the others, as the square root of their AVE is superior to the correlations. In addition, in order to complement the discriminant analysis test, Table 2 also presents the Heterotrait-Monotrait (HTMT) values. All values above the diagonal are lower than 0.85, indicating that there is discriminant validity (Henseler et al., 2015).

Table 2. Discriminant validity – correction matrix and Heterotrait-Monotrait (HTMT) ratio.

Constructs	Ind	TL	Org	Abs	Gen	Stor	Adap	Ef	Eft
Ind	*0.826*	0.344	0.288	0.120	0.190	0.216	0.145	0.238	0.222
TL	0.320	*0.820*	0.218	0.188	0.288	0.268	0.253	0.206	0.280
Org	0.263	0.193	*0.815*	0.293	0.283	0.317	0.388	0.337	0.315
Abs	0.131	0.164	0.267	*0.840*	0.304	0.283	0.293	0.284	0.250
Gen	0.188	0.224	0.243	0.328	*0.847*	0.316	0.351	0.335	0.314
Stor	0.105	0.235	0.288	0.253	0.265	*0.832*	0.222	0.298	0.268
Adap	0.089	0.318	0.315	0.342	0.388	0.213	*0.457*	0.227	0.356
Ef	0.219	0.215	0.301	0.255	0.401	0.274	0.266	*0.905*	0.380
Eft	0.186	0.191	0.388	0.271	0.367	0.318	0.314	0.416	*0.912*

Notes: The values of the diagonal cells (italics) refer to the square root of the AVE values; below the diagonal elements are the correlations between constructs; above the diagonal elements are the HTMT ratio values.

4.2 Structural model and hypothesis testing

The bootstrap re-sampling technique with 5000 resamples was applied using Smart-PLS in order to test the significance of path coefficients (β) within the structural model (Hair et al., 2013). The results of the structural model (Table 3 and Figure 2) show that learning culture has a significant and positive relationship with dynamic capability ($\beta = 0.464$, $p < 0.001$), supporting hypotheses H1. In contrast, it did not show a significant relationship with team performance ($\beta = 0.122$, $p > 0.05$), refuting H2. Dynamic capability, in turn, showed a strongly significant and positive relationship with team performance ($\beta = 0.706$, $p < 0.001$), supporting H3. Additionally, the age control variable showed a significant and positive relationship with performance, whereas the relationship between the size of the teams and performance was not significant.

Table 3. Structural model analysis.

Hypothesis	Relationship	Path coefficient	t-statistics	p-value	Sig. level	Results	f^2
H1	LC → DC	0.464	4.760	0.000	***	Supported	0.303
H2	LC → TP	0.122	0.951	0.315	NS	Not Supported	0.070
H3	DC → TP	0.706	12.844	0.000	***	Supported	0.515
Control variables	TS → TP	-0.063	0.343	0.567	NS	Not Supported	-0.036
	Age → TP	0193	1.836	0.025	*	Supported	0.138

Notes: *p < 0.05; **p < 0.01; ***p < 0.001.

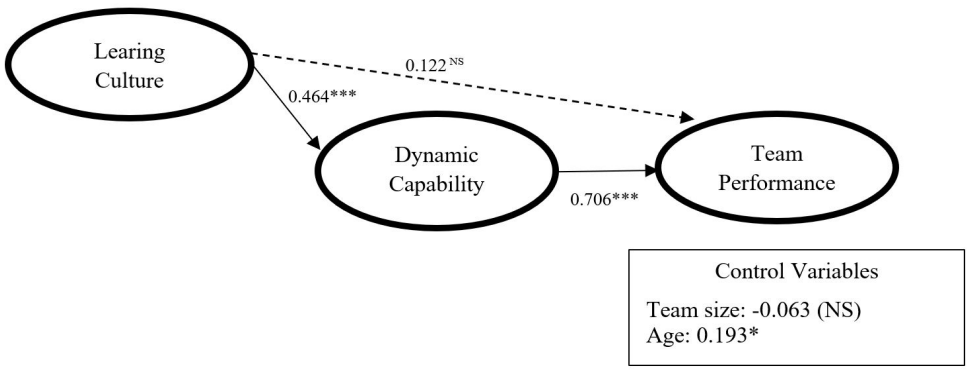

Figure 2. Results of PLS path modeling. * p < 0.05; ** p < 0.01; *** p < 0.001; NS – Not significant.

The results of the PLS analysis indicated a strong explanatory power of the model with coefficients of determination (R^2) of dynamic capability and team performance of 0.526 and 0.513, respectively. The overall quality of the model was assessed by the goodness-of-fit index (GoF), which is estimated from the geometric mean of the latent variables' AVE and the mean R^2 of the endogenous variables (Tenenhaus et al., 2005). The estimated GoF was 0.518, exceeding the cut-off value of 0.36 (Wetzels et al., 2009). In addition, the proposed model's predictive quality was assessed using Stone-Geisser (Q^2). A Q^2 value above zero suggests that the model has acceptable predictive validity (Geisser, 1975). In the model of this study, Q^2 is 0.54 for dynamic capability and 0.51 for team performance, supporting the hypotheses presented. The effect size (f^2) values were estimated to measure the level of importance of an independent variable in relation to a dependent variable of the structural model. The threshold values for small, medium and large effects are 0.02, 0.15 and 0.35, respectively (Chin, 2010). As shown in Table 3, with the exception of the refuted hypotheses (H2) and the age control variable, which have low f^2 values, the other hypotheses have medium or high f^2 values.

Regarding the mediating effects, we initially applied the non-parametric bootstrap method (bootstrap sample size = 500), as suggested by Preacher & Hayes (2008). As shown in Table 4, the indirect relationship between learning culture and team performance ($\beta = 0.145$, $p < 0.01$) was significant, supporting H4.

Table 4. Results of the bootstrap method for mediating effects.

IV	M	DV	Effect of IV on M (a)	Effect of M on DV (b)	Direct effect (c')	Indirect effect (a*b)	Total effect (c)	Conclusion
LC	DC	TP	0.431**	0.337	0.128	0.145	0.273	H4 supported

Notes: IV: Independent variable; M: Mediator; DV: Dependent variable; LC: Learning Culture; DC: Dynamic Capability; TP: Teamwork Performance; *p < 0.05; **p < 0.01.

The three-step procedure recommended by Baron & Kenny (1986) was used to test whether the mediating effect was complete or partial. Both learning culture and teamwork context have a significant relationship with team performance (path c). The relationship of learning culture and teamwork context with dynamic capability (path a) and the relationship between the mediating variable (dynamic capability) and the independent variable were also significant. Subsequently, the relationship between the independent variable and the dependent variable, controlled by the mediating variable (c'), was

examined. If c 'is insignificant, it follows that the relationship is completely mediated. On the other hand, it is partially mediated. The results in Table 5 show that dynamic capacity has a mediating effect between the learning culture (VI) on the team's performance (VD), supporting hypothesis H4.

Table 5. Results of the Baron and Kenny method (1986) for mediation purposes.

IV	M	DV	IV → DV (c)	IV → M (a)	IV → DV (c')	M → DV (b)	Conclusion
LC	DC	TP	0.284**	0.415***	0.138	0.477***	Full

Notes: IV: Independent variable; M: Mediator; DV: Dependent variable; LC: Learning Culture;TP: Teamwork Performance * p < 0.05; ** p < 0.01; *** p < 0.001.

5 Discussions and conclusions

The results of the empirical research, carried out with teams of industrial companies, show that dynamic capability was strongly and positively related to the teams' performance. The results of the model showed that dynamic capability is the key factor that impacts team performance. The learning culture, in turn, has an effect mediated by dynamic capability.

Many studies show that organizations achieve competitive advantage and improve their performance through teamwork (Blazevic & Lievens, 2004) and the development of dynamic capability (Lin et al., 2020; Eisenhardt & Martin, 2000). However, there is a lack of studies in the literature deepening the relationship between dynamic capability and team performance by analyzing the role of antecedent constructs. Thus, this study investigates the relationship between dynamic capability and team performance, analyzing the impact of the learning culture. The research results support the hypothesis that the organizational management process needs to be aligned with the organization's contextual variables in order to develop dynamic capabilities, offering preliminary evidence for RBV and KBV.

The results show that although the learning culture does not directly contribute to the team's performance, its influence was positive and indirect in relation to the performance, mediated by the dynamic capability. In this sense, the learning culture does not directly create value to the point of impacting the performance of a team, however, it is a factor that interferes in a very significant and positive way in relation to the dynamic capability. This result is in line with previous research on the effect of culture on performance (Jamshed & Majeed, 2019; Gold et al., 2001; Zahra & George, 2002; Hung et al., 2010), pointing out that, although culture of learning does not directly impact performance-related results, it acts as an organizational factor that contributes positively to performance, having its effect mediated by dynamic capability. The culture of learning promotes an environment aimed at the creation and transformation of competences through the professional growth of individuals, the sharing of knowledge, the stimulation of the creative process and the institutionalization of individual knowledge, which promotes dynamic capability, as demonstrated in the results of the model of search. The improvement of the team's performance is more directly linked to the use of what the team members have learned in order to improve the processes, rebuilding competencies. In this way, it can be assessed that the characteristics of a learning culture, aimed at sharing knowledge and cooperation between individuals, improve the internal conditions of the team and strengthen the dynamic capability of the firm.

Analyzing the environment where the study was carried out, manufacturing teams of industrial companies, it appears that these teams are usually formed by specialized employees with little multidisciplinarity regarding the content of the work. This characteristic of specialization and deepening in a specific body of knowledge becomes key to the refinement and reconstruction of competences, promoting dynamic capacity (Teece et al., 1997; Eisenhardt & Martin, 2000). However, as verified in a work carried out Li & Huang (2013), teams that work with a high degree of specialization and a lower level of multidisciplinarity are more limited in terms of the complexity of generating, absorbing and exploring new knowledge.

This study has some limitations that open opportunities for future research. The first refers to the small sample size. Future studies may work with a larger sample, and, in addition, including other sectors of activity such as the service sector.

The author chose to work with manufacturing teams from industrial companies. These teams work with employees of different levels of training and, normally, with a high degree of task specialization. In future work, it is possible to analyze the relationship between the constructs studied in teams with more multidisciplinary knowledge, as is the case with project and product development teams.

This research studies the culture of learning within the context of the team. It is recommended that, in future research, the culture of the organization as a whole be considered, as it is the organizational culture that gives rise to the culture of the teams. Finally, this study used the team's size and age as control variables, however, in future research, other variables such as the company's area of expertise and level of knowledge specialization can be used.

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Appendix A. Measurement items

LC. Learning culture

Ind. Individual level

Ind1. In my company, people identify the skills and knowledge needed to perform tasks in the future;

Ind2. In my company, people are rewarded for learning new skills;

Ind3. In my company, people engage in honest and open dialogue with each other;

Ind4. In my company, people build relationships of mutual trust.

TL. Team level

TL1. In my company, teams are free to adapt their goals according to the needs perceived;

TL2. In my company, teams treat people equally;

TL3. In my company, team performance is treated as more relevant than individual performance;

TL4. In my company, teams review their beliefs and way of acting based on group discussions and reflections;

TL5. In my company, teams are rewarded for results achieved in group.

Org. Organizational level

Org1. My company makes the lessons learned available to all employees;

Org2. My company allows employees to control resources relating to their processes;

Org3. My company encourages interdepartmental work in problem-solving and improvement situations;

Org4. In my company, leaders use their knowledge and experience to guide and teach their employees.

DC. Dynamic Capability

Abs. Absorption Capability

Abs1. My company absorbs new knowledge from suppliers, competitors and customers.

Abs2. My company absorbs new knowledge from patents.

Abs3. My company absorbs new knowledge from research institutes.

Abs4. My company absorbs new knowledge from new employees.

Gen. Generation Capability

Gen1. New knowledge is generated internally through individual learning.

Gen2. My company has research & development activities that generate new knowledge.

Gen3. My company builds strategic alliances with other companies and institutes that promote the internal generation of new knowledge.

Stor. Storage capability

Stor1. The knowledge generated and absorbed is registered in documents.

Stor2. The knowledge registered is easily interpreted and used by individuals.

Stor3. The knowledge registered is disseminated among individuals.

Adap. Adaptation capability

Adap1. Individuals apply the knowledge generated in different processes through learning.

Adap2. My company favors the integration of knowledge from different areas, individuals and teams.

Adap3. My company combines primary knowledge with new knowledge created or absorbed.

TP. Team performance

Ef. Efficiency

Ef1. Ability of teams to complete activities and tasks.

Ef2. Quality level of completed work.

Ef3. Level of operational efficiency of the activities carried out, i.e., carrying out activities without losses.

Eft. Effectiveness

Eft1. Ability to achieve collective goals.

Eft2. Team's ability to meet planned deadlines.

Eft3. Team's ability to comply with planned budgets.