Innovation in teams: the role of psychological capital and team learning

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Abstract

The main purpose of the present research was to analyse the relationship between team psychological capital and innovation, considering team learning as a mediating variable. A field survey was carried out, which included 124 work teams belonging to organizations from different sectors of activity. Hypotheses were tested through PROCESS. Results supported a direct positive relationship between team psychological capital and team innovation and an indirect influence of team psychological capital on team innovation, through team learning. The findings of this study highlight the role of team learning as an intervening process between team psychological capital and team innovation. Accordingly, managers should seek to develop team psychological capital and learning behaviours among their teams to promote innovation.

Keywords: team psychological capital, team learning, team innovation.

Introduction

Globalization has made the business world increasingly competitive and challenging, requiring teams to develop and adapt quickly to ensure their efficiency (Anderson et al., 1992; West, 2002). In this ever-changing context, the team's ability to adapt swiftly to changes, to bounce back from setbacks and to persist when facing obstacles have emerged as key psychological capabilities (Dimas et al., 2018). In line with this, team psychological capital, which is defined as a collective positive psychological state composed of efficacy, optimism, hope and resilience, has received increasing attention from both research and practice (Luthans et al., 2007). Indeed, previous studies found support for the positive influence of team psychological capital (PsyCap) on attitudes, such as job satisfaction (Heled et al., 2016), behaviours, like organizational citizenship behaviours (Bogler & Somech, 2019), and results, such as performance (e.g., Rebelo et al., 2018; Rego et al., 2019; Walumbwa et al., 2011), team task allocation effectiveness (e.g., Rego et al., 2019), service quality and customer satisfaction (Mathe-Soulek et al., 2014). However, the investigation of the impact of PsyCap on team and organizational outcomes is far from complete and more research is needed (Luthans & Youssef-Morgan, 2017; Tho & Duc, 2020). In the business context, it is of utmost importance to acknowledge the value of PsyCap in terms of results for the organization so that managers will consider investing in promoting it. Accordingly, in the present study we intend to explore the influence of PsyCap at the team level on a key team outcome in the current business world: team innovation. Team innovation has become increasingly important for organizational success and is a source of distinct competitive advantage (Anderson et al., 2014). Therefore, exploring its antecedents is critical for the effectiveness and long-term survival of organizations.

Beyond exploring the direct effects of PsyCap on team and organizational results, it is also important to investigate the underlying mechanisms through which PsyCap leads to its desired outcomes (Luthans & Youssef-Morgan, 2017; Newman et al., 2014). Therefore, in the present study we intend to explore the indirect effects of PsyCap at the team level by investigating the role of team learning as an intervening mechanism between team PsyCap and team innovation. Figure 1 summarizes the hypothesized model, in which, building on the I-P-O framework (McGrath, 1984), team PsyCap is conceptualized as an input, team learning as a mediating process and team innovation as an outcome. Team PsyCap is conceived as an input in our model because, in line with Newman et al. (2014) and also Heled et al. (2016), we consider PsyCap as a resource, a collective "asset" teams can draw upon, which have an influence on attitudes, organizational behaviour and effectiveness. Team learning is conceived as a process since our focus is on the activities and behaviours that team members adopt to learn (Edmondson et al., 2007; Rebelo et al., 2020). Finally, innovation is conceptualized as an outcome of team interactions, as it involves the intentional introduction and adoption of new ideas and solutions in the group (West & Farr, 1990).

This study contributes to the literature in different ways. First, the present study intends to contribute to the positive organizational behaviour literature by studying the influence of PsyCap on innovation, a relationship that has received little attention at the team level. Second, this is one of the first studies exploring the mediating role of team learning in the relationship between team PsyCap and team innovation. Tho and Duc (2020) have recently found support for a partial mediation of team exploratory learning on the relationship between team PsyCap and team innovation, on a sample from the retail industry and considering only data obtained from the team leader. We expand on this study by considering teams from different sectors and adopting a multisource

approach. Accordingly, this study also contributes to the team learning literature by clarifying its role as a mediating process between inputs and outcomes.

[Insert Figure 1 approximately here]

Team psychological capital and team innovation

Psychological capital is a psychological and developmental state that draws from positive psychology in general, and positive organizational behaviour in particular. As a higher-order construct, PsyCap is composed of four first-order psychological resources: hope (i.e., persevering in achieving goals and redirecting paths), self-efficacy (i.e., having confidence to succeed at challenging tasks), resilience (i.e., maintaining firmness or bouncing back when problems and adversities arise) and optimism (making a positive attribution about succeeding now and in the future) (Luthans & Youssef-Morgan, 2017; Luthans et al., 2007). PsyCap resources do not act in isolation, but in a joint and synergistic way, producing effects over time and across contexts (Luthans & Youssef-Morgan, 2017; Luthans et al., 2007).

When individuals work together in groups to achieve common goals, they develop common psychological structures called emergent states, which represent cognitive, motivational or affective states (Marks et al., 2001). Accordingly, the importance of considering the team level when studying the role of PsyCap in the organizational context has been highlighted in the literature (e.g., Newman et al., 2014). This research is focused on team PsyCap, which is defined as a collective psychological resource that is composed of team efficacy, team hope, team optimism and team resilience. In particular, we explore the relationship between team PsyCap and team innovation.

In challenging and uncertain contexts, innovation is essential for the effectiveness of teams and organizations (West & Anderson, 1996). Innovation can be defined as a process or as a result (Peralta et al., 2014). As a process, it involves two sub-processes: creativity and innovation. While creativity only implies generating new ideas, innovating involves implementing those ideas (Hülsheger et al., 2009), but these two phenomena can occur simultaneously (West, 2002). Regarding innovation as a result, it presupposes the successful implementation of creative ideas (Schippers et al., 2015; West, 2002). In this research, innovation is conceptualized as a result, consisting of the introduction and intentional application of new processes, products, or procedures, with the purpose of bringing benefit (West & Farr, 1990).

Previous studies reveal the importance of PsyCap as a predictor of innovative behaviours at the individual level. Luthans et al. (2011), for instance, found that PsyCap was positively related to problem-solving performance and innovation. Mishra et al. (2019) also found support for the positive relationship between individual PsyCap and innovative work behaviour among service-sector employees in India. In their organizing framework for research on PsyCap, Newman et al. (2014) considered team innovation as one of the outcomes of team PsyCap that should be explored in future research agenda. Recently, Tho and Duc (2020) found a positive effect of team PsyCap on team innovation in the retail service industry, in Vietnam.

Accordingly, we intend to expand previous studies on the influence of team PsyCap on team innovation, considering in a more comprehensive work context. Specifically, we propose that team PsyCap, through its constituent resources, is positively related to team innovation. Self-efficacy makes a team more confident in its abilities, promoting goal-orientation and greater involvement in tasks, as well as more communication and cohesion (West et al., 2009), which can encourage innovation.

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Likewise, a resilient team has the ability to absorb, preserve and improve functioning while encountering adversities and has the ability to be creative and adaptive to change (Dimas et al., 2018; Carmeli et al., 2013; Meneghel et al., 2016). Since innovation demands creative and non-routine responses (Vera & Crossan, 2005), a team that is resilient tends to be more prepared to implement new solutions and products. Moreover, resilient teams deal better with adversity and are more able to improvise and adapt to changes (West et al., 2009). Since innovation is a complex process that often entails difficulties, obstacles and frustration (Carmeli et al., 2006), to succeed in terms of innovation, a team needs to persevere and to persist, which have been associated with optimism (Walumbwa et al., 2011). Likewise, optimism may lead to constructive thinking patterns, which are essential to generate ideas for problem solving (Carmeli et al., 2006). Finally, hope also appears to be an important resource in terms of innovation. Indeed, teams with high levels of hope are motivated to achieve their goals through their sense of agency, having both the drive and the ability to generate alternative pathways in order to succeed in the things they wish to (Luthans & Youssef, 2004). Building on these theoretical arguments, we predict that:

H_1: Team psychological capital is positively related to team innovation.

Team learning as a mediator of the relationship between team PsyCap and team innovation

The importance of team learning for team effectiveness has largely been supported (Rebelo et al., 2020). Research on team learning allows to understand how teams become effective and adaptive and improve their performance, which is essential for organizational learning (Edmondson et al., 2007; Senge, 1990). As stated by Senge (1990) "unless teams can learn, the organization cannot learn" (p. 10).

Team learning has been conceptualized either as a result or as a process (Decuyper et al., 2010). Thus, team learning could be conceived as the outcomes or results that emerge as a collective property of the team, as well as a process that occurs through team members' activities and interactions (Rebelo et al., 2018).

This study conceptualizes team learning as a process and follows the well-known proposal of Edmondson (1999), who conceived team learning as a process of reflection and action, characterized by a) seeking feedback (both internally and externally) to evaluate the group's performance and to look for possible improvements; b) exploring, sharing knowledge and constructively managing differences of opinion; c) experimenting collectively with new strategies to achieve team objectives; d) reflecting on past achievements and on future aims; and e) discussing errors collectively and exploring ways to prevent them.

Evidence from previous studies supported the importance of team PsyCap on the development of teams' ability to learn (Rebelo et al., 2018). Indeed, when teams have confidence (self-efficacy), motivation to succeed (hope), persistence (optimism) and the ability to deal with adversity (resilience), they tend to be more open to participating in the learning process (Rebelo et al., 2018; West et al., 2009).

Likewise, previous empirical evidence also supports the positive relationship between team learning and innovation (e.g., Sun et al., 2016; Timmermans et al., 2013; Walter & van der Vegt, 2013). When teams engage in learning behaviours, such as sharing information, reflecting on achievements and errors or experimenting with new approaches to address tasks, their ability to develop new ideas and to introduce new procedures and solutions tend to increase (Drach-Zahavy & Somech, 2001; Walter & van der Vegt, 2013). In other words, teams that are able to learn create the appropriate conditions for innovation (West, 2002).

Therefore, considering that previous studies support the positive relationship between PsyCap and team learning (e.g., Rebelo et al., 2018), and between team learning and team innovation (e.g., Drach-Zahavy & Somech, 2001; Walter & van der Vegt, 2013), we expect that beyond the direct effect that team PsyCap has on team innovation, it will also have an indirect effect through team learning. More specifically, we conceptualize team learning as an underlying mechanism in the relationship between team PsyCap and team innovation. Accordingly, the following hypothesis is established:

H2: Team learning has a mediating role in the relationship between psychological capital and innovation at team level.

Method

Sample

The sample is composed of 124 Portuguese teams belonging to organizations from different sectors of activity, including industry (15.8%), associative (21.7%) and trade and services (62.5%). A large proportion of them were small (30.6%), followed by large organizations (26.4%). Work teams also belong to different areas of activity, with services (38.3%) and the commercial areas (18.3%) being the most representative. Team size varied from 3 to 22 members, with an average of approximately six members ($SD =$ 3.96), and team tenure ranged from 3 months to 46 years and 3 months, with an average of approximately 8 years ($SD = 8.81$).

Of the team leaders ($N = 124$), 58.3% were male and their age ranged from 18 to 67 years old ($M = 42.37$; $SD = 11.38$). Most of them have a higher education background (58.7%). Experience as a leader varied from approximately from 1 month to

27 years, with an average of approximately 6 years (SD = 6.66). Regarding seniority in the organization, it ranged from approximately 3 months to 45 years and 2 months (M = 14; SD = 10.68). Of the team members, 59.9% were female and their age ranged from 17 to 67 years old (M = 35.83; SD = 11.61). The majority report having a higher education background (41.6%). Seniority in the team ranged from approximately 1 month to 43 years and 5 months (M = 5.23; SD = 6.42) and seniority in the organization varied from approximately 1 month to 50 years (M = 9.30; SD = 10.02).

Data Collection Procedures

A multisource approach was implemented in data collection: team members were surveyed about team psychological capital, while team leaders were surveyed about team learning and team innovation. The use of different sources, along with other strategies such as assuring anonymity and confidentiality, contributes to reducing the risk of common method variance (Podsakoff et al., 2012).

Organizations were identified using both the authors' personal and professional networks and national company databases that are accessible online. In the first contact, which was established with the CEO or the HR manager of the organizations, the purpose of the study was presented, along with the benefits of participating in the study (e.g., report on the organization's results).

In the organizations that agreed to participate, the following criteria was considered for teams be included in the sample: they must be composed of at least three members; they should be perceived by themselves and others as a team; and they have to regularly interact interdependently to achieve a common goal (Cohen & Bailey, 1997). Additionally, to guarantee the representativeness of team members' responses it was also necessary to have valid responses from at least half of the teams' members. Data

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was collected through questionnaires, which were available in a paper format or on an electronic platform. Participation in the study was voluntary and ethical concerns were assured, such as data confidentiality, participants' anonymity, participants' right to desist and the use of data solely for scientific purposes. Participants had to agree to an informed consent form before answering the questionnaire. Ethical approval for this study was obtained from the Ethics Committee of the Faculty of Psychology and Educational Sciences from the University of Coimbra.

Measures

Team psychological capital. Team PsyCap was assessed by team members, through the *Psychological Capital Questionnaire* (PCQ), developed by Luthans et al. (2007) and adapted to the Portuguese language and to the team level by Rebelo et al. (2018). This scale is composed of 24 items, covering the four resources components of this construct. Each resource (self-efficacy, hope, resilience, and optimism) is assessed by six items. Answers to the items are based on a Likert-type scale with six options, from (1) *strongly disagree* to (6) *strongly agree*. Examples of items are: In our team [...] "we feel confident analysing a long-term problem to find a solution" (efficacy), "we were able to think of several paths to achieve our current goals" (hope), "we usually managed to solve difficulties at work, in one way or another" (resilience) and "with regard to our work, we always look at the positive side of things" (optimism).

Team learning. Team learning was assessed by leaders through the *Team Learning Behaviours scale* (observer survey), developed by Edmondson (1999), and adapted to the Portuguese language by Rebelo et al. (2018). The scale is composed of seven items that are rated on a Likert-type scale, ranging from (1) *almost never happens*

to (5) *almost always happens.* A sample item is: This team [...] "*actively monitors its progress and performance*".

Team innovation. Team innovation was assessed by leaders through the three-item scale of Batarseh et al. (2017), which, in turn, was based on the two-item scale of Vera & Crossan (2005). The items were translated into the Portuguese language and validated. The responses were based on a Likert-type scale ranging from (1) *totally disagree* to (7) *totally agree*. A sample item is: "*The team frequently introduces new product/service innovations*".

Control variables. Since previous studies reveal that team size (e.g., Hülsheger et al., 2009; West & Altink, 1996) and team tenure (e.g., Katz, 1982) may affect team processes and results, these variables were included as control variables. Information concerning team size and team tenure were obtained from team leaders.

Results

Preliminary analysis

Due to the sample size, we performed two confirmatory factor analyses (CFA), using the maximum likelihood method of estimation: one for the team psychological capital construct (N = 554 members); the other with the two constructs answered by team leaders, i.e., team learning and team innovation (N = 124 leaders).

Concerning team PsyCap, the results of the CFA with the 24 items of the scale ($\chi2$ (246) = 1195.1, p < .001, CFI = .84, RMSEA = .08) pointed to some problems with the adjustment of the model (Kline, 2016). An analysis of the loadings of the different items on their respective factor revealed problems with three items (i.e., standardized loadings below .22). Also, an analysis of the Modification Indices suggested the elimination of another two items. Accordingly, these items were sequentially removed

from the model. The measurement model with a four-factor structure, without those five items yielded an acceptable fit with the data (χ^2 (146) = 520.57, p < .001, CFI = .92, RMSEA = .07). All standardized loadings of the different items on their respective factors were significant (p < .001), the majority above .60 and one above .40. The Cronbach's alphas obtained for efficacy, hope, optimism, and resilience were .86, .87, .77, and .73, respectively. Since PsyCap is conceptualized as a higher-order core construct that includes efficacy, optimism, hope and resilience (Walumbwa et al., 2011), we ran a second-order confirmatory factor analysis with the four-dimensional structure previously specified. The fit indexes (χ^2 (148) = 521.97, p < .001, CFI = .92, RMSEA = .07) were very similar to the ones presented by the four-dimensional structure without the second order factor. All the first-order factor loadings on the second-order factor (team PsyCap) were above .76, allowing the use of efficacy, hope, optimism and resilience factors as indicators of the team PsyCap construct.

Regarding the variables measured by team leaders (N = 124) we ran another CFA, considering team learning and team innovation as two distinctive factors. The model revealed unacceptable fit indices (χ^2 (34) = 86.56, p < .001, CFI = .85, RMSEA = .11). An analysis of the loadings of the different items on their respective factor revealed problems with three items (i.e., standardized loadings below .24). Therefore, these items were sequentially eliminated (the three items were from the team learning scale). The measurement model with a two-factor structure, without those three items, has a good fit with the data, yielded by a non-significant chi-square (χ^2 (13) = 12.56, p = 0.483). All factorial loadings were above .48 and the average was .70. The Cronbach's alphas for team learning and team innovation were .67 and .89, respectively.

Data aggregation

PsyCap was examined at the team level but collected at the individual level. Thus, members' responses were aggregated to the team level by computing the average of team members' perceptions on efficacy, optimism, hope and resilience. To ensure that the aggregation was appropriate in our sample, we assessed the degree of intra-team consensus by calculating the inter-rater reliability index r_{wg} (James et al., 1993), and the intra-class correlation coefficients ICC(1) and ICC(2) (Bliese, 2000). The average r_{wg} across the 124 teams was .92 (SD = .13), .93 (SD = .11), .89 (SD = .15), .94 (SD = .10) for efficacy, hope, optimism, and resilience, respectively; for the same variables ICC(1) values were .29, .26, .20, and .18, whereas ICC(2) values were .65, .61, .53, and .50. Taken together, the r_{wg}, ICC(1) and ICC(2) values provide sufficient justification for aggregating the data at the team level in this study (Bliese, 2000).

Test of hypotheses

Table 1 provides the descriptive statistics and the correlations between the study variables. Team tenure was dropped from further analysis since it was not correlated with our variables (Becker, 2005). Regarding team size, since it was negatively correlated with team innovation ($r = -.24$, p = .008), it was introduced as a control variable in further analyses.

(table 1 about here)

To test our first hypothesis, we ran a multiple regression analysis with team innovation as the criterion variable and team size and team PsyCap as the predictors. The results are presented in Table 2. As can be seen, team PsyCap has a positive direct relationship with team innovation controlling for team size ($B = .85$; p = .011). Accordingly, Hypothesis 1 was supported.

(table 2 about here)

Hypothesis 2 was tested using PROCESS, a macro from SPSS developed by Hayes (2013). Through bootstrapping, Model 4 of this macro allows the construction of a 95% confidence interval for assessing a simple mediation (a 5000 estimated bootstraps sample was used to build the interval). The indirect effect on the simple mediation is calculated from the product of the predictor coefficient on the mediator, and from the mediator on the criterion. The effect is statistically significant if zero is not included between the maximum and minimum limits of the 95% confidence interval generated by PROCESS.

As shown in Table 3, results indicated that the indirect coefficient was significant, as zero is not included between the maximum and minimum limits of the 95% confidence interval generated by PROCESS (B = 0.25, SE = 0.11, 95% CI = 0.09 – 0.53). Since the direct effect was significant (B = 0.60, SE = 0.20, p = .004), the mediation identified is a partial mediation. Therefore, Hypothesis 2 was supported.

(table 3 about here)

Discussion

The aim of this study was to contribute to clarifying the relationship between team PsyCap and team innovation, by analysing both its direct effect and its indirect effect through team learning. Our results support Hypothesis 1 and reveal that teams with higher levels of hope, self-efficacy, resilience and optimism tend to be more innovative. Accordingly, our results emphasize the importance of developing team psychological capacities in order to promote innovation in teams.

Regarding Hypothesis 2, our results support the indirect influence of team PsyCap on team innovation through team learning. Accordingly, team PsyCap will influence innovation among teams both directly and indirectly, through its effect on team learning. Teams with more resources in terms of positive psychological capabilities will engage more in learning behaviours. Because "learning is a process characterized by forward and backward moments" (Rebelo et al., 2018, p. 368), teams that are confident in their abilities to succeed and that persist in facing obstacles and difficulties are more open to learning together. Promoting the creation and application of knowledge, the adoption of learning behaviours by team members will then lead to innovation (Walter & van der Vegt, 2013). Therefore, in line with previous studies, our results support team learning as one of the "the most potent carrier[s] of innovation in teams" (Drach-Zahavy & Somech, 2001, p. 120).

Conclusions, main contributions, limitations and further research

The results of the present study highlighted the role of team PsyCap as an antecedent of learning and innovation in teams. Accordingly, our findings add to the body of knowledge on the outcomes of positive psychological resources by clarifying its influence on team processes and results (Luthans & Youssef-Morgan, 2017). Additionally, our study contributes to the team learning literature, by emphasizing the role of team learning as a key mediational process between team inputs (e.g., PsyCap) and outcomes (e.g., innovation).

This research has several implications for practice that should be mentioned. By highlighting the role of team PsyCap in triggering innovation in teams, our findings suggest that managers should contribute to developing positive psychological resources among teams to build innovative teams. One of the most significant characteristics of PsyCap is its malleability and openness to development, contrary to trait-like

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characteristics that tend to be relatively fixed (Luthans & Youssef-Morgan, 2017). Results from previous studies found support for the effectiveness of short training interventions in developing PsyCap (e.g., Demerouti et al., 2011). Accordingly, organizations should implement training interventions at the team level to increase their positive psychological resources. Moreover, previous studies emphasized that leadership behaviours and characteristics are related to the levels of Psycap of the team (e.g., Rebelo et al., 2018; Rego et al., 2017). Therefore, leaders should develop behaviours such as transformational leadership behaviours to promote the psychological resources of the team.

In addition, in line with previous studies (e.g., Drach-Zahavy & Somech, 2001; Sun et al., 2016; Timmermans et al., 2013), our results highlight the importance of team learning for team innovation. Therefore, managers should stimulate learning behaviours in teams, by establishing common and clear goals (Bunderson & Sutcliffe, 2002; Dixon, 2017), as well as stimulating communication, facilitating accessibility to information and knowledge sharing (Heled et al., 2016). Accordingly, training on team learning behaviours would be valuable, along with training interventions in developing team PsyCap.

Two other strengths of our study are the sample size and the fact that is made up of organizational work teams from different sectors. However, this research has also some limitations that should be mentioned. We analysed group processes and emerging states, which are dynamic phenomena of team functioning and, therefore, they are reciprocally related to each other and to their results (Mathieu et al., 2017). Indeed, although the role of team PsyCap as an antecedent of team behaviours and results is theoretically supported (e.g., Newman et al., 2014), the reverse is also possible. In fact, when teams adopt team learning behaviours, such as seeking feedback and reflecting

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together on how to improve, their collective resources, like the sense of self-efficacy or the level of optimism, may increase. Accordingly, to clarify this issue, future research should adopt a longitudinal design.

In addition, our sample is restricted to Portuguese organizations, preventing results from being applied to different countries and cultures. The questionnaire survey method is a self-report measure and can lead to social desirability bias. Thus, it may have resulted in common method variance, a systematic error due to data collection through the same method (Conway, 2002) and, in the case of innovation and team learning, through the same source. However, we adopted some procedures to mitigate this potential threat: we collected data from two different sources (Chang et al., 2010) (while innovation and team learning were assessed by leaders, PsyCap was assessed by team members); in addition, the questionnaires were divided into different sections, with a title and a short introduction paragraph of the variables to be analysed (Brewerton & Millward, 2001) and different scales formats were used (Podsakoff et al., 2012) . In future studies, it would be relevant to adopt a multimethod approach (e.g., direct observation, or interviews), for better data triangulation.

To conclude, the present research gives an answer to the Newman's call (2014) for more studies exploring the PsyCap as a collective resource and its impact on team behaviours and outcomes, and presents this team "asset" as a promising area of research and practice.

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