ISCTE Business School
Instituto Universitário de Lisboa

INFLUENCE OF LEADER SENSE-GIVING AND LEADER PROMOTION OF TEAM SENSE-MAKING ON TEAM EFFECTIVENESS: MEDIATION ROLE OF TEAM PLANNING AND TEAM ADAPTATION

Veronica Marras

Dissertation submitted as partial requirement for the conferral of
Master in Human Resources Management and Organizational Consultancy

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Abstract

In the global, dynamic environment in which organizations are set today, the ability to adapt in response to change stimuli has become key for organizational success. Teamwork has been chosen as preferred work organization tool to ensure flexibility and adaptiveness by collecting dispersed knowledge and experience in order to manage the complexity of the work environment. Team effectiveness, as a fundamental indicator of organizational performance, has team adaptation as one of its key predictors. The ability of teams to successfully engage in adaptation processes has been showed to be influenced by another team process: team planning. Of the three types of planning classified in the literature, we focused on the transition phase deliberate and contingency planning. Leaders have been shown to have a significant influence on team processes and team outcomes. The aim of our study is to explore two leadership functions, leader sense-giving (LSG) and leader promotion of team sense-making (LPSM), as antecedents of team effectiveness, with team performance as chosen indicator. We propose and test a double mediation model with deliberate and contingency planning and team adaptation as serial mediators of the relationship between both LSG and LPSM and team effectiveness. By conducting a study on 82 consulting teams, we found support to our proposition that LSG and LPSM positively influence team performance through both team planning and team adaptation processes. Practical implications of these findings are discussed.

Keywords

Sense-giving; sense-making; team planning; team adaptation.

Classificação JEL

D23 – Organizational Behaviour; O15 – Human Resources

Resumo

No ambiente global e dinâmico em que as organizações se encontram hoje, a capacidade de adaptação em resposta a estímulos de mudança tornou-se fundamental para o sucesso organizacional. O trabalho em equipe foi escolhido como ferramenta de organização de trabalho preferencial para garantir flexibilidade e capacidade de adaptação, reunindo conhecimento e experiência dispersos para gerenciar a complexidade do ambiente de trabalho. A eficácia da equipe, como um indicador fundamental do desempenho organizacional, tem a adaptação da equipe como um de seus principais fatores de previsão. A capacidade de as equipes se envolverem com sucesso nos processos de adaptação mostrou-se influenciada por outro processo: o planejamento da equipe. Dos três tipos de planejamento classificados na literatura, nos concentramos na fase de transição com o planejamento deliberado e de contingência. Os líderes demonstraram ter uma influência significativa nos processos da equipe e nos resultados da equipe. O objetivo do nosso estudo é explorar duas funções de liderança, sense-making do líder (LSG) e promoção de senso de equipe do líder (LPSM), como antecedentes da eficácia da equipe, com o desempenho da equipe como indicador escolhido. Propomos e testamos um modelo de mediação dupla com planejamento deliberado e de contingência e adaptação da equipe como mediadores seriais da relação entre o LSG e o LPSM e a eficácia da equipe. Ao conduzir um estudo em 82 equipes de consultoria, encontramos suporte à nossa proposta de que o LSG e o LPSM influenciam positivamente o desempenho da equipe por meio do planejamento da equipe e dos processos de adaptação da equipe. Implicações práticas desses achados são discutidas.

Palavras-chave

Sense-giving; sense-making; planeamento da equipe; adaptação da equipe.

Classificação JEL

D23 – Organizational Behaviour; O15 – Human Resource

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1. Introduction

Team and teamwork represent a recurring and crucial theme within the contemporary organizational debate. There is talk of teams in the private sector, in the public sector, in politics and in schools. Among the main requirements for young graduates looking for a job, the phrase 'ability to work in team' is frequently used (Weiss & Hoegl, 2015). Teamwork as a working method is commonly considered as a vehicle for innovation, diversity and success. Modern organizations have shifted to "*leaner and more agile structures, by shifting to team-based work organizations*" (Kozlowski *et al.*, 2009: 113) in order to cope with a fast-moving, continuously changing environment where flexibility and adaptability are key organizational features. Teams have been indicated by researchers of the last half of the twentieth century as potential solution to this need for dynamism as they bring together a capital of knowledge, experience, skills and social network connections that are hard to be found at an individual level (Maynard, Kennedy Sommer, 2015). Therefore, as teams have become ubiquitous in modern organizations (Burke, Stagl, Salas *et al.*, 2006), team effectiveness has become a key indicator of organizational effectiveness. Team adaptation, being the feature that fostered their rise in work organization, represents the process through which teamwork benefits organizational performance. Therefore, much attention has been put by researchers on the antecedents of this team process, in order to identify the inputs that activate team adaptation. Among these, team planning has been recognized as initial stage of the adaptation cycle by several team adaptation researchers (e.g. Burke, Stagl, Salas, *et al.*, 2006; Rosen *et al.*, 2011).

The emphasis on developing team members skills to ensure high performance levels has put a stress on team leadership role (Kozlowski *et al.*, 2009). In fact, several authors have recognized the pivotal role that leadership functions play in fostering team adaptability (Randall, Resick & DeChurch, 2011). Among these functions are those leadership activities that aim at clarifying unclear environmental clues and providing a defined framework for their interpretation. Leader sense-giving and leader sense-making have been listed among those leader performance functions that are able to influence team cognitive processes and consequently team effectiveness (Zaccaro, Rittman & Marks, 2001).

The current study seeks to explore the relationship between leadership functions, team planning and team adaptation in determining team effectiveness. We first summarize up-to-date literature on team adaptation and its connections with team performance. We move, then, to discuss the role of team planning, particularly in its transition phase types of deliberate and contingency planning, and its relationship with team adaptation. Third, we review literature on

leadership functions of sense-giving and sense-making and propose a new conceptualization of leader promotion of team sense-making. Finally, we propose and test a double mediation model for the influence of leadership functions on team effectiveness through the serial mediation of team planning and team adaptation.

2. Literature Review

2.1 On the importance of teamwork

As stated by Guchait, Lei & Tews (2016: 300) "*teamwork is an inevitable part of organizational life*". The topic of teamwork has gained consistently higher attention in the literature (Weiss & Hoegl, 2015), answering the increasing use of teams in all kinds of organizations (Cross, Rebele, & Grant, 2016). In fact, in the last decades of the twentieth century, recent technological advancements, the increase in the interdependence between organizational roles, the growing tendency to economize the resources available to obtain better results, and the always growing number of tasks not accomplishable by individuals alone have pushed organizations to include working groups in their organizational structure (Salas, Burke, & Cannon-Bowers, 2000). The post-industrial organizational context is highly globalized (Fusch, 1997), with increasingly distributed expertize and technology mediated communications, constantly affected by environmental changes and in need for innovation.

The greater decentralization of responsibility within organizations brought by modern working methods, should allow both to offer workers greater initiative and control over their work, while being able to fully use their creativity, and to achieve higher production objectives (Gallie *et al.*, 2012).

The use of teams fits, therefore, in this renewal logic of organizations as open systems (Morgan, 1986). According to Salas, Cooke & Rosen (2008), the organizational choice falls more often on teams when: there is a high level of errors that may lead to serious consequences; the complexity of the task to be performed exceeds the capacity of an individual; the task-environment is poorly defined, ambiguous and stressful; multiple and rapid decisions are needed.

Notwithstanding the large amount of published studies on teams and teamwork and the increasing interest of researchers in the topic, some authors questioned the actuality of the renown widespread use of teams in organizations (e.g. Devine *et al.*, 1999). To answer the lack of objective evidence of the continuous expansion of teamwork, Weiss & Hoegl (2015), conducted a multi-method review of the literature by combining article counts with the

technique of *culturomics* to analyze societal diffusion of teamwork construct. Their findings confirmed a positive trend of societal diffusion of teamwork during and past the twentieth century, which was accompanied almost in parallel by scientific research (Weiss & Hoegl, 2015).

The question of why this trend of teamwork use exists rises spontaneously. Effective teamwork has been linked to higher levels of innovation, safety and efficacy (O'Neil & Salas, 2018). Linked with the history of teamwork diffusion is the argument that through teamwork employees get a higher level of control over their work and a consequent sense of empowerment, which, in turn, is connected to higher motivation and engagement and, finally, higher productivity (Gallie *et al.*, 2012). Literature on teamwork efficacy is controversial and in development, which relates to the centrality of team effectiveness in the teamwork research body as further specified in the following paragraph.

2.2 Team effectiveness

The renewed interest among researchers in studying team functioning due to the popularity of teams in modern organizations resulted in a conspicuous production of literature on the subject, with team effectiveness as the most analyzed question (Piña, Martinez & Martinez, 2008).

The past few decades have been characterized by what Cross and colleagues (2016) called a "*collaborative overload*". In their Harvard Business Review article, the authors examine the downsides of the increased recurrence of teamwork and teams in modern organizations' work structures. Among the potential and actual threats of an excessive use of teamwork are the increases in stress levels, burnout and turnover (Cross *et al.*, 2016). In fact, most teams fail to achieve their full teamwork potential (O'Neil & Salas, 2018) by falling in one of the sources of what Steiner (1972) called process loss. It is in this context that ensuring team effectiveness is of outmost relevance to avoid wasting precious resources in terms of time, money and talent. Hence, the focus on high performance teamwork as the goal to achieve: a level of performance at which team members are able to "*deliver at stakeholder objectives at the highest level of quality*" and to mature in their capabilities over time both as a work unit and as individual team members (O'Neil & Salas, 2018).

The most popular conceptualization of team effectiveness derives from the framework of reference for team research that has been predominant in the second half of the twentieth century and that was originated by McGrath in his work of 1964: the Input-Process-Output

(IPO) model. This framework gives an organized structure to each team variable of interest by placing them in one of the three categories and by linking them accordingly. *Inputs* are "*antecedent factors that enable and constrain member's interactions*" (Mathieu *et al.*, 2008: 412). *Processes* describe "*member's interactions toward task accomplishment*" (Mathieu *et al.*, 2008: 412), or how the inputs are translated into outcomes, serving as mediator of the relationship between inputs and outputs. Finally, the definition of team effectiveness as the third element of the model, the *output*, is threefold: "*(a) performance judged by relevant others external to the team; (b) meeting of team-member needs; and (c) viability, or the willingness of members to remain in the team*" (Kozlowski & Ilgen, 2006: 79). Team effectiveness is, therefore, conceptualized as a multidimensional phenomenon.

Notwithstanding the ground-breaking impact of McGrath's (1964) framework on team research, a more contemporary perspective of teams as multi-level systems sees team effectiveness and the processes that determine it as dynamic entities, which are not sufficiently captured by the IPO model applications (Koslowski & Ilgen, 2006).

Of the several adaptations of the IPO model, Ilgen and colleague's (2005) Input – Mediator – Output – Input (IMOI) model addresses both the contextual issue, or the multi-level nature of teams (individual – team – organization – environment), by imagining a series of input dimensions nested into each other, and the temporal issue, by defining a recurring pattern in the so-called episodic cycles. Furthermore, this model answers several researchers' claim of the existence of two main types of mediators (Cohen & Bailey, 1997; Marks, Mathieu & Zaccaro, 2001; Ilgen *et al.*, 2005; Mathieu *et al.*, 2008): a behavioral one, represented by the most traditionally recognized processes, and a cognitive, affective one, which includes what Marks *et al.* (2001) named emergent states. Analyzing team effectiveness through this lens facilitates the dialogue between determinants and consequences, besides creating a common reference for team research body of literature.

Regarding measurement of team effectiveness, although research has embraced Cohen & Bailey's (1997) threefold categorization of team effectiveness – (1) performance effectiveness, (2) attitudinal outcomes, (3) behavioral outcomes –, these dimensions are not considered of equal importance for different types of teams (Piña *et al.*, 2008). Unlike the organizational behavior literature, where performance has been identified as the most widely studied criterion variable (Bommer *et al.*, 1995), in teams research a consensus on criterion measures, included team performance, has not been reached yet (Mathieu *et al.*, 2008). Nonetheless, team performance (both quality and quantity) has been extensively used in team research models as

main outcome variable, with a clear attempt to address the multi-level declination of performance at the organizational, team and individual level (Mathieu *et al.*, 2008).

2.3 Team Adaptation

Team adaptation has gained continuously higher attention from researchers in the past two decades. The dynamic and global context in which modern teams operate poses the need for teams to learn how to recognize, understand and react to critical changes quickly and effectively (Randall, Resick & DeChurch, 2011).

Several have been the attempts to re-organize the body of knowledge about team adaptation in a common framework, possibly consistent with the IMOI model (e.g. Christian *et al.*, 2017; Maynard, Kennedy & Sommer, 2015) and able to incorporate a temporal frame (e.g. Burke, Stagl, Salas *et al.*, 2006; Rosen *et al.*, 2011). Authors on this topic used similar terms to define the main variables of the framework, but lacked in consistency in both the meaning assigned to each term (Maynard *et al.*, 2015) and the conceptualization of the construct as either process, individual difference or change in performance (Baard, Rench & Kozlowski, 2014). In fact, Burke, Stagl, Salas and colleagues (2006), embraced other authors' claim that performance should be conceptualized as the action itself, rather than its result (Campbell, 1990; Kozlowski & Bell, 2003), while Maynard *et al.* (2015) argued that team adaptation has wrongly been conceptualized as an outcome, and team adaptive performance has been used in reference to team processes instead.

Notwithstanding the different use of terminology in the latest literature on team adaptation, the models, if analyzed with an Input-Mediator-Output mindset, have more elements in common than expected.

Christian *et al.* (2017: 63) described team adaptation as "*an unfolding process whereby factors associated with adaptability influence adaptive mechanisms, which in turn affect team adaptive performance*".

Maynard and colleagues (2015: 655) defined *adaptability* as "*the capacity of a team to make needed changes in response to a disruption or trigger*" and is determined by a series of individual-, team- and organizational-level factors that serve as input to the adaptation network. Similarly, Burke, Stagl, Salas *et al.* (2006) identified a series of individual (knowledge, attitudes, traits and abilities) and job design characteristics as inputs to team adaptation.

Adaptive mechanisms may include action, transition and interpersonal processes as well as emergent states (Maynard *et al.*, 2015; Christian *et al.*, 2017). Burke *et al.* (2006) built and

Rosen *et al.* (2011) further integrated a conceptual model that has a set of four recurring phases, each composed by different processes, forming an *adaptive cycle*, which interacts with a set of emergent states, and generates an adaptive outcome.

Finally, Christian *et al.* (2017) defined *team adaptive performance* as an outcome that reflects the effects of enacted changes on behaviors, measured by indicators of task effectiveness within the context of a change. Maynard *et al.* (2015) talked about team adaptive outcomes as the consequences of the adaptation process, while Burke *et al.* (2006) and Rosen *et al.* (2011) identified team adaptation as the final outcome of their model, and defined it as "*a change in team performance, manifested in the innovation of new or modification of existing structures, capacities, and/or behavioral and cognitive goal-directed actions, in response to a salient cue or cue stream (…) (that) results in a functional outcome for the entire team*" (Burke *et al.*, 2006: 1201).

Frick *et al*. (2018) recently proposed an integrated heuristic of the team adaptation process that attempts to simplify the existent literature on the subject by identifying four main phases that the authors call the four R's of team adaptation: (a) recognize; (b) reframe; (c) respond; and (d) reflect. The first phase corresponds to Burke and colleagues' (2006) cue recognition, meaning ascription and situation assessment phases and consists in scanning the environment for change cues, acknowledging the change and communicating it to the rest of the team. The team moves then to the reframe phase, which resembles Burke *et al.* (2006) and Rosen *et al.* (2011) plan formulation phase, where team members engage in role differentiation and goal setting in preparation to change response, by designing a plan and developing shared mental models. The third phase, respond, is the action phase in which the team implements the response formulated in the previous phase while engaging in performance monitoring and back-up behaviors. The cycle ends with the reflect phase: team members contemplate the change occurred, re-analyze how the team reacted to it by reframing its approach, implementing a coping strategy and what are the outcomes of these actions.

For the purpose of this dissertation, we are going to refer to team adaptation as

> a function of behavioral processes and cognitive emergent states by which the team reacts to an adaptive stimulus, evaluates the situation and adjusts operations accordingly in order to minimize the performance losses caused by a disruption in team routine (Christian *et al.*, 2017; Randall *et al.*, 2011).

Consistently with Ilgen *et al.* (2005) review's structure, we place team adaptation in the set of *functioning* processes, which characterize the continuum M-O of the IMOI framework, and we analyze team adaptation as the most direct predictor of team performance. While Maynard *et al.* (2015) model analyzed the relationship between team adaptation as a process and team performance as an adaptive outcome, we will investigate the process of team adaptation in relation to a measure of team performance that is not limited to adaptive circumstances, with a view to introduce team adaptation in a broader context of team functioning and to be able to identify the specific weight of this process in determining team performance in general. Nonetheless, we expect that the positive relationship between team adaptation and team performance found by researchers in adaptive contexts (Maynard *et al.*, 2015) will still be observed when referring to general team performance.

Hypothesis 1: The extent to which teams engage in team adaptation process positively influences team performance.

2.4 Team Planning

Researchers have recognized the fundamental role of an effective initial plan as determinant of team's success in reaching a final goal (Ilgen *et al.*, 2005), as well as they reported planning during a mission to enhance performance (Stout *et al.*, 1999). Team planning has been defined as *"the development of alternative courses of action for mission accomplishment"* (Marks *et al.*, 2001: 365), composed by two phases of gathering information and developing a strategy (Ilgen *et al.*, 2005). It is the manner in which the team organizes its work (DeChurch & Haas, 2008) and it includes setting team's goals, clarifying expectations, assigning team member's roles, discussing on task requirements, prioritizing tasks, reflecting on environmental constraints, sharing information and identifying information sources.

Researchers on the subject distinguished between different types of planning based on both timing and adaptability characteristics (DeChurch & Haas, 2008).

Weingart (1992), in studying the impact of group goals, task complexity, effort and planning on team performance, analyzed planning in terms of amount, timing and quality of the process. The author distinguished between *preplanning* and *in-process planning*, the former occurring before the actual task-related activities, while the latter takes place during task performance.

Marks, Mathieu and Zaccaro (2001), in their taxonomy of team processes, distinguished two recurring phases of performance episodes: *transition phases*, whereby the team reflects on past and future relevant events, and *action phases*, when team members actually engage in task accomplishment activities. The authors further outlined three sub-dimensions of strategy formulation and planning: deliberate planning, contingency planning and reactive strategy adjustment. *Deliberate* planning, or *"the formulation and transmission of a principal course of action for mission accomplishment"* (p. 365), occurs at the beginning of each performance episode and it is based on information about the task and the environment that is available at that moment. This information can change after this initial planning phase, or the team can get feedback from the environment that leads to a necessary change in strategy. Therefore, the team also engages in *contingency* planning: *"the a priori formulation and transmission of alternative plans and strategy adjustments in response to anticipated changes in the performance environment"* (p. 366). It consists in recognizing potential risks and using if/then logic to develop Plan Bs for mission accomplishment. Both deliberate and contingency planning occur before the team engages in task performance, and are therefore included in the transition phase of the performance episode. During the action phase, some new information may be revealed, together with environmental changes and modifications internal to team itself. *Reactive strategy adjustment* is the third type of planning that Marks and colleagues defined as *"the alteration of existing strategy or plans in response to unanticipated changes in the performance environment and/or performance feedback"* (p. 366). It constitutes a *"transitory sub-episode"* within the action phase, where team members re-strategize and adjust existing plans according to the change trigger encountered.

As highlighted by DeChurch & Haas (2008), these three types of planning can be grouped according to adaptation capacity: while deliberate planning does not account for potential changes during performance, contingency and reactive planning build on team capacity to adapt when confronted by an adaptive stimulus.

In-process planning (or reactive strategy adjustment) has been found to be more predictive of team performance than pre-planning (deliberate and contingency planning) (DeChurch & Haas, 2008; Weingart, 1992). As previously mentioned, it is not clear whether team adaptation, as a process meant to deal with non-routine events, is able to be integrated in Marks *et al.* (2001) cycle of action and transition phases (Lei *et al.*, 2016). If team adaptation entails adjustments to only action phase processes (Maynard *et al.*, 2015), it is logical to expect reactive strategy adjustment to be the best fitted type of planning in response to adaptive stimuli.

Deliberate and contingency planning may have, though, an unrecognized potential as prevention tools, in fostering team's ability to deal with non-routine environments. As noted by Marks, Zaccaro & Mathieu (2000), *cognitive entrainment*, or the inflexibility of knowledge structures (i.e. shared mental models) in teams, causes behavior patterns not to change in novel environments, resulting in a loss of structure and sense-making capabilities, necessary to successfully adapt in response to a stimulus. Team planning, especially in its component of contingency planning could make up for the lack of mental model flexibility by verbalizing possible unexpected scenarios and, therefore, providing defined alternative courses of action. Stout and colleagues (1999), analyzed the relationship between effective team planning and team shared mental models. The authors found that engaging in high-quality planning would, in fact, improve the quality of team SMM by helping the transfer of information and reducing the amount of errors during high-workload periods (Stout *et al.*, 1999).

After all, most of the previously cited research on team adaptation recognized the importance of planning by including some form of it in their conceptual models.

Christian *et al.* (2017) included plan formulation in the set of adaptive processes. Burke, Stagl, Salas *et al.* (2006) described a plan formulation phase that follows the situation assessment one. Rosen *et al.* (2011) integration of Burke *et al.* (2006) model could be seen as a Russian doll phenomenon of team planning, since the authors specifically distinguished between Marks *et al.* (2001) categories of deliberate, contingency (plan formulation phase) and reactive strategy planning (plan execution phase) within the same adaptive cycle, someway emphasizing the importance of pre-planning even in the same action phase.

We focused on the impact of deliberate and contingency planning on team adaptation process and ultimately team performance. We expect both types of team planning to be positively related to team performance through their enhancement of team adaptation process.

Hypothesis 2: Team adaptation positively mediates the relationship between both deliberate planning (H2a) and contingency planning(H2b) and team performance.

2.5 Leadership functions

Literature highlighting the important role of leaders in adaptive contexts is conspicuous in both fields of team leadership and team adaptation. Leaders are "*the key linchpin for developing (…) processes and emergent states that underlie team effectiveness*" (Kozlowski *et al.*, 2009: 114). They are essential to the enactment of certain team action structures whereby

team members can develop and maintain a shared coherence and be able to adapt effectively (Burke, Stagl, Salas *et al.*, 2006).

A fundamental element of dealing with change in organizations is the effect that these changes have on interpretive schemes of the members of an organization (Gioia & Thomas, 1996). The conceptualization of organizations as open systems implies a characterization of ambiguous structures, processes and environment, creating the need to make sense of these unclear elements (Tillmann & Goddard, 2008). *Sense-making* has been defined as a process of understanding change that involves scanning the environment for important modifications and assigning meaning to these events by applying stored knowledge, experience, values, and beliefs (Gioia & Chittipeddi, 1991; Giuliani, 2016). Weick, Sutcliffe & Obstfeld (2005) highlighted how, while sense-making as a cognitive phenomenon is an individual's inner process of making sense of daily experiences, the theoretical perspective of sense-making takes into consideration the relational and team level of meaning structures (Giuliani, 2016). Sense-making is, therefore, the process of creating a framework for change interpretation and consequent actions of the team.

It follows that, in order to manage change effectively, leaders need to manage team members' interpretation of environmental changes. Day, Gronn & Salas (2004: 864) highlighted how leaders "*create, foster, promote and maintain shared understanding to enable effective teamwork*". Leaders themselves engage in sense-making activities to construct meaning around changes and to reconcile them with the overall strategy. Fleishman and colleagues' (1991) framework of leadership function included an *Information search and structure* category of functions which Zaccaro, Rittman & Marks (2001: 455) described as the "*systematic search, acquisition, evaluation, and organization of information regarding team goals and operations*". Leaders scan the environment for pertinent cues and integrate them into their existing cognitive structures (Burke, Stagl, Klein *et al.*, 2006), then moving to the *Information use in problem solving* function (Fleishman *et al.*, 1991).

Some researchers described leader's sense-making as a series of activities involving the identification of environmental changes, the interpretation of these events and the offer of this interpretation to the team (Morgeson, 2005). Others defined leader's sense-making as the process of diagnosing the nature and meaning of changing events in the environment, where leaders' role is to identify the implications of change, prioritize on which ones should be addressed and define possible solution paths (Zaccaro *et al.*, 2009). Both definitions highlight the active role of leaders as designated responsible for the interpretation of environmental changes. Given the influential role of leaders in a team environment, it goes without saying

how their interpretation of the environment is perceived as dominant by their followers. Leaders' sense-making activities inevitably influence other organization members' own sense-making by defining strategies, giving feedback, or more generally by making decisions in reaction to environmental changes.

To better understand the role of managers in the sense-making process, researchers developed on the concept of *sense-giving*. Gioia & Chittipeddi (1991: 442) defined sense-giving as the process of "*attempting to influence the sense-making and meaning construction of others towards a preferred redefinition of organizational reality*". Leader's sense-giving, therefore, consists of "*the communication of a leader's interpretation of environmental information and provision of a conceptual frame that helps team members understand the rationale and context of collective actions*", and has leader's sense-making as basis (Barnett & McCormick, 2012: 665). Leader's sense-giving function creates a structure around team member's sense-making by constraining it, putting limits to member's participation and ultimately deciding the chosen interpretation of events by shutting down the alternatives (Giuliani, 2016).

As noted by Morgeson (2005) in his exploration of external leadership role in self-managing teams, although positively related to effectiveness in disruptive circumstances, leader sense-giving activities could be perceived as intrusive and manipulative by team members. Sense-giving is a rather strong exercise of a leader's influence on the team and leaves not too much space to individual and group interpretation, with the potential risk of creating dependence between the team and the leader's ability to provide sense during performance episodes in general and in response to adaptive stimuli in particular. As highlighted by Ashmos & Nathan (2002), teams that engage in sense-making are used to their full potential not only in the production phase of a specific output (i.e. execution of the leader's orders) but also in the decision on which output is needed (interpretation and decision phase). Literature about shared leadership underlines the advantages of the dynamical transfer of leadership functions among team members in fostering teams' ability to adapt to internal and external changes (Burke, Stagl, Salas *et al.*, 2006). Furthermore, the positive contribution of team leadership to teams' adaptive capacity occurs not by handing down solutions to the team but rather by promoting team engagement in problem solving activities autonomously (Burke, Stagl, Salas *et al.*, 2006). The effort of a leader in developing team potency – that is, the perception, shared by the members of a team, that the team is effective across tasks and contexts – would be beneficial not only on team performance but also on their adaptability, by engaging in more creative problem solving and risk-taking (Kozlowski *et al.*, 2009).

Team members, both individually and as a team, engage in sense-making activities to different extents. Team sense-making is the coordination of individual sense-making towards a common understanding of the situation, thanks to which the following decision steps are, if not obvious, easy to identify (Klein, Wiggins & Dominguez, 2010). It is of particular importance for teams in a dynamic context to learn how to autonomously and jointly recognize change cues, interpret them and identify possible solution paths. The role of leaders in this scenario would be to facilitate team sense-making, rather than providing their own interpretations of the environment through sense-giving.

We define leader's promotion of team sense-making (LPSM) as:

> the process through which team leaders encourage and facilitate team sense-making activities by: smoothing the coordination process; stimulating individual participation and the development of different perspectives; guiding the collective decision-making process towards a common understanding of the situation.

The connection between leadership functions as leader sense-giving, team adaptation and team adaptive performance has been long recognized in the literature (Zaccaro *et al.*, 2009).

Zaccaro *et al.* (2001) included leader's sense-giving function among the leadership processes that influence team effectiveness through team cognitive processes. In particular, they highlighted the relationship between leader sense-giving and team shared mental models. The interpretation framework provided by the leader through sense-giving activities would be able to give team members an enriched mental model of which cue-responses are more appropriate to each environmental event and why, therefore helping the team to adapt in dynamic environments. Marks *et al.* (2000) found empirical evidence of the positive relationship between enriched leader briefings, mental models' similarity and accuracy and team performance in context of adaptation to novel environments. Leader sense-giving is beneficial to convince followers of the necessity of change itself, by using effective communication strategies and persuading them of the effectiveness of the chosen course of action (Zaccaro *et al.*, 2009).

The concept of leader promotion of team sense-making is a rather new construct, but, as team sense-making itself has been positively linked to the team adaptation process (Klein *et al.*, 2010), we suppose that the promotion of such behavior will similarly have positive consequences on adaptation.

Both team sense-making and leader sense-giving can be compared to Burke, Stagl, Salas and colleagues' (2006) *situation assessment*. The authors included two main processes in this phase of the adaptive cycle: cue recognition, or *"the identification of cues or patterns (...) that might negatively impact (...) the mission success"*, and meaning ascription, or *"the process of assigning meaning and relevance to cues by classifying or synthetizing them based on existing knowledge"* (Rosen *et al.*, 2011: 110). Both processes can be performed either individually by the leader (leader sense-giving) or collectively by the team (team sense-making).

The same conceptual model includes a plan formulation phase that directly follows the situation assessment phase. As previously showed, teams need to develop a shared understanding of the current situation to be able to effectively adapt. Klein and colleagues (2010: 304) highlight how the outcome of successful team sense-making is *"collective understanding of the situation, at which point the appropriate decision to make is obvious or greatly simplified"*. It follows that a shared awareness of the situation is a clear pre-requisite to effective team planning. Christian and colleagues (2017) have included a leader function in their model's set of inputs as well. According to the authors, leader briefings, as leader communication acts, may act as a form of sense-giving by including anticipated flexible or adaptive responses to potential unexpected events. Through a positive impact on the shared understanding of the environment and on team shared mental models, leader briefings would influence the adaptive process of plan formulation (Christian *et al.*, 2017).

We, therefore, expect both leader sense-giving and leader promotion of team sense-making to positively influence the amount of deliberate and contingency planning in which the team engages, which in turn will enhance the team adaptation process.

> *Hypothesis 3: Deliberate (H1a and b) and contingency (H1c and d) planning positively mediate the relationship of Leader sense-giving (H1a and c) and Promotion of team sense-making (H1b and d) with team adaptation.*

The conceptual model we propose (see conceptual diagram in Appendix A.4) sees both leadership functions as ultimately positively related to team performance through the positive influence of leader sense-giving and promotion of sense-making on the amount of deliberate and contingency team planning and subsequently on the team adaptation process.

> *Hypothesis 4: Team planning and team adaptation positively sequentially mediate the relationship between leadership functions and team performance.*

3. Method

3.1 Participants

Participants included 82 teams composed by a total of 304 team members and 81 team leaders (1 team leader did not participate in the survey). All teams either were composed by consultants (57% of participants) or belonged to a consultancy firm, with HR, Analytics and Administrative roles. Most team leaders have the title of Manager (48%) or Supervisor (e.g. Team Leader; Senior Consultant) (27%), with only 1 CEO and 4 Partners and a rest of 14 Directors.

Teams' size ranged from a minimum of 2 to a maximum of 9 team members, with average size of 3,7. Females represent the clear majority of team members (70%) and the 54% of team leaders. Team members' average age is 29, with a range of 40 years between 20 and 60, while team leaders' average age is 37. The 77% of participants have been working at their company for less than 3 years, while less than 10% of them have a seniority of more than 7 years. On the contrary, as logically expectable, 47% of team leaders have been working in their company for more than 7 years.

3.2 Procedure

The study is part of the *ConsulTeam* project, coordinated by ISCTE-IUL Professor Ana Margarida Passos, which has been carried out since the academic year 2016/2017, this being the second year of data collection. Participants from several consultancy firms filled out two different questionnaires, one addressed to team members and one to team leaders. The questionnaires were either printed out and completed by pen or filled in as word files and saved as Pdf files before delivery. Each participant answered the questionnaire independently from other team members or the leader. Both questionnaires are reported in the Appendix (section A.2 and A3).

3.3 Measures

Leader sense-giving and leader promotion of team sense-making

Based on Morgeson, DeRue & Karam team leadership review of 2010, we identified five items for each leadership function about which participants indicated how much they agreed on a 7-points Likert scale (from 1= totally disagree to 7= totally agree). A list of the items is provided in the Appendix (A.1). Both leaders and team members' questionnaires included LSG

and LPSM questions, but, for the purpose of our model, we used the team members' measures. Internal consistency reliabilities for the LSG and LPSM scales were .93 and .95 respectively.

Team planning: deliberate and contingency

Both deliberate and contingency planning were measured in the team members' questionnaire with three items each with an adapted 7-points Likert scale (from 1= totally disagree to 7= totally agree) from DeChurch & Haas (2008). The items can be found in the relative list in the Appendix (A.1). Cronbach's alpha values were .89 for deliberate planning and .87 for contingency planning.

Team adaptation

Team adaptation process was measured in the team questionnaire with eight items as proposed by Marques-Quinteiro *et al.* (2015), on a 7-points Likert scale (from 1= totally disagree to 7= totally agree). Internal consistency reliability for team adaptation scale had a value of .91. The eight items are listed in the Appendix (A.1).

Team performance

Team performance was measured by two items on the same 7-points Likert scale (from 1= totally disagree to 7= totally agree) as adapted from González-Romá *et al.* (2009). Both team members and leaders' questionnaires included the two items, but in order to avoid common method variance bias (Podsakoff *et al.*, 2003), we used the leader measure in our model. The two items are listed in the Appendix (A.1). Cronbach's alpha for team performance scale was .78.

4. Results

4.1 Aggregation

Since the model level of analysis was the team one, team members' responses were aggregated on a team basis. Computed $Rwg_{(j)}$ average scores for variables extracted from the team members' questionnaire are reported in Table 1 as a measure of agreement among team members on each single variable (James *et al.*, 1993; Biemann *et al.*, 2012). Notwithstanding the critical observations regarding the use of a .70 Rwg average cutoff criterion as arbitrary and

lacking formal support (Lance *et al.*, 2006), we consider it as a reasonable threshold for evaluating the degree of within-group agreement on our key variables.

4.2 Hypothesis testing

In Table 1 we reported the mean, standard deviation and correlation coefficients for all variables at the team level. The two leadership functions have a significant positive correlation with each other ($r = .83, p < 0.01$). Leader sense-giving is positively and significantly correlated with both types of planning ($r_{deliberate} = .61$, $p < 0.01$; $r_{contingency} = .64$, $p < 0.01$) and team adaptation ($r = .62$, $p < 0.01$). Promotion of team sense-making by the leader is as well positively and significantly correlated with both types of planning ($r_{deliberate} = .58$, $p < 0.01$; $r_{contingency} = .63$, $p < 0.01$) and team adaptation ($r = .62$, $p < 0.01$). Both leadership functions are positively and significantly correlated with team performance as rated by the leader ($r = .32$, $p < 0.01$, $r = .28$, $p < 0.05$). Results show a positive significant correlation between team adaptation and both deliberate ($r = .59$, $p < 0.01$) and contingency ($r = .51$, $p < 0.01$) planning, while there is no significant correlation between the two planning types and team performance. Finally, team performance is reported to be significantly positively correlated with team adaptation ($r = .49$, $p < 0.01$).

Table 1. *Descriptive statistics and Bivariate Correlations*

Variable	*M*	*SD*	*Rwg*	1	2	3	4	5	6
1. Leader sense-giving	5.23	0.81	0.76						
2. Promotion of team sense-making	5.26	0.91	0.75	.83**					
3. Team deliberate planning	5.19	0.75	0.73	.61**	.58**				
4. Team contingency planning	4.66	0.76	0.74	.64**	.63**	.78**			
5. Team adaptation	5.51	0.60	0.88	.62**	.62**	.59**	.51**		
6. Leader: team performance	5.75	0.76		.32**	.28*	.16	.16	.49**	

* p .05. ** p .01.

Our hypotheses include both simple and multiple mediated relationships between the variables of interest. Hypothesis 2 suggests a simple mediation of team adaptation between team planning and team performance, while Hypothesis 3 identifies team planning as a mediator of the relationship between leadership functions of sense-giving and promotion of team sense-making and team adaptation process. Moreover, our model includes team planning

and team adaptation as multiple sequential mediators of the relationship of the leadership functions of leader sense-giving and promotion of team sense-making with team performance.

We used Hayes' (2013) PROCESS macro on SPSS to evaluate the indirect effects of the aforementioned relationships. The macro uses bootstrapping method for statistical inference about the indirect effects, and we selected a 5000 times re-sample option, together with a 95% confidence interval. The application of bootstrapping method avoids issues related with non-normal samples (Hayes, 2013). The PROCESS output reports the minimum (LLCI) and maximum (ULCI) limits of the 95% confidence interval: we assume significance when the interval doesn't include zero (Hayes, 2013).

We report the path and indirect effects estimates for both the simple and the double mediated models in Tables 2 to 7.

In *Hypothesis 1* we stated the existence of a positive relationship between team adaptation and team performance. A significantly high Pearson coefficient (0.49; p-value < 0.01) supports this first hypothesis of a positive association between team adaptation team performance.

Hypothesis 2 proposed team adaptation as a mediator of the positive relationship between deliberate planning (H2a) and team performance and between contingency planning (H2b) and team performance. We tested the hypothesis with a simple mediation model number 4 on PROCESS macro and we calculated the direct and indirect effects of team planning on team performance. Team adaptation positively mediated the relationship between deliberate planning and team performance (B = 0.35, CI = 0.18, 0.53) and that between contingency planning and team performance (B = 0.28, CI = 0.14, 0.44). Hypotheses H2a and H2b were both supported by results.

Table 2. *Model path estimates for simple mediation models for Hypothesis 2.*

Paths	Coefficient	*p* value
Model with Deliberate Planning		
Deliberate Planning → Team Performance[a]	-0.195	0.111
Deliberate Planning → Team Performance[b]	0.160	0.157
Deliberate Planning → Team Adaptation	0.470	0.000
Team Adaptation → Team Performance	0.755	0.000
Model with Contingency Planning		
Contingency Planning → Team Performance[a]	-0.123	0.284
Contingency Planning → Team Performance[b]	0.157	0.161
Contingency Planning → Team Adaptation	0.404	0.000
Team Adaptation → Team Performance	0.691	0.000

Note: [a] The total effect of deliberate planning on team performance without the inclusion of mediator variables.
[b] The total effect of deliberate planning on team performance with the inclusion of mediator variables.

Table 3. *Model indirect effects estimates for simple mediation models for Hypothesis 2.*

Indirect effects	Coefficient	CI	
		LL	UL
Model with Deliberate Planning			
DP → Team Adaptation → TP	0.355	0.183	0.533
Model with Contingency Planning			
CP → Team Adaptation → TP	0.279	0.143	0.443

Note: number of bootstrap resamples = 5000; DP = deliberate planning; CP = contingency planning; TP = team performance.

As we can see from the coefficients reported in Table 2, the direct effect of deliberate planning on team performance (without the inclusion of mediator variables) was not found to be significantly different from zero (B = -0.19, $p > 0.05$). The same is true for the direct effect of contingency planning on team performance (B = -0.12, $p > 0.05$).

Hypothesis 3 proposed that the positive relationship between leader sense-giving and team adaptation is mediated by deliberate planning (H3a) and contingency planning (H3b), and that the positive relationship between leader promotion of team sense-making and team adaptation is mediated by deliberate planning (H3c) and contingency planning (H3d). Deliberate planning positively mediated the relationship between leader sense-giving and team adaptation (B= 0.15, CI = 0.05, 0.26) and the relationship between leader promotion of sense-making and team adaptation (B = 0.13, CI = 0.04, 0.24). On the contrary, contingency planning is not a significant mediator of neither the relationships between leader sense-giving and team adaptation (B = 0.09, CI = -0.01, 0.20) nor the one between leader promotion of team sense-making and team adaptation (B = 0.08, CI = -0.01, 0.18). Therefore, Hypothesis 3 is partially supported: H3a and H3c are supported by results while Hypotheses H3b and H3d are not supported.

It is interesting to notice how the direct effects of both leadership functions on team adaptation have been found to be statistically significantly different from zero in both scenarios with deliberate (LSG: B = 0.30, $p < 0.01$; LPSM: B = 0.27, $p < 0.01$) and contingency planning (LSG: B = 0.36, $p < 0.01$; LPSM: B = 0.32, $p < 0.01$).

Table 4. *Model path estimates for simple mediation models for Hypothesis 3.*

Paths	Coefficient	p value
Model with Leader sense-giving and Deliberate Planning		
LSG → Team Adaptation[a]	0.302	.000
LSG → Team Adaptation[b]	0.455	.000
LSG→ Deliberate Planning	0.562	.000
Deliberate Planning → Team Adaptation	0.273	.001
Model with Leader sense-giving and Contingency Planning		
LSG → Team Adaptation[a]	0.360	.000
LSG → Team Adaptation[b]	0.455	.000
LSG→ Contingency Planning	0.601	.000
Contingency Planning → Team Adaptation	0.159	.079
Model with LPSM and Deliberate Planning		
LPSM → Team Adaptation[a]	0.275	.000
LPSM → Team Adaptation[b]	0.409	.000
LPSM→ Deliberate Planning	0.483	.000
Deliberate Planning → Team Adaptation	0.277	.001
Model with LPSM and Contingency Planning		
LPSM → Team Adaptation[a]	0.323	.000
LPSM → Team Adaptation[b]	0.409	.000
LPSM→ Contingency Planning	0.527	.000
Contingency Planning → Team Adaptation	0.163	.067

Note: LSG = leader sense-giving; LPSM = promotion of team sense-making. The coefficients refer to the unstandardized regression coefficients.
[a] The total effect of deliberate planning on team performance without the inclusion of mediator variables.
[b] The total effect of deliberate planning on team performance with the inclusion of mediator variables.

Table 5. *Model indirect effects estimates for simple mediation models for Hypothesis 3.*

Indirect effects	Coefficient	CI	
		LL	UL
Model with Leader sense-giving and Deliberate Planning			
LSG → DP → Team Adaptation	0.154	0.051	0.261
Model with Leader sense-giving and Contingency Planning			
LSG → CP → Team Adaptation	0.096	-0.008	0.202
Model with LPSM and Deliberate Planning			
LPSM → DP → Team Adaptation	0.134	0.043	0.238
Model with LPSM and Contingency Planning			
LPSM → CP → Team Adaptation	0.086	-0.010	0.184

Note: number of bootstrap resamples = 5000; LSG = leader sense-giving; DP = deliberate planning; CP = contingency planning; LPSM = promotion of team sense-making.

Hypothesis 4 stated that team planning and team adaptation positively serially mediate the relationship between leadership functions and team performance. Deliberate planning and team adaptation mediated the relationship between leader sense-giving and team performance (B = 0.22, CI = 0.09, 0.37) and that between leader promotion of team sense-making and team performance (B = 0.24, CI = 0.10, 0.40). Contingency planning and team adaptation mediated the relationship between LSG and team performance (B = 0.24, CI = 0.09, 0.40) and that between LPSM and team performance (B = 0.25, CI = 0.10, 0.43). Hypothesis 4a, 4b, 4c and 4d were all supported by the results. As can be noticed by the coefficients reported in Table 6, neither leader sense-giving nor leader promotion of team sense-making direct effects on team performance were statistically significantly different from zero in neither deliberate (LSG: B = 0.12, $p > 0.05$; LPSM: B = 0.02, $p > 0.05$) nor contingency (LSG: B = 0.13, $p > 0.05$; LPSM: B = 0.02, $p > 0.05$) planning scenarios. The specific indirect effects of leader sense-giving on team performance through deliberate planning (B = -0.14, CI = -0.28, 0.01) and contingency planning (B = -0.11, CI = -0.26, 0.02) were found to be not significant as well (see Table 7). Similarly, the indirect effects of leader promotion of team sense-making on team performance through both deliberate (B = -0.11, CI = -0.23, 0.03) and contingency (B = -0.08, CI = -0.22, 0.06) planning were found to be not statistically significantly different from zero. On the contrary, the specific indirect effects of both leadership functions on team performance through team adaptation only, were found to be statistically significantly different from zero in deliberate planning scenarios (LSG: B = 0.11, CI = 0.02, 0.21; LPSM: B = 0.1, CI = 0.02, 0.21), while not significant in contingency planning scenarios (LSG: B = 0.06, CI = -0.01, 0.15; LPSM: B = 0.05, CI = -0.01, 0.15). The PROCESS output, through the "*contrast*" option, provides also an estimate for the difference between specific indirect effects, and the bootstrapping option calculates a 95% confidence interval for the comparisons. As we can see in Table 7, the difference between the specific indirect effect of leader sense-giving on team performance through only team adaptation and the specific indirect effect of leader sense-giving on team performance through both deliberate planning and team adaptation is not statistically significantly different from zero (B = 0.12, CI = -0.03, 0.28). Similarly, the difference between the specific indirect effect of leader promotion of team sense-making on team performance through only team adaptation and the specific indirect effect of leader promotion of team sense-making on team performance through both deliberate planning and team adaptation is not statistically significantly different from zero (B = 0.14, CI = -0.04, 0.31). Consequently, we cannot say that the model with double mediation explains more than the model with only team adaptation as mediator of the relationship between leadership functions and team performance.

Table 6. *Model path estimates for double mediation models.*

	Coefficient	*p* value
Model with Leader Sense-giving and Deliberate Planning		
LSG → Team Performance[a]	0.123	.344
LSG → Team Performance[b]	0.314	.003
LSG → Deliberate Planning	0.578	.000
LSG → Team Adaptation	0.325	.000
Deliberate Planning → Team Adaptation	0.267	.002
Deliberate Planning → Team Performance	-0.241	.068
Team Adaptation → Team Performance	0.689	.000
Model with LPSM and Deliberate Planning		
LPSM → Team Performance[a]	0.022	.853
LPSM → Team Performance[b]	0.253	.010
LPSM → Deliberate Planning	0.512	.000
LPSM → Team Adaptation	0.319	.000
Deliberate Planning → Team Adaptation	0.260	.002
Deliberate Planning → Team Performance	-0.203	.120
Team Adaptation → Team Performance	0.741	.000
Model with Leader Sense-giving and Contingency Planning		
LSG → Team Performance[a]	0.126	.365
LSG → Team Performance[b]	0.314	.003
LSG → Contingency Planning	0.622	.000
LSG → Team Adaptation	0.386	.000
Contingency Planning → Team Adaptation	0.149	.100
Contingency Planning → Team Performance	-0.179	.171
Team Adaptation → Team Performance	0.625	.000
Model with LPSM and Contingency Planning		
LPSM → Team Performance[a]	0.021	.872
LPSM → Team Performance[b]	0.253	.010
LPSM → Contingency Planning	0.571	.000
LPSM → Team Adaptation	0.375	.000
Contingency Planning → Team Adaptation	0.137	.124
Contingency Planning → Team Performance	-0.133	.310
Team Adaptation → Team Performance	0.678	.000

Note: LSG = leader sense-giving; LPSM = promotion of team sense-making; The coefficients refer to the unstandardized regression coefficients.

[a] The total effect of deliberate planning on team performance without the inclusion of mediator variables.

[b] The total effect of deliberate planning on team performance with the inclusion of mediator variables.

Table 7. *Model indirect effects estimates for double serial mediation models for Hypothesis 4.*

Indirect effects	Coefficient	CI	
		LL	UL
Model with Leader sense-giving and Deliberate Planning			
Ind1: LSG → DP → TA → TP	0.224	0.097	0.371
Ind2: LSG → DP → TP	-0.140	-0.278	0.005
Ind3: LSG → TA → TP	0.106	0.023	0.208
C1: Ind1 – Ind2	-0.364	-0.558	-0.149
C2: Ind1 – Ind3	-0.246	-0.431	-0.069
C3: Ind2 – Ind3	0.118	-0.032	0.280
Model with Leader sense-giving and Contingency Planning			
LSG → CP → TA → TP	0.242	0.091	0.402
LSG → CP → TP	-0.112	-0.265	0.019
LSG → TA → TP	0.058	0.010	0.150
C1: Ind1 – Ind2	-0.353	-0.556	-0.140
C2: Ind1 – Ind3	-0.170	-0.357	-0.023
C3: Ind2 – Ind3	0.183	0.012	0.371
Model with LPSM and Deliberate Planning			
LPSM → DP → TA → TP	0.236	0.098	0.398
LPSM → DP → TP	-0.106	-0.230	0.034
LPSM → TA → TP	0.099	0.025	0.210
C1: Ind1 – Ind2	-0.342	-0.540	-0.118
C2: Ind1 – Ind3	-0.205	-0.372	-0.052
C3: Ind2 – Ind3	0.136	-0.041	0.307
Model with Promotion of sense-making and Contingency Planning			
LPSM → CP → TA → TP	0.253	0.103	0.433
LPSM → CP → TP	-0.076	-0.220	0.065
LPSM → TA → TP	0.053	-0.014	0.148
C1: Ind1 – Ind2	-0.330	-0.546	-0.120
C2: Ind1 – Ind3	-0.129	-0.284	0.011
C3: Ind2 – Ind3	0.201	0.018	0.404

Note: number of bootstrap resamples = 5000; LSG = leader sense-giving; DP= deliberate planning; CP = contingency planning; TA = team adaptation; TP = team performance; PSM = promotion of team sense-making.

5. Discussion

Our study examined the interactions between leadership functions, team planning and team adaptation on determining team performance. We proposed a double mediated model that imagines the two transition-phase types of team planning – deliberate and contingency – and the process of team adaptation as serially connected in explaining how leader sense-giving and leader promotion of team sense-making functions predict the final level of team performance. The results of this study supported our hypothesis of a positive interaction between these

variables, while excluding the significance of a direct effect of both leader sense-giving and leader promotion of team sense-making on team performance, without the medium of team planning and team adaptation. These findings are discussed in the last part of this section, and the intermediary hypotheses' results are discussed in the remainder of the paragraph.

Team adaptation has been clearly shown to be related to team performance, therefore extending the applicability of a relationship already found in works of several authors in the field of team adaptation (e.g. Maynard *et al.*, 2015) to a more general context of team dynamics.

Both types of team planning have been shown to be significantly positively related to team adaptation process, through which they predict the final level of team performance. The results highlighted, instead, how a direct effect of deliberate and contingency planning on the level of performance of the team is not statistically significantly different from zero. This would mean that transition phase planning processes exert their influence on performance only by fostering the capacity of the team to adapt effectively. This finding supports our proposition and provides an important contribution to the research on team planning, which is still in a developmental phase and has not yet explored sufficiently the link between these transition phase processes and team effectiveness.

Moving forward, while deliberate planning positively and significantly mediates the relationship between leader sense-giving and team adaptation and that between leader promotion of sense-making and team adaptation, contingency planning doesn't mediate the relationship between either leadership functions and team adaptation. In the deliberate planning scenario, the two leadership functions' direct effect on team adaptation (controlling for mediator variables) is also positive and statistically significantly different from zero, which means that the path through deliberate planning is not the only one in which these leadership function can have an impact on the adaptation process. In the contingency planning scenario, the direct effect is the only statistically significant path for both leader sense-giving and leader promotion of team sense-making as predictors of team adaptation.

Regarding the simple mediation model proposed in Hypothesis 3 with deliberate planning as a mediator of the relationship between leader sense-giving and team adaptation, it is important to highlight the fact that *b*, the regression coefficient of the influence of deliberate planning on team adaptation when controlling for leader sense-giving, is positive and statistically significantly different from zero. The same is true for the promotion of team sense-making model. This coefficient corresponds to the increment on team adaptation that a one-unit increase in deliberate planning would cause while keeping the input variable (LSG or LPSM) constant. The fact that both coefficients are significant means that the influence of deliberate

planning on team adaptation is not entirely derived from the effect that the two leadership functions have on this team planning type. This finding should inform further research on the relevant inputs that exert an influence on deliberate planning in the prediction of team adaptation process.

Finally, the double mediation model with team performance as dependent variable was supported in all four scenarios. This last analysis proved that both leadership functions exert their influence on team performance through team planning and team adaptation, while they do not influence it directly. In fact, leader sense-giving and leader promotion of team sense-making direct effects on team performance were not statistically significant in neither planning type scenarios.

The specific indirect effects of both leadership functions on team performance through team planning as unique medium (both deliberate and contingency) was not found to be statistically significantly different from zero. This means that the effect of the two leadership functions on team performance through team planning is relevant only when mediated by the team adaptation process, and therefore these functions are particularly important in dynamic and changeable contexts in which the adaptation process is activated.

On the contrary, the specific indirect effect of LSG and LPSM on team performance through team adaptation, independent of deliberate planning level, was found to be statistically significantly different from zero and positive. This means that, in both leader sense-giving and promotion of team sense-making models, the influence of the leadership functions on team performance is not completely explained by the double mediation of deliberate planning and team adaptation. Thus, the previously highlighted positive significant influence of LSG and LPSM on team adaptation recurs also when shifting the focus on team performance as outcome of the model. This finding comes as no surprise, as, as previously mentioned, the connection between leader sense-giving, team adaptation and team adaptive performance has been long recognized in the literature (Zaccaro *et al.*, 2009). This specific indirect effect should be further investigated to verify whether there may be other mediators than team planning, causally positioned between the two leadership functions and team adaptation, that can better explain team performance, some of which have already been studied in team research (e.g. shared mental models: Marks *et al.*, 2000; Zaccaro *et al.*, 2001).

The difference between the two specific indirect effects it's not significant, which prevents us to state that either one of them is in some way higher in importance.

When moving to the contingency planning scenarios, the same specific indirect effect is no longer significant. In this context, the only significant path that leads leader sense-giving

and leader promotion of team sense-making to team performance is the one that goes through both contingency planning and team adaptation.

The confrontation between the results of Hypothesis 3 and Hypothesis 4 models regarding the contingency planning context poses what seems to be a contradiction. In fact, while contingency planning wasn't successfully proven as mediator of the relationship between leader sense-giving and team adaptation or leader promotion of team sense-making and team adaptation, the relationship between these variables is significant when adding a new variable to the model as dependent variable: team performance. This apparent contradiction between the simple and the double mediation models shows that, for what regards contingency planning, a significant relation between the variables exists only when in relation to the final outcome.

In conclusion, there is a clear difference between the two types of planning processes regarding their relationship with LSG, LPSM, team adaptation and team performance. Contingency planning connections with the aforementioned variables seems to be more controversial and unclear. This result is in some way in contrast with common sense and the general conceptual difference between deliberate and contingency planning. In fact, while deliberate planning entails the formulation of a principal course of action that the team should follow in order to achieve their task goal, contingency planning consists in reflecting on the possible disruptive events that may arise during task performance and lay down a reaction plan in preparation of the potential change (Marks *et al.*, 2001). One would logically expect contingency planning to have a higher correlation with team adaptation, being this type of planning process strictly related to adaptive circumstances. On the contrary, we see already from the Pearson coefficients (see Table 1) that team adaptation is slightly more correlated with deliberate planning ($r = 0.59$, $p < 0.01$) than contingency planning ($r = 0.51$, $p < 0.01$).

A possible reason for this misalignment might be the difficult nature of the contingency planning construct which makes it harder for team members to understand and to recognize it in the set of team processes. By looking at contingency planning average in Table 1 (*average* = 4.66; *standard deviation* = 0.76), we notice that the responses stayed mostly between "Neither agree nor disagree" and "Agree", which reveals some uncertainty among the respondents on the construct itself, and, more generally, the lowest average value of the set of variables. This might be a result of cultural bias, with respondents being reluctant in expressing strong evaluations on both ends of the scale.

6. Practical implications

Our study hold significant implications for modern organizations, particularly for their teams. We highlighted how the results of teams' work are hugely impacted by their capacity to adapt to a changing environment. This ability depends on a series of processes that start earlier on the path towards task accomplishment, the transition phase processes, among which are two different types of planning: deliberate and contingency. We brought evidence of two ways of improving the likelihood that teams are going to engage in deliberate and contingency planning: by providing them with a clear direction on how to interpret situations, events and alterations to their environment and by fostering their own ability to make sense of unclear circumstances by discussing, expressing different opinions, confronting their points of view and reaching a consensus. Both media belong to the leadership sphere of competence, which underlines the fundamental role of people managers in reaching teams' goals.

We believe that through training and discussion, these functions can bring decisive improvements to teams' dynamics. An important piece of learning for leaders to focus on would be how to distinguish between situations in which leader sense-giving in more suited, rather than leader promotion of team sense-making, and vice versa. In fact, we saw (see paragraph 2.5) how leaders' direct interventions can be seen as too invasive and interpreted as impositions by team members. This may have counterproductive effects when not recognized in advance, and, in these circumstances, might be better to make the team self-sufficient by providing them with the necessary tools, to then leave them autonomously tackle the problem they face. There might also be other scenarios in which the team is not ready, not sufficiently trained or the disruptive event is of such magnitude that team members alone cannot make sense of the environment and a firm, clear and directive interpretation of the situation is needed, in which case sense-giving from the leader might be more effective.

Our findings put also in evidence the key role of team planning in activating the adaptation process. Both deliberate and contingency planning are activities that can be formally included in the teamwork routine, and their execution can be facilitated by the use of modern technologies, to speed up the process, make it instantly available to all team members (included those that are not physically based in the main office), and make it easily updateable. As previously observed (see paragraph 5), there might be some confusion among respondents about the concept of contingency planning itself, which creates the need for specific training on this type of planning together with an illustration of the potential benefits of the process on team adaptive capacity.

7. Limitations and directions for future research

Our study provides important findings for research in the fields of team leadership, team planning, team adaptation and team effectiveness. Nonetheless, several limitations exist originating from the chosen data collection method, the operationalization of variables and regarding the applicability and extendibility of results.

A first limitation comes from the self-report nature of data for what concerns team planning and, most of all, team adaptation processes. The fact that both variables are measured on team members' perceptions on their own level of engagement in these activities, without comparing these measures with an external source of evaluation, may decrease the degree of validity of the results. Furthermore, the use of a common scaling approach on most of the variables, all measured from the team member as unique data source, may originate common method variance bias of results (Fuller *et al.*, 2016). To limit this chance, we chose to use the leaders' measure of team performance instead of team members' one, but the risk of incurring in CMV bias still exists for the remaining variables. It is important to highlight the fact that, being this study inserted in the bigger scale ConsulTeam project, the questionnaire included measures of a long series of other variables, the response to which may have had a role in increasing the risk of CMV bias (see a complete version of the questionnaires in sections A.2 and A.3 of the Appendix).

Future research on the subject may be more reliable if using more objective measures of the extent to which teams engage in both team planning processes and on the quality of their adaptation process, at least confronting the individual data source with an external evaluator.

Regarding the operationalization of variables, a weak spot is represented by team performance measure, in that the items used to evaluate the level of performance are very generally put. In one way, this operationalization may protect the results from other biases that may reduce the generalizability of performance measures (Mathieu *et al.*, 2008). In fact, since performance is a context specific variable that varies between teams and organizations, using a more general approach may protect from the risk of using a more detailed but "one-size-fits-all" measure for teams that may not be comparable. Nevertheless, defining more tailored, team-specific measures of performance, and subsequently creating a universal index to compare specific measures would be ideal in reaching true values of performance at its closest.

A second limitation related to the operationalization regards contingency planning measure. As mentioned in the methodology section (see paragraph 3.3), it was measured with

three items adapted from DeChurch & Haas (2008). The first of this item originally recited "*Use "if-then" logic in developing your plans (i.e., If this happens then we'll do that)?*", with the last portion of the statement in brackets appositely added by the authors after a preliminary test, to increase the item's clarity (DeChurch & Haas, 2008). For the sake of brevity, our questionnaire included the short-version item, which might have possibly reduced the clarity of the statement.

On another note, we studied team adaptation as a general team process, equating it to other team processes that are not strictly related to certain enacting circumstances. We made this choice in order to emphasize the role of team adaptation in modern-days teamwork and its function as main predictor of team effectiveness. However, this decision entails a series of risks related to the specific nature of team adaptation as a process that, by definition, starts in reaction to an adaptive stimulus. Not taking the stimulus into account in the first place means that we are not able to distinguish between different types of the same, such as the difference between internal and external stimulus (Christian *et al.*, 2017).

This limitation connects to a more general consideration on the relevance of more time-bound, longitudinal studies in future research that take into consideration the cyclical nature of team dynamics, as highlighted by Ilgen *et al.* (2005) IMOI model.

Further research is also needed on the other possible sequential mediators of the relationship between leadership functions (sense-giving and promotion of team sense-making) and team performance through team adaptation. In fact, we saw how the specific indirect effect of LSG and LPSM on team performance through team adaptation only resulted statistically significant, which is consistent with the fact that other mediators of equivalent relationships have been studied in the literature (e.g. shared mental models).

Moreover, notwithstanding the significant amount of literature on leader sense-giving and sense-making in general, the role of leaders in fostering this team activity needs to be deepened. This connects to another limitation of our study which could have included a measure of the actual team sense-making activity consequently to its promotion by the leader as additional mediator. We did not include it both for simplicity reasons and to avoid extending too far an already complex double mediation model. Nonetheless, future research could investigate further the rather new construct of promotion of team sense-making itself and its influence on team sense-making performance.

8. Conclusion

In a dynamic, global, constantly changing environment as the one in which organizations are set today, teams have become a strategic work organization element. In order to succeed in such a context, teams must be flexible and ready to adapt at the fast pace of the market. Team adaptation, as an action process, has a huge impact on the final performance of the team, which will ultimately determine the whole organization's performance.

Our study provides evidence of the important influence of two causal antecedents to an effective team adaptation. The first one is team planning process as part of the transition phase of team functioning. This phase includes deliberate planning, or the formulation of a principal course of action towards mission accomplishment, and contingency planning, the formulation in advance of strategies to overcome potential obstacles. The second one is the role of leaders in enacting both team planning and team adaptation processes through two leadership functions connected to making sense of a complex, dynamic environment: leader sense-giving and leader promotion of team sense-making. The former is the leader's attempt to influence the individual sense-making process of each team member to a preferred interpretation of reality by providing a conceptual frame of the environment. The latter is the process of encouraging and facilitating team sense-making activities by stimulating individual inputs and coordinating the discussion process towards a common-understanding of the environment.

Our findings revealed how the relationship between these leadership functions and team effectiveness, measured through performance, goes through team planning and team adaptation processes in a sequence. Teams whose leaders engage in sense-giving and promotion of sense-making are more likely to engage in both deliberate and contingency planning, which in turn enhances the team's adaptation process, which ultimately results in higher performance outcomes.

These findings hold important implications for today's organizations: by training leaders in recognizing the suitability of each sense-making function and by training team members' team planning skills, significant benefits for the adaptation process may arise together with a higher level of team performance.

Bibliography

Ashmos, D. P., & Nathan, M. L. 2002. Team sense-making: A mental model for navigating uncharted territories. ***Journal of Managerial Issues***, 14(2): 198-217.

Baard, S. K., Rench, T. A., & Kozlowski, S. W. J. 2014. Performance adaptation: A theoretical integration and review. ***Journal of Management***, 40: 48–99.

Biemann, T., Cole, M. S., Voelpel, S. 2012. Within-group agreement: On the use (and misuse) of r_{WG} and $r_{WG(J)}$ in leadership research and some best practice guidelines. ***The Leadership Quarterly***, 23: 66-80.

Bommer, W. H., Johnson, J. L., Rich, G. A., Podsakoff, P. M., & MacKenzie, S. B. 1995. On the interchangeability of objective and subjective measures of employee performance: A meta-analysis. ***Personnel Psychology***, 48: 587-605.

Burke, C. S., Stagl, K. C., Klein, C., Goodwin, G. F., Salas, E., & Halpin, S. M. 2006. What type of leadership behaviors are functional in teams: a meta-analysis. ***The Leadership Quarterly***, 17: 288–307.

Burke, C. S., Stagl, K. C., Salas, E., Pierce, L., & Kendall, D. 2006. Understanding team adaptation: A conceptual analysis and model. ***Journal of Applied Psychology***, 91(6): 1189–1207.

Campbell, J. P. 1990. Modeling the performance prediction problem in industrial and organizational psychology. In M. D. Dunnette & L. M. Hough (Eds.), ***Handbook of industrial and organizational psychology*** (2nd ed., 1: 687–732). Palo Alto, CA: Consulting Psychologists Press.

Christian, J. S., Christian, M. S., Pearsalla, M. J., & Long, E. C. 2017. Team adaptation in context: An integrated conceptual model and meta-analytic review. ***Organizational Behavior and Human Decision Processes***, 140: 62-89.

Cohen, S. G. & Bailey, D. E. 1997. What makes teams work? Group effectiveness research from the shop floor to the executive suite. ***Journal of Management***, 23(3): 239-90.

Cross, R., Rebele, R., & Grant, A. 2016. Collaborative overload. ***Harvard Business Review***, 94: 74–79.

Day, D. V., Gronn, P., & Salas, E. 2004. Leadership capacity in teams. ***The Leadership Quarterly***, 15(6): 857-880.

DeChurch, L. A., & Haas, C. D. 2008. Examining team planning through an episodic lens. Effects of deliberate, contingency, and reactive planning on team effectiveness. ***Small Group Research***, 39(5): 542-568.

Devine, D. J., Clayton, L. D., Philips, J. L., Dunford, B. B., & Melner, S. B. 1999. Teams in organizations: Prevalence, characteristics, and effectiveness. ***Small Group Research***, 30: 678-711.

Fleishman, E. A., Mumford, M. D., Zaccaro, S. J., Levin, K. Y., Korotkin, A. L., & Hein, M. B. 1991. Taxonomic efforts in the description of leader behavior: A synthesis and functional interpretation. ***Leadership Quarterly***, 4: 245–287.

Frick, S. E., Fletcher, K. A., Ramsay, P. S., Bedwell, W. L. 2018. Understanding team maladaptation through the lens of the four R's of adaptation. ***Human Resources Management Review***, (in press).

Fuller, C. M., Simmering, M. J., Atinc, G., Atinc, Y., & Babin, B. J. 2016. Common methods variance detection in business research. ***Journal of Business Research***, 69(8): 3192–3198.

Fush, G.E. 1997. ***Organizational change from scientific management to the learning organization: Implications for new work systems***. British Columbia.

Gallie, D., Zhou, Y., Felstead, A., & Green, F. 2012. Teamwork, skill development and employee welfare. ***British Journal of Industrial Relations***, 50: 23-46.

Gioia, D. A., & Chittipeddi, K. 1991. Sense-making and sense-giving in strategic change initiation. ***Strategic Management Journal***, 12(6): 433–448.

Gioia, D. A., & Thomas, J. B. 1996. Identity, image, and issue interpretation sensemaking during strategic change in academia. ***Administrative Science Quarterly***, 41(3): 370-403.

Giuliani, M. 2016. Sensemaking, sensegiving and sensebreaking: The case of intellectual capital measurements. ***Journal of Intellectual Capital***, 17(2): 218-237.

González-Romá, V., Fortes-Ferreira, L., & Peiró, J. M. 2009. Team climate, climate strength and team performance: A longitudinal study. ***Journal of Occupational and Organizational Psychology***, 82(3): 511–536.

Guchait, P., Lei, P., & Tews, M. J. 2016. Making teamwork work: Team knowledge for team effectiveness. ***The Journal of Psychology***, 150(3): 300-317.

Hayes, A.F. 2013. ***Introduction to mediation, moderation, and conditional process analysis: A regression-based approach***. New York, NY: The Guildford Press.

Ilgen, D. R., Hollenbeck, J. R., Johnson, M., & Jundt, D. 2005. Teams in organizations: from input-process-output models to IMOI models. ***Annual Review of Psychology***, 56: 517-543.

James, L. R., Demaree, R. J. and Wolf, G. 1993. Rwg: An assessment of within group interrater agreement. ***Journal of Applied Psychology***, 78:306-309.

Klein, G., Wiggins, S., & Dominguez, C. O. 2010. Team sensemaking. ***Theoretical Issues in Ergonomics Science***, 11(4): 304-320.

Kozlowski, S. W. J., & Bell, B. S. 2003. Work groups and teams in organizations. In W.C. Borman, D.R. Ilgen, & R.J. Klimoski (Eds.), ***Handbook of psychology: Vol. 12. Industrial and organizational psychology*** (pp. 333–375). London: Wiley.

Kozlowski, S. W., & Ilgen, D. R. 2006. Enhancing the effectiveness of work groups and teams. ***Psychological Science in the Public Interest***, 7(3): 77–124.

Kozlowski, S. W. J., Watola, D. J., Jensen, J. M., Kim, B. H., & Botero, I. C. 2009. Developing adaptive teams: A theory of dynamic team leadership. In E. Salas, G. F. Goodwin, & C. S. Burke (Eds.). ***Team effectiveness in complex organizations: Cross-disciplinary perspectives and approaches*** (pp. 113–155). New York, NY: Routledge/ Taylor & Francis Group.

Lance, C. E., Butts, M. M., & Michels, L. C. 2006. The source of four commonly reported cutoff criteria. ***Organizational Research Methods***, 9: 202–220.

Lei, Z., Waller, M. J., Hagen, J., Kaplan, S. 2016. Team adaptiveness in dynamic contexts: Contextualizing the roles of interaction patterns and in-process planning. ***Group & Organization Management***, 41(4): 491-525.

Mathieu, J. E., Maynard, M. T., Rapp, T., & Gilson, L. L. 2008. Team effectiveness 1997-2007: A review of recent advancements and a glimpse into the future. ***Journal of Management***, 34: 410-476.

Marks, M. A., Mathieu, J. E., & Zaccaro, S.J. 2001. A temporally based framework and taxonomy of team processes. ***Academy of Management Review***, 26(3): 356-376.

Marks, M. A., Zaccaro, S. J., & Mathieu, J. E. 2000. Performance implications of leader briefings and team-interaction training for team adaptation to novel environments. ***Journal of Applied Psychology***, 85:971–86.

Marques-Quinteiro, P., Ramos-Villagrasa, P. J., Passos, A. M., & Curral, L. 2015. Measuring adaptive performance in individuals and teams. ***Team Performance Management: An International Journal***, 21(7/8): 339–360.

Maynard, M. T., Kennedy, D. M., & Sommer, S. A. 2015. Team adaptation: A fifteen-year synthesis (1998–2013) and framework for how this literature needs to ‘‘adapt” going forward. ***European Journal of Work and Organizational Psychology***, 24: 652–677.

McGrath, J. E. 1964. ***Social psychology: A brief introduction***. New York: Holt, Rinehart & Winston.

Morgan, G. 1986. ***Images of organization***. Newbury Park, California: Sage.

Morgeson, F. P. 2005. The external leadership of self-managing teams: Intervening in the context of novel and disruptive events. ***Journal of Applied Psychology***, 90: 497-508.

Morgeson, F. P., DeRue, D. S., Karam, E. P. 2010. Leadership in teams: A functional approach to understanding leadership structures and processes. ***Journal of Management***, 36(1): 5-39.

O'Neill, T.A., & Salas, E. 2018. Creating high performance teamwork in organizations. ***Human Resource Management Review*** (in press).

Piña, M. I. D., Martínez, A. M. R., & Martínez, L. G. 2008. Teams in organizations: A review on team effectiveness. ***Team Performance Management: An International Journal***, 14(1/2): 7-21.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. 2003. Common method bias in behavioural research: A critical review of the literature and recommended remedies. ***Journal of Applied Psychology***, 88(5): 879-903.

Randall, K. R., Resick, C. J., & DeChurch, L. A. 2011. Building team adaptive capacity: The roles of sensegiving and team composition. ***Journal of Applied Psychology***, 96(3): 525-540.

Rosen, M. A., Bedwell, W. L., Wildman, J. L., Fritzsche, B. A., Salas, E., & Burke, C. S. 2011. Managing adaptive performance in teams: Guiding principles and behavioral markers for measurement. ***Human Resource Management Review***, 21: 107–122.

Salas, E., Burke, C. S., & Cannon-Bowers, J. A. 2000. Teamwork: Emerging principles. ***International Journal of Management Reviews***, 2: 339-356.

Salas, E., Cooke, N. J. & Rosen, M. A. 2008. On Teams, teamwork, and team performance: Discoveries and developments. ***Human Factors***, 50(3): 540-547.

Steiner, I. D. 1972. ***Group process and productivity***. New York: Academic Press.

Stout, R. J., Cannon-Bowers, J. A., Salas, E., & Milanovich, D. M. 1999. Planning, shared mental models, and coordinated performance: An empirical link is established. ***Human Factors***, 41: 61-71.

Tillmann, K., & Goddard, A. 2008. Strategic management accounting and sense-making in a multinational company. ***Management Accounting Research***, 19(1): 80-102.

Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. 2005. Organizing and the process of sensemaking. ***Organization Science***, 16(4): 409-421.

Weingart, L. R. 1992. Impact of group goals, task component complexity, effort, and planning on group performance. ***Journal of Applied Psychology***, 77: 682-693.

Weiss, M., & Hoegl, M. 2015. The history of teamwork's societal diffusion: A multi-method review. ***Small Group Research***, 46(6): 589-622.

Zaccaro, S. J., Banks, D., Kiechel-Koles, L., Kemp, C., & Bader, P. 2009. ***Leader and team adaptation: The influence and development of key attributes and processes***. Technical Report 1256, United States Army Research Institute for the Behavioral and Social Sciences.

Zaccaro, S. J., Rittman, A. L., & Marks, M. A. 2001. Team leadership. ***The Leadership Quarterly***, 12: 451-483.

Appendix

A.1 Items list per variable

Leader sense-giving

- The leader tells the team how events or situations the team is faced with should be interpreted.
- The leader tells the team how to understand events or situations.
- The leader explains the meaning of ambiguous events or situations to the team.
- The leader changes the way the team interprets events or situations the team is faced with.
- The leader alters the way the team thinks about events or situations the team is faced with.
- The leader modifies how the team thinks about events or situations the team is faced with

Leader promotion of team sense-making

- The leader encourages the team to collectively interpret things that happen to the team.
- The leader promotes team discussions about different perspectives of events or situations.
- The leader encourages team members to provide their individual viewpoint on events or situations.
- The leader promotes the development of a shared understanding of events or situations among the team member.
- The leader encourages the team to collectively make sense of ambiguous situations.
- The leader encourages the team members to look at events or situations the team is faced with from different perspectives.

Deliberate planning

- The team develops a clear plan prior to the beginning of the project.
- The team decides who would do what during the project.
- The team clarifies expectations about team members' roles

Contingency planning

- The team uses "if – then" logic in developing your plans.
- The team specifies alternative courses of action that would take effect if the initial plan didn't work
- The team communicates backup plans in advance.

Team adaptation

- We engage in creative action to solve problems for which there are no easy or strait forward answers.
- We find innovative ways to deal with unexpected events.
- We adjust and deal with unpredictable situations by shifting focus and taking reasonable action.
- We devise alternative plans in very short time, as a way to cope with new task demands.
- We search and develop new competences to deal with difficult situations/ problems.
- We adjust the personal style of each member to the team as a whole.
- We improve interpersonal relationships taking into account the needs and aspirations of each member.
- We maintain focus when dealing with multiple situations and responsibilities.

Team performance

- This team has a good performance.
- This team is effective.

A.2 Team members' questionnaire

SURVEY - CONSULTANTS

1. This survey is part of a research project carried out by a group of researchers from ISCTE-Instituto Universitário de Lisboa, focused on team effectiveness in the context of consultancy firms. The main objective of this project is to identify the factors related to teamwork that contribute to the effectiveness of the projects carried out by the organization and to the satisfaction of both the clients and the consultants themselves.
2. The data collected will be exclusively analyzed by the research team and anonymity will be guaranteed.
3. The questions are written in a way that you only have to point out the answer that seems most appropriate for you.
4. There is no right or wrong answers. We are only interested in your personal opinion.
5. For each question there is a scale. You can use any point on the scale as long as you consider it is appropriate.
6. Respond to the entire questionnaire without interruption.

For any clarification, or to receive additional information about the study please contact: Prof.ª Ana Margarida Passos (ana.passos@iscte-iul.pt).

Thanks for your collaboration!

To answer this questionnaire think about the consulting project you are currently involved in and the team you are working

1. The following questions attempt to describe **team behaviors**. Please indicate to what extent you agree with each of them using the response scale:

Totally disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Totally agree
1	2	3	4	5	6	7

1.	We engage in creative action to solve problems for which there are no easy or strait forward answers	1	2	3	4	5	6	7
2.	We find innovative ways to deal with unexpected events	1	2	3	4	5	6	7
3.	We adjust and deal with unpredictable situations by shifting focus and taking reasonable action	1	2	3	4	5	6	7
4.	We devise alternative plans in very short time, as a way to cope with new task demands	1	2	3	4	5	6	7
5.	We search and develop new competences to deal with difficult situations/ problems.	1	2	3	4	5	6	7
6.	We adjust the personal style of each member to the team as a whole	1	2	3	4	5	6	7
7.	We improve interpersonal relationships taking into account the needs and aspirations of each member.	1	2	3	4	5	6	7
8.	We maintain focus when dealing with multiple situations and responsibilities	1	2	3	4	5	6	7

2. The following statements relate to **feelings** that some teams have **about their work**. Please use the same scale as above.

1.	At our work, we feel bursting with energy	1	2	3	4	5	6	7
2.	At our job, we feel strong and vigorous	1	2	3	4	5	6	7
3.	We are enthusiastic about our job	1	2	3	4	5	6	7
4.	Our job inspires us	1	2	3	4	5	6	7
5.	When we arrive at work, we feel like starting to work	1	2	3	4	5	6	7
6.	We feel happy when we are working intensely	1	2	3	4	5	6	7
7.	We are proud of the work that we do in the organization.	1	2	3	4	5	6	7
8.	We are immersed in our work	1	2	3	4	5	6	7
9.	We get carried away when we are working	1	2	3	4	5	6	7

3. The following questions are related to how the **team manages their time**. Please use the same scale as above. In my team:

1.	We have the same opinions about meeting deadlines	1	2	3	4	5	6	7
2.	We have similar thoughts about the best way to use our time in our work	1	2	3	4	5	6	7
3.	We agree on how to allocate the time available	1	2	3	4	5	6	7
4.	We have similar ideas about the time it takes to perform certain tasks.	1	2	3	4	5	6	7

4. Considering **your team as a whole**, indicate to what extent it is heterogeneous (from 0 to 100%).

Very homogeneous	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Very heterogeneous

5. The following questions are related to how your team works as a group. Enter, please, **how often** each one of these situations occurs during your work. Please use the following rating scale:

Never	Very rarely	Rarely	Sometimes	Often	Very often	Always
1	2	3	4	5	6	7

1.	How much emotional conflict is there among members in your work team?	1	2	3	4	5	6	7
2.	How much friction is there among team members?	1	2	3	4	5	6	7
3.	How frequently are there conflicts about ideas in your work team?	1	2	3	4	5	6	7
4.	To what extent do team members disagree about time allocation in your work team (how much time to spend on tasks)?	1	2	3	4	5	6	7
5.	To what extent are there differences of opinion in your work team	1	2	3	4	5	6	7
6.	How often do people in your team disagree about opinions regarding the work being done?	1	2	3	4	5	6	7
7.	To what extent are there disagreements about how long to spend on specific tasks in your team?	1	2	3	4	5	6	7
8.	How much are personality conflicts evident in your work team?	1	2	3	4	5	6	7
9.	To what extent is there is conflict about how you should pace task activities in your team?	1	2	3	4	5	6	7

6. Based on the **knowledge you have of your team**, indicate to what extent you agree with each of the following statements. Please use the following rating scale:

Totally disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Totally agree
1	2	3	4	5	6	7

1.	My team focuses on preventing negative events	1	2	3	4	5	6	7
2.	My team typically focuses on the success we hope to achieve in the future	1	2	3	4	5	6	7
3.	My team often worries that we will fail to accomplish our goals	1	2	3	4	5	6	7
4.	We are more oriented toward achieving gains than toward preventing losses	1	2	3	4	5	6	7
5.	We are a team that is primarily striving to fulfill our duties, responsibilities and obligations.	1	2	3	4	5	6	7
6.	We are a team that is primarily striving to fulfill our hopes, wishes and aspirations	1	2	3	4	5	6	7

7. Think now about **how your team works**. Please indicate to what extent you agree with each of the following statements. Please continue to use the same rating scale.

1.	We regularly discuss whether the team is working effectively together.	1	2	3	4	5	6	7
2.	We modify our objectives in the light of changing circumstances	1	2	3	4	5	6	7
3.	The methods used by the team to get the job done are often discussed.	1	2	3	4	5	6	7
4.	The team often reviews its objectives	1	2	3	4	5	6	7
5.	This team often reviews its approach to problems.	1	2	3	4	5	6	7

8. Please think about the **outcomes of your team's work**. Please continue to use the same rating scale.

6.	My team has a good performance.	1	2	3	4	5	6	7
7.	We are satisfied in working in this team.	1	2	3	4	5	6	7
8.	My team is effective.	1	2	3	4	5	6	7
9.	I would not hesitate to work with this team on other projects.	1	2	3	4	5	6	7
10.	This team could work well on future projects.	1	2	3	4	5	6	7

9. The following questions concern **the way your team works**. Please indicate to what extent you agree or disagree with each of them. Please continue to use the same rating scale.

11.	We, as a team, jointly interpret events or situations we are faced with	1	2	3	4	5	6	7
12.	In our team we express and reconcile conflicting views on events or situations we are faced with.	1	2	3	4	5	6	7
13.	We, as a team, develop a complete understanding of events or situations we are faced with.	1	2	3	4	5	6	7
14.	In our team we aim to achieve a full and clear understanding of events or situations we are faced with.	1	2	3	4	5	6	7
15.	We, as a team, collectively make sense of ambiguous situations.	1	2	3	4	5	6	7
16.	We, as a team discuss different perspectives on how to understand events or situations we are faced with.	1	2	3	4	5	6	7
17.	We, as a team try to ensure that we have a similar understanding of events or situations we are faced with.	1	2	3	4	5	6	7
18.	We as a team encourage each other to look at events or situations we are faced with from different perspectives.	1	2	3	4	5	6	7

10. The questions below relate to how your **team plans the work**. Please use the following rating scale:

Totally disagree	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**	**Totally agree**
1	2	3	4	5	6	7

To what extent did your team carry out the following?:

1.	Develops a clear plan prior to the beginning of the project.	1	2	3	4	5	6	7
2.	Decides who would do what during the project.	1	2	3	4	5	6	7
3.	Clarifies expectations about team members' roles	1	2	3	4	5	6	7
4.	Uses "if – then" logic in developing your plans..	1	2	3	4	5	6	7
5.	Specifies alternative courses of action that would take effect if the initial plan didn't work	1	2	3	4	5	6	7
6.	Communicates backup plans in advance.	1	2	3	4	5	6	7
7.	Effectively makes needed adjustments to the initial plan	1	2	3	4	5	6	7
8.	Redistributes tasks among team members as needed.	1	2	3	4	5	6	7
9.	Smoothly synchronizes joint actions	1	2	3	4	5	6	7
10.	Combines individual efforts toward team's goals	1	2	3	4	5	6	7
11.	Effectively coordinates member actions	1	2	3	4	5	6	7

11. Think about work done by the team during the project (e.g., analysis of results, contact among members, meetings, etc.). Indicate the percentage (%) of **time your team communicated** in the last week through the different methods. The sum of the four methods of communication should correspond to 100%.

1.	Face to face.	
2.	Audio communication over the phone or other devices over the Internet.	
3.	Visual communication via Skype or other online platforms.	
4.	E-mail	
		100%

12. Think about your **leader and his/her leadership behaviors**. Indicate to what extent you agree with each of the statements. Please use the following rating scale:

Totally disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Totally agree
1	2	3	4	5	6	7

The leader…

1.	Reviews relevant performance results with the team.	1	2	3	4	5	6	7
2.	Monitors team and team member performance	1	2	3	4	5	6	7
3.	Tells the team how events or situations the team is faced with should be interpreted.	1	2	3	4	5	6	7
4.	Tells the team how to understand events or situations.	1	2	3	4	5	6	7
5.	Explains the meaning of ambiguous events or situations to the team.	1	2	3	4	5	6	7
6.	Provides positive feedback when the team performs well	1	2	3	4	5	6	7
7.	Contributes with concrete ideas to improve team performance.	1	2	3	4	5	6	7
8.	Notices flaws in task procedures or team outputs.	1	2	3	4	5	6	7
9.	Communicates what is expected of the team.	1	2	3	4	5	6	7
10.	Participates in problem solving with the team	1	2	3	4	5	6	7
11.	Ensures that the team has clear performance goals..	1	2	3	4	5	6	7
12.	Encourages the team to collectively interpret things that happen to the team.	1	2	3	4	5	6	7
13.	Promotes team discussions about different perspectives of events or situations..	1	2	3	4	5	6	7
14.	Encourages team members to provide their individual viewpoint on events or situations.	1	2	3	4	5	6	7
15.	Promotes the development of a shared understanding of events or situations among the team member.	1	2	3	4	5	6	7
16.	Encourages the team to collectively make sense of ambiguous situations.	1	2	3	4	5	6	7
17.	Encourages the team members to look at events or situations the team is faced with from different perspectives.	1	2	3	4	5	6	7
18.	Changes the way the team interprets events or situations the team is faced with.	1	2	3	4	5	6	7
19.	Alters the way the team thinks about events or situations the team is faced with.	1	2	3	4	5	6	7
20.	Modifies how the team thinks about events or situations the team is faced with.	1	2	3	4	5	6	7

13. Think now about your **leader behaviors**. Indicate to what extent you agree or disagree with each statement. Please, use the following rating scale:

Totally disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Totally agree
1	2	3	4	5	6	7

1.	The leader tends to be softer when he/she realizes that a team member is going through a difficult situation.	1	2	3	4	5	6	7
2.	The leader is not always completely honest with us to avoid complicated or unpleasant situations in the team.	1	2	3	4	5	6	7
3.	For the leader it is important that the team likes him/her even if for that he/she is not totally realistic in the feedback it gives to the team.	1	2	3	4	5	6	7
4.	The leader believes that negative feedback, even if appropriate, tends to discourage the team.	1	2	3	4	5	6	7

14. Think of **how your team members work with each other** to carry out the projects in which they are involved. Please continue to use the same rating scale.
Some members of my team:

1.	Defer responsibilities they should assume to other team member.	1	2	3	4	5	6	7
2.	Puts forth less effort on the job when other team members are around to do the work.	1	2	3	4	5	6	7
3.	Do not do their part of the work.	1	2	3	4	5	6	7
4.	Puts forth less effort than other members of the team.	1	2	3	4	5	6	7
5.	If they have the opportunity, they leave the job for another member to finish.	1	2	3	4	5	6	7
6.	They prefer to look like they do than to really do it.	1	2	3	4	5	6	7

15. Think of **teams in general**. Please continue to use the same rating scale.

1.	I believe that team diversity is a key aspect to increasing performance.	1	2	3	4	5	6	7
2.	Belonging to a heterogeneous team can be the key for success.	1	2	3	4	5	6	7
3.	I think teams work better if team members are similar to each other.	1	2	3	4	5	6	7
4.	I think teams perform better on tasks if team members are similar to each other.	1	2	3	4	5	6	7

16. Think now about **how you behave**. Please indicate how much you agree or disagree with each of the statements. Please use the same rating scale.

1.	I can communicate one idea in many different ways.	1	2	3	4	5	6	7
2.	I can find workable solutions to seemingly unsolvable problems.	1	2	3	4	5	6	7
3.	I have the self-confidence necessary to try different ways of behaving.	1	2	3	4	5	6	7

17. In most situations, my team **leader** when **giving feedback is**:…

1.	Unfair	1	2	3	4	5	6	7	Fair
2.	False	1	2	3	4	5	6	7	True
3.	Negative	1	2	3	4	5	6	7	Positive

Finally, we would like to ask some socio-demographic data, essential to data analysis:

1.Sex: ☐Male ☐ Female **2. Age:** _____ years

3. Job function in the organization: _____

4. How long have you been working in this organization?

☐ Less than 1 year ☐ 1 to 3 years ☐ 3 to 5 years ☐ 5 to 7 years ☐ More than 7 years

5. Number of people who work on your team: _____

THANK YOU VERY MUCH FOR YOUR PARTICIPATION!

A.3 Leaders' questionnaire

SURVEY - LEADER

1. This survey is part of a research project carried out by a group of researchers from ISCTE-Instituto Universitário de Lisboa, focused on team effectiveness in the context of consultancy firms. The main objective of this project is to identify the factors related to teamwork that contribute to the effectiveness of the projects carried out by the organization and to the satisfaction of both the clients and the consultants themselves.
2. The data collected will be exclusively analyzed by the research team and anonymity will be guaranteed.
3. The questions are written in a way that you only have to point out the answer that seems most appropriate for you.
4. There is no right or wrong answers. We are only interested in your personal opinion.
5. For each question there is a scale. You can use any point on the scale as long as you consider it is appropriate.
6. Respond to the entire questionnaire without interruption.

For any clarification, or to receive additional information about the study please contact: Prof.ª Ana Margarida Passos (ana.passos@iscte-iul.pt).

Thanks for your collaboration!

To answer this questionnaire think about the TEAM and the specific project you are leading

1. The following questions describe team's behaviors. Please indicate to what extent you agree with each of them using the following rating scale:

Totally disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Totally agree
1	2	3	4	5	6	7

1.	This team has a good performance.	1	2	3	4	5	6	7
2.	Members are satisfied in working in this team..	1	2	3	4	5	6	7
3.	This team is effective.	1	2	3	4	5	6	7
4.	I would not hesitate to work with this team on other projects.	1	2	3	4	5	6	7
5.	This team could work well on future projects.	1	2	3	4	5	6	7

2. Think about **your behavior as a team leader**. Please use the same rating scale.

1.	Review relevant performance results with the team.	1	2	3	4	5	6	7
2.	Monitors team and team member performance	1	2	3	4	5	6	7
3.	Tells the team how events or situations the team is faced with should be interpreted.	1	2	3	4	5	6	7
4.	Tells the team how to understand events or situations.	1	2	3	4	5	6	7
5.	Explains the meaning of ambiguous events or situations to the team.	1	2	3	4	5	6	7
6.	Provides positive feedback when the team performs well	1	2	3	4	5	6	7
7.	Contribute with concrete ideas to improve team performance.	1	2	3	4	5	6	7
8.	Notices flaws in task procedures or team outputs.	1	2	3	4	5	6	7
9.	Communicates what is expected of the team.	1	2	3	4	5	6	7
10.	Participates in problem solving with the team	1	2	3	4	5	6	7
11.	Ensures that the team has clear performance goals..	1	2	3	4	5	6	7
12.	Encourages the team to collectively interpret things that happen to the team.	1	2	3	4	5	6	7
13.	Promotes team discussions about different perspectives of events or situations..	1	2	3	4	5	6	7
14.	Encourages team members to provide their individual viewpoint on events or situations.	1	2	3	4	5	6	7
15.	Promotes the development of a shared understanding of events or situations among the team member.	1	2	3	4	5	6	7
16.	Encourages the team to collectively make sense of ambiguous situations.	1	2	3	4	5	6	7
17.	Encourages the team members to look at events or situations the team is faced with from different perspectives.	1	2	3	4	5	6	7
18.	Changes the way the team interprets events or situations the team is faced with.	1	2	3	4	5	6	7
19.	Alters the way the team thinks about events or situations the team is faced with.	1	2	3	4	5	6	7
20.	Modifies how the team thinks about events or situations the team is faced with.	1	2	3	4	5	6	7

3. Think about **how you interact with the team and how you communicate** with the team members. Please indicate to what extent you agree or disagree with each statement using the following rating scale:

Totally disagree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Totally agree
1	2	3	4	5	6	7

1.	I tend to be softer when I realize that a team member is going through a difficult situation.	1	2	3	4	5	6	7
2.	I am not always completely honest with team members to avoid complicated or unpleasant situations in the team.	1	2	3	4	5	6	7
3.	For me it is important that the team likes me even if for that I'm not totally realistic in the feedback I gives to the team.	1	2	3	4	5	6	7
4.	I believe that negative feedback, even if appropriate, tends to discourage the team.	1	2	3	4	5	6	7

Finally, we would like to ask some socio-demographic data, essential to data analysis:

1.Sex: ☐Male ☐ Female **2. Age:** _____ years

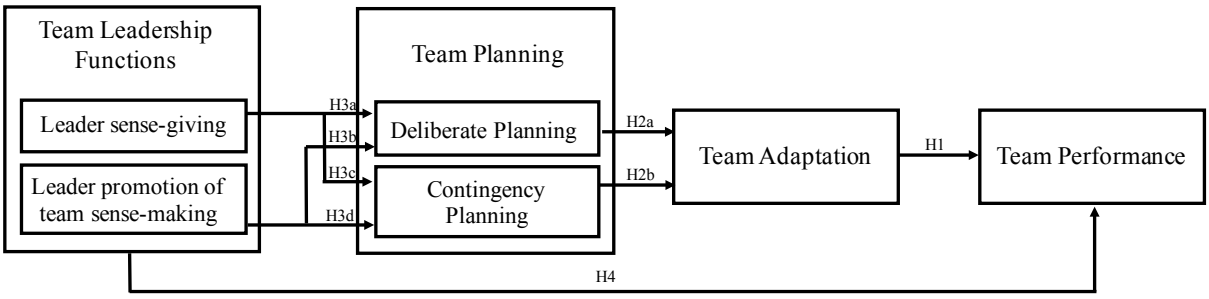
3. Job function in the organization: _____

4. How long have you been working in this organization?

☐ Less than 1 year ☐ 1 to 3 years ☐ 3 to 5 years ☐ 5 to 7 years ☐ More than 7 years

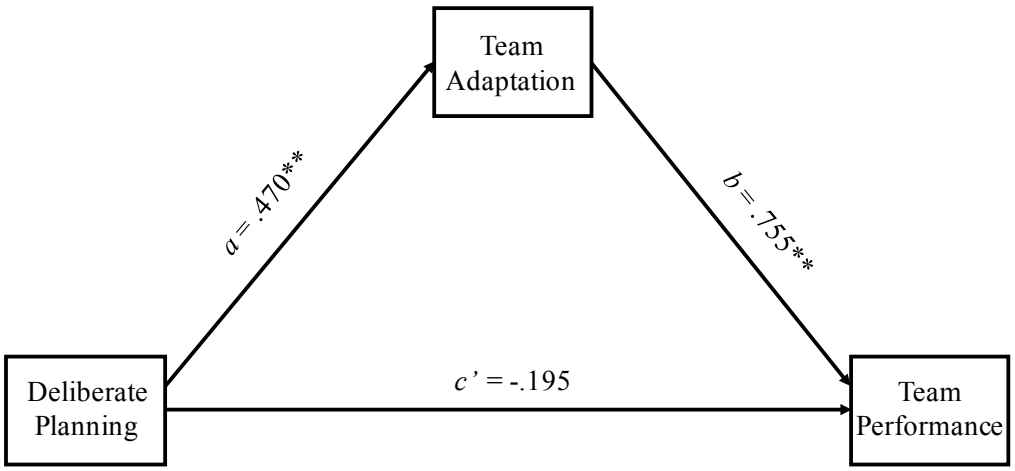
THANK YOU VERY MUCH FOR YOUR PARTICIPATION!

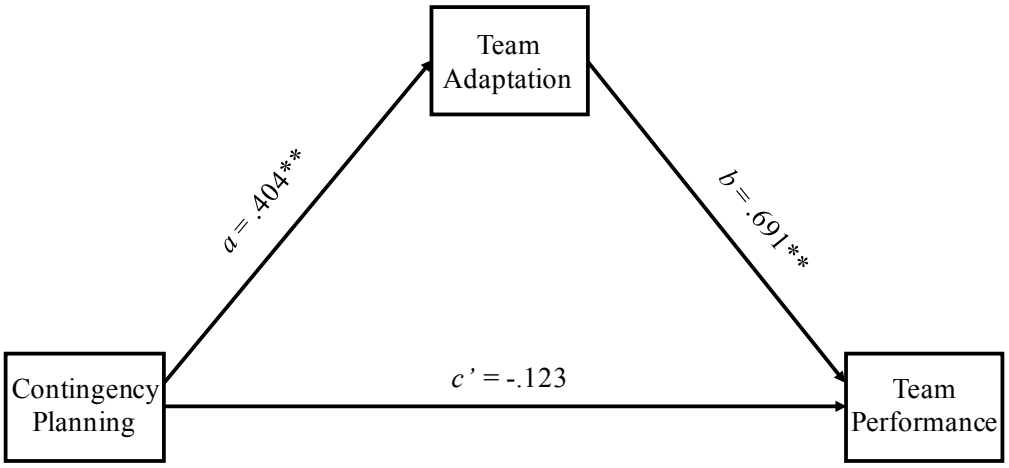
A.4 Conceptual diagram



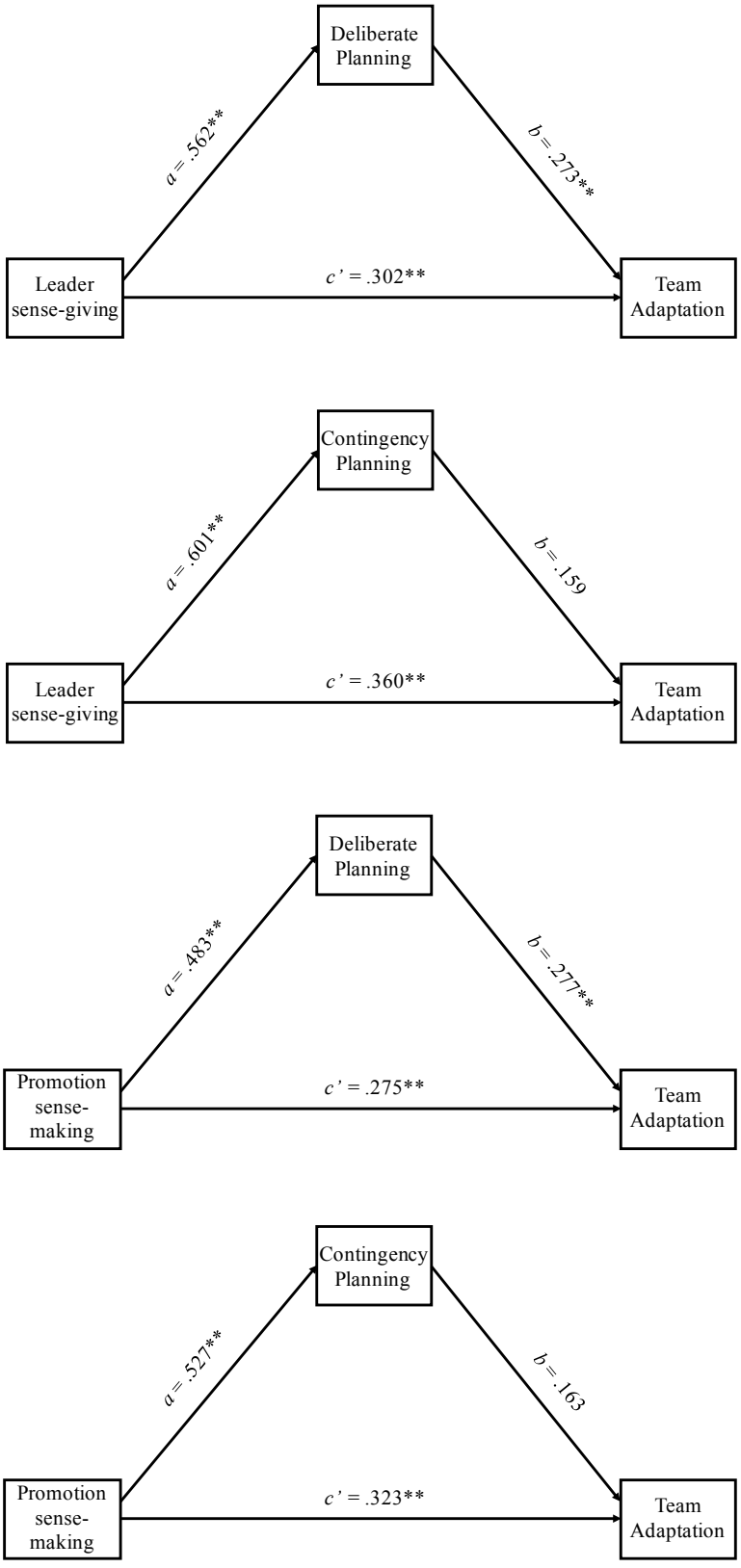
A.5 Statistical Diagrams

A.5.1 Statistical diagrams of Hypothesis 2





A.5.2 Statistical diagrams of Hypothesis 3



A.5.3 Statistical diagrams of Hypothesis 4