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The mediation role of situational awareness in the relationship between functional leadership and adaptive team performance

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Master in Human Resources Management and Organizational Consulting

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Departamento de Recursos Humanos e Comportamento Organizacional

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Abstract

In today's dynamic and unpredictable organizational landscape, the ability of teams to adapt effectively has become essential for maintaining performance and competitiveness. Functional leadership has emerged as a critical enabler of team adaptation, particularly through its emphasis on diagnosing team needs and guiding responses to change. This study explores how two key leadership concepts, such as sensegiving and sensemaking, relate to adaptive team performance, considering situational awareness as a potential mediating cognitive emergent state. Drawing on theories of leadership and cognitive states, this study proposes and tests a mediation model in which situational awareness connects functional leadership behaviours to team adaptation. Based on data collected from 31 organizational teams across different sectors, results reveal that although sensegiving and sensemaking enhance situational awareness, this cognitive state does not fully mediate their relationship with adaptive team performance. Nevertheless, team members perceive stronger associations between leadership, situational awareness, and adaptation than leaders themselves. These findings offer important insights into how leadership practices can influence emergent cognitive states and drive team adaptation in complex environments.

Keywords

Functional leadership; sensegiving; sensemaking; situational awareness; team adaptation; adaptive team performance

JEL Classification

D23 – Organizational Behaviour, **O15** – Human Resources

Resumo

No atual panorama organizacional dinâmico e imprevisível, a capacidade das equipas se adaptarem de forma eficaz tornou-se essencial para manter o desempenho e a competitividade. Assim, a liderança funcional emergiu como um fator crucial para a adaptação das equipas, especialmente pelo seu foco no diagnóstico das necessidades da equipa e na orientação das respostas à mudança. Este estudo explora de que forma dois conceitos-chave da liderança, como o *sensegiving* e o *sensemaking*, se relacionam com o desempenho adaptativo das equipas, considerando a consciência situacional como um estado cognitivo emergente com uma possível função mediadora. Com base em teorias de liderança e de estados cognitivos, este estudo propõe e testa um modelo de mediação em que a consciência situacional liga os comportamentos da liderança funcional à adaptação da equipa. Com base em dados recolhidos de 31 equipas organizacionais de diferentes setores, os resultados revelam que, embora o *sensegiving* e o *sensemaking* aumentem a consciência situacional, este estado cognitivo não medeia totalmente a sua relação com o desempenho adaptativo de equipas. Ainda assim, os membros das equipas percecionam relações mais fortes entre liderança, consciência situacional e adaptação do que os próprios líderes. Estes resultados oferecem contributos importantes para a compreensão de como as práticas de liderança podem influenciar estados cognitivos emergentes e potenciar a adaptabilidade das equipas em ambientes complexos.

Keywords

Functional leadership; *sensegiving*; *sensemaking*; situational awareness; team adaptation; adaptive team performance

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1 Introduction

Teams are increasingly required to address complex and dynamic challenges within the current rapidly changing organizational environment. As Kozlowski and Ilgen (2006) emphasize, teams have become the cornerstone of modern organizations, bringing together diverse expertise to achieve shared goals. However, in adaptive contexts, teams depend on their capacity to embrace change and align their processes with shifting environmental demands to effectively perform (Salas, Cooke, & Rosen, 2008). Therefore, organizations are increasingly oriented towards the importance of team processes and acknowledge their dependence on them, which has led to a growing focus on identifying the factors that contribute to adaptive team performance, a crucial element for organizational success.

In contemporary academic and organizational contexts, leadership is increasingly recognized as a key solution for enhancing team processes and ensuring effectiveness (Day, 2001). This way, leadership plays a critical role in fostering team adaptation, particularly in environments characterized by uncertainty and sudden change (Uhl-Bien & Arena, 2018). While there are various leadership styles, for the purposes of adaptation, a more flexible approach is necessary, where processes, learning, communication and team dynamics can be enhanced (Yukl & Mahsud, 2010). According to that concept, this study focuses on functional leadership theory, which highlights the importance of diagnosing team needs and implementing strategies to improve performance. As outlined by Zaccaro, Rittman, and Marks (2001), within this framework, leader sensegiving and sensemaking are essential. Sensegiving involves providing clear guidance and interpretations to help teams navigate challenges, while sensemaking facilitates collective understanding and problem-solving (Morgeson, DeRue, & Karam, 2010; Weick, Sutcliffe, & Obstfeld, 2005). These processes enable teams to align their actions with situational demands, laying the foundation for effective adaptation.

While leadership is essential for fostering team adaptation, it is equally crucial to consider the cognitive processes and states that are related to this adaptation. Since teams are composed of individuals and leadership is dependent on people, the cognitive processes and states of each team member become critical. These mental processes, such as perception, decision-making and problem-solving are vital for navigating complex and dynamic environments. In this context, situational awareness is an emergent cognitive state and can play a key role, because it allows teams to perceive, comprehend and anticipate changes in their environment, thus enabling them to adapt effectively (Endsley, 1995). Situational awareness is crucial for recognizing potential challenges and adjusting strategies as necessary (Burke, Stagl, Salas, et al., 2006). Despite its importance, how functional leadership fosters situational awareness and shapes adaptive team performance remains unclear, yet clarifying these cognitive states is key to understanding team adaptation in dynamic environments.

Consequently, the study looks at how functional leadership and cognitive states impact a team's ability to adapt. It specifically explores how situational awareness affects the link between functional leadership and team performance, providing insights into the cognitive factors that drive successful team adaptation. Therefore, this research seeks to answer the question: *"To what extent do cognitive states and processes, such as situational awareness, act as a mediator in the relationship between functional leadership and adaptive team performance?"*. This question is particularly relevant in today's volatile and uncertain organizational contexts, where the ability to adapt is a key driver of success. Understanding these relationships will provide valuable insights for leaders aiming to enhance their teams' adaptation, offering practical strategies to foster situational awareness and drive adaptive team performance in dynamic conditions (Endsley, 1995; Uhl-Bien, Marion, & McKelvey, 2007).

Following the research question, this study has several key objectives, such as firstly understanding the mechanisms and components of functional leadership in teams, focusing on how leaders diagnose needs and guiding adaptive processes. Also, it seeks to build a theoretical connection between functional leadership and situational awareness, exploring how this cognitive state is promoted within teams. Therefore, it will be crucial to define the importance of situational awareness in influencing team performance and examine how leaders foster this team emergent state. Additionally, the study will investigate the mediating role of situational awareness in the relationship between functional leadership and adaptive team performance, while also aiming to empirically demonstrate these connections across different organizational contexts, providing robust evidence of how leadership and cognitive states interact to drive adaptation. Finally, the research will propose new questions about functional leadership and its impact on adaptive performance and cognitive states, setting the stage for future research.

To achieve these objectives, the dissertation is structured to provide a comprehensive exploration of the topic. Following this introduction, the literature review will delve into the theoretical foundations of functional leadership, situational awareness, and adaptive team performance, highlighting key studies and concepts. The conceptual model and research hypotheses will be presented to outline the proposed relationships between these variables. Consequently, the methodology section will describe the quantitative approach and procedures used for data collection and analysis. The results section will present the findings, while the discussion will interpret them in the context of existing research. Finally, the conclusion will summarize the study's contributions, note its limitations, and offer recommendations for future research. This study's insights aim to deepen understanding of how functional leadership and cognitive processes drive adaptive team performance, offering a framework to improve leadership and enhance team adaptation in dynamic organizational settings.

2 Literature Review

2.1 Challenges and Pressures in Modern Team Dynamics

Constant change and high complexity are key components that perfectly describe the landscape in which teams perform today. Nowadays, organizations are operating in environments characterized by volatility, uncertainty, complexity and ambiguity (VUCA), where quick responses and adaptation are crucial (Bennett & Lemoine, 2014). This way, it is not enough to have high levels of performance and innovation, but it is also required that teams are able to make fast decisions and adjust strategies with limited information. (Christian et al., 2017).

As competition intensifies globally, teams are under pressure not only to perform routine tasks efficiently but also to be highly creative and adaptable. That's why the need for constant innovation is especially pronounced in competitive Red Ocean markets, where teams must continually differentiate themselves to stay ahead. Conversely, in Blue Ocean markets, where new opportunities are emerging, teams are expected to anticipate and shape these opportunities through creative and proactive strategies (Kim & Mauborgne, 2005). In both cases, the pressure to deliver high-quality results in a timely manner while maintaining adaptation is ever-present (Zaccaro et al., 2001).

Moreover, the market demand more than just technical proficiency but also collaborative problem-solving skills, so teams are facing an increase in complexity of tasks. This way, teams must often integrate diverse perspectives, extend their knowledge on diverse areas multidisciplinary problems (Kozlowski & Ilgen, 2006). However, complexity is not a single factor, because there are other constraints such as time management and the need for quick adaptations, that demand a strong cognitive response from team members. According to Marks, Mathieu and Zaccaro (2001), teams must balance planning, flexibility and swift decision-making to ensure success in these dynamic environments.

Organizational success can be impacted by the pressure to innovate and the need to constantly adjust to new challenges, because it creates a high-stakes environment where team performance affects that success. In this manner, teams are expected to operate at the forefront of innovation, whether by adapting to new technologies, responding to changes in market demand or navigating unforeseen crises. This combination of rapid change, constant pressure and the need for high-level performance forces teams to rethink traditional approaches to collaboration and problem-solving.

Consequently, this evolution in the organizational needs, especially the need in adaptation, makes leadership to become increasingly crucial. As teams face complex challenges that require both innovation and efficiency, leaders must create an environment that supports quick decision-making, fosters creativity and encourages collaboration under pressure. Therefore,

leadership must not only be responsive to change but also proactive in guiding teams through uncertainty to face the dynamics and expectations placed on those teams.

2.2 Functional Leadership

Functional leadership theory emerged as a practical framework to address the increasing complexity and dynamism of modern organizational environments. Developed by Zaccaro, Rittman, and Marks (2001), this theory emphasizes the leader's role in ensuring team effectiveness by addressing specific needs as they arise. Unlike traditional leadership models, which often centre on leader traits or individual styles, functional leadership prioritizes what leaders do to facilitate team processes, manage resources and navigate challenges. This perspective is especially pertinent to current environments, where uncertainty and ambiguity require leaders to adopt a flexible and proactive approach.

A central aspect of functional leadership is its focus on adaptation, where leaders operating within this framework rather than following strict rules or procedures, they customize their approach to fit the specific needs of each situation. (Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006). This way, leaders can balance both practical tasks, like streamlining processes and emotional needs, like building strong relationships, because of this adaptation capacity. By understanding the unique challenges of each team member and the overall team dynamic, functional leaders create a supportive environment where everyone can thrive.

The theory also emphasizes the importance of diagnosing performance gaps and addressing them promptly. Functional leaders are expected to monitor team dynamics, identify barriers to success and implement timely interventions to resolve issues before they escalate. Zaccaro (2001) argue that this diagnostic ability is one of the most critical aspects of functional leadership, as it ensures that teams maintain focus and cohesion, particularly in high-stakes scenarios. Morgeson (2005) expands on this idea, highlighting the role of leaders as intermediaries who connect teams to external resources and information necessary for adaptation.

Functional leadership framework integrates the concepts of sensegiving and sensemaking, particularly in environments characterized by complexity and rapid change. Sensegiving refers to the process by which leaders frame situations, providing team members with a coherent narrative or framework to interpret ambiguous circumstances (Gioia & Chittipeddi, 1991). Leaders help team members focus on relevant priorities and navigate uncertainty more effectively, by offering clarity and direction. Morgeson (2005) emphasizes that sensegiving is essential when teams face novel challenges, as it reduces confusion and fosters alignment across team members.

In contrast, sensemaking is a collaborative process that involves the team collectively interpreting and understanding their environment. As Weick (1995) describe, this concept

highlights the importance of team-wide engagement in constructing a shared understanding of the situation. Sensemaking requires an active participation from all team members to integrate different perspectives, refine interpretations and develop actionable strategies. Morgeson, DeRue and Karam (2010) argue that effective sensemaking strengthens a team's capacity to adapt by ensuring that all members operate with a consistent understanding of their objectives and challenges.

The relationship between sensegiving and sensemaking shows the collaborative nature of functional leadership, where leaders initiate the process by providing clarity through sensegiving, framing the situation in ways that align with organizational goals. The team then engages in sensemaking, collaboratively refining this framework and adjusting strategies as necessary. This dynamic interaction ensures that teams are not only reactive but also proactive, able to anticipate and respond effectively to changes in their environment. As Morgeson (2010) note, leaders who facilitate both processes create teams that are more cohesive, adaptable and resilient.

Recent empirical work by Passos, Sinval, Guedes, Santos, and Uitdewilligen (2019) has offered a significant definition of the concept of sensemaking within the functional leadership framework by differentiating it into two distinct but interrelated leadership functions, which are sensegiving and promotion of team sensemaking. This way, sensegiving refers to the leader's communication of their own interpretation of ambiguous or complex situations, effectively shaping how the team should understand and respond to environmental cues. On the other hand, promotion of team sensemaking involves actively encouraging team members to engage in the collective construction of meaning, which includes stimulating open dialogue, integrating of diverse perspectives, and guiding the team toward a shared understanding. The authors argue that previous conceptualizations, such as that of Morgeson (2010), conflate these two functions under the broader concept of sensemaking, overlooking their distinct behavioural mechanisms and implications. Importantly, the studies conducted by these authors demonstrate that both functions are independently associated with team performance. However, they also interact, where the positive impact of sensegiving on performance is significantly stronger when leaders simultaneously promote team sensemaking. Therefore, functional leadership is impacted by this distinction, as it suggests that leaders must go beyond simply offering interpretive clarity and create the conditions for team members to co-construct their understanding, which enhances adaptability, ownership, and cognitive alignment in dynamic settings.

A key strength of functional leadership lies in its ability to balance structure with creativity. While leaders provide frameworks through sensegiving, they must also foster an environment where team members feel empowered to contribute their ideas and challenge assumptions. This balance is particularly important in settings that demand both operational efficiency and

innovation. Burke et al. (2006) emphasize that leaders who encourage diverse perspectives within the sensemaking process enhance a team's ability to generate creative solutions, ultimately driving performance and adaptation.

In environments characterized by constant pressure and high levels of cognitive demand, functional leadership plays a critical role in maintaining team focus and coherence. Leaders help mitigate cognitive overload by prioritizing and streamlining information through effective sensegiving. Zaccaro et al. (2009) argue that this function is particularly valuable in fast-paced contexts, where excessive or irrelevant information can overwhelm team members and hinder decision-making. By guiding the team's attention to the most critical aspects of a situation, leaders ensure that resources and efforts are optimally directed.

Additionally, functional leadership is closely aligned with contemporary approaches to distributed leadership. Rather than centralizing decision-making authority, functional leaders recognize the value of shared leadership, allowing team members to take the lead when their expertise or perspective is most relevant. This approach not only enhances team adaptation but also fosters a sense of ownership and accountability among members. Morgeson et al. (2010) highlights that distributed leadership, facilitated by functional leaders, creates more resilient teams capable of navigating complex challenges collaboratively.

The integration of sensegiving and sensemaking within the functional leadership framework also emphasizes the importance of fostering a culture of continuous learning. Leaders who engage in these processes encourage reflection and open dialogue, enabling teams to adapt and refine their approaches as conditions evolve. Weick et al. (2005) highlight that sensemaking is inherently tied to organizational learning, as it allows teams to build on past experiences and apply insights to new challenges. This way, functional leaders, by facilitating these processes, ensure that teams remain agile and prepared to meet the demands of an ever-changing organizational landscape.

2.3 Situational Awareness

Situational awareness (SA) is a cognitive emergent state that enables individuals and teams to perceive, comprehend and anticipate changes in their environment. At first, it was an integrated approach in aviation or military (Endsley, 1995), as an approach to understand how to improve safety and decisions when a person or a group is under stress. In military structures, SA is one of the key concepts related to operational effectiveness as it helps personnel to detect hazards and to respond in an appropriate way during military operations (Tubbs, 2015). The best practices in SA have also been transferred to business organizations as they operate in more complex environments which the levels of uncertainty are like military operations.

Endsley (1995) SA theory consists of three progressive levels which are the perception, comprehension, and the projection. The perception is the first step where key aspects within

the environment are identified, the second stage being comprehension where the meaning of such perceptions is comprehended, and lastly the third stage of projection where anticipation for the next state is set. These rules form together what can be called a cycle of observing and adjusting which allows people to act rather than react and such relative movement is done in teams. Though traditionally SA was exposed to the cognition of a single individual, when it comes to teams, it is applicable because they operate on the notion of common SA whereby all the team members have an organic sense of the surrounding and act accordingly. (Salas et al., 2008). This awareness is fundamental to coordinate responses against dynamic and high-stakes scenarios.

In organizational contexts, SA serves as a foundation for effective teamwork and performance, that's why high-performing teams rely on SA to process complex information, prioritize tasks and adapt to changing demands. Therefore, SA guarantees that all team members are in agreement and able to take coordinated action by cultivating a common knowledge of objectives, resources, and difficulties (Salas et al., 2008). For instance, SA assists teams in seeing new opportunities and dangers in fast-paced sectors like technology and finance, enabling them to make proactive strategy adjustments rather than rushing to address emergencies.

The benefits of SA extend beyond task efficiency to include improved collaboration and communication within teams. Shared situational awareness, where all members have a consistent understanding of the team's objectives and environment, strengthens coordination and reduces errors caused by misalignment (Marks, Mathieu, & Zaccaro, 2001). This shared cognition promotes trust and clarity, creating an environment where team members can focus on their roles without ambiguity. In turn, this alignment enhances overall team performance, particularly in complex and high-pressure settings (Christian et al., 2017).

To foster SA within teams, leadership can play a crucial role, because leaders act as facilitators of SA by integrating information from various sources, identifying relevant patterns, and disseminating key insights to team members (Morgeson, DeRue, & Karam, 2010). Through effective communication, leaders enable their teams to develop a shared understanding of priorities and potential challenges. Sensegiving, a critical leadership function, aligns closely with SA by framing environmental information in ways that are accessible and actionable for team members (Gioia & Chittipeddi, 1991). Leaders who excel in sensegiving not only clarify current realities but also empower their teams to anticipate future scenarios.

In practice, SA enhances a team's ability to adapt to unexpected changes, whether those changes arise from internal dynamics or external market forces. For instance, during times of organizational restructuring, SA enables teams to navigate uncertainty by identifying which changes are critical and developing strategies to address them. Similarly, in customer-facing roles, SA helps teams anticipate client needs and adjust their approaches, accordingly,

improving satisfaction and outcomes. As González-Romá, Fortes-Ferreira, and Peiró (2009) note, teams with high levels of shared SA are better positioned to innovate and solve complex problems collaboratively.

Although SA has many advantages, it is not always easy to achieve in teams. The growth of SA may be delayed by obstacles such as conflicting priorities, confusing communication and information overload, which could result in delays or poor decision-making. By prioritizing important activities, promoting open communication and simplifying information flows, leaders can proactively overcome these obstacles. Since they allow teams to continuously improve their comprehension of their surroundings and modify their tactics, accordingly, structured debriefs and feedback loops are very useful in preserving SA (Zaccaro et al., 2009).

SA is particularly pertinent in settings like the contemporary business world that are marked by a high degree of uncertainty and rapid change. The growth of digital tools and data analytics has extended the availability of information but has also raised the complexity of screening and interpreting it. Leaders must balance the benefits of data-driven insights with the cognitive limits of their teams, ensuring that information is presented in a way that enhances rather than overwhelms their SA. This balance is a hallmark of functional leadership, which emphasizes addressing team needs while fostering autonomy and adaptation (Morgeson, 2005).

Finally, SA closes the gap between individual proficiency and group output. Shared SA guarantees that team members' efforts are coordinated and reinforce each other, even when each team member may be excellent in their own job. SA-focused leaders build teams that are not just productive but also flexible, able to handle uncertainty and seize new possibilities. This capacity is becoming more widely acknowledged as a key factor in success in intricate organizational settings where quick thinking and strategic planning are essential.

Although SA has been extensively studied in fields like aviation and the military, its application in organizational contexts remains relatively underexplored. This gap in the literature highlights the importance of examining SA in business settings, particularly in relation to its influence on leadership effectiveness and team outcomes. By investigating whether SA mediates the relationship between functional leadership and adaptive team performance, this study aims to contribute valuable insights into how this emergent state can drive positive results in dynamic environments.

2.4 Adaptive Team Performance

The ability of a team to adjust its behaviours, methods, and procedures in response to shifting work demands, dynamic environmental conditions, or unforeseen problems is known as adaptive team performance (Baard, Rench, & Kozlowski, 2014). In the context of more complex and uncertain organizational environments, this flexibility has become essential.

Compared to traditional performance, which is more focused on efficiency and consistency, adaptive performance emphasizes flexibility, resilience, and the ability to innovate in the face of change (Christian, Pearsall, & Long, 2017). Teams with high levels of adaptation may deal with disruptions, take advantage of new opportunities, and continue to be effective over time, claim Randall, Resick, and DeChurch (2011).

The IMOI model (Ilgen, Hollenbeck, Johnson, & Jundt, 2005) is frequently used to frame the fundamental concepts of adaptive team performance. According to Marks, Mathieu, and Zaccaro (2001), adaptation is viewed as a dynamic process that develops through ongoing cycles of input, action, reflection, and adjustment. Teams must be able to identify changes in their surroundings, comprehend the ramifications of those changes, and respond in concert to adapt effectively. Even when faced with unexpected obstacles, teams can continue to function effectively thanks to this iterative loop (Kozlowski & Bell, 2003). According to researchers, adaptive performance is better understood as a continuous process that involves behavioural changes and cognitive assessments, even though it is occasionally thought of as an outcome (Burke, Stagl, Salas, Pierce, & Kendall, 2006; Maynard, Kennedy, & Sommer, 2015).

In an attempt to consolidate the diverse perspectives on adaptive team performance, several models have been proposed. For example, Burke et al. (2006) developed a framework that identifies inputs such as individual traits, knowledge, and team structure as key determinants of adaptive capacity. These inputs interact with adaptive mechanisms, including action, transition, and interpersonal processes, to produce adaptive outcomes. Similarly, Christian et al. (2017) describe adaptation as an unfolding process in which factors associated with adaptability influence adaptive mechanisms, ultimately affecting team performance. The consistency of these frameworks highlights the importance of examining adaptive team performance not merely as a result but as a complex process shaped by various factors.

The work of Frick et al. (2018), who put out a heuristic model known as the Four R's of Team Adaptation: Recognize, Reframe, Respond, and Reflect, significantly advances our understanding of adaptive team performance. The cyclical nature of adaptation is expressed in this model, which begins with the identification of change cues, then involves redefining roles and goals, acting appropriately in response, and evaluating the results to guide future adaptations. This approach closely aligns with earlier models by Burke et al. (2006) and Rosen et al. (2011), emphasizing that successful adaptation requires ongoing environmental scanning, goal adjustment, performance monitoring, and learning.

Despite variations in terminology and conceptualization, most frameworks agree on the critical components of adaptive team performance. Effective adaptation relies on shared mental models, which enable team members to maintain a common understanding of tasks, roles, and processes (Mathieu, Maynard, Rapp, & Gilson, 2008). When teams share accurate mental models, they can coordinate more effectively and respond to changes with greater

speed and precision. Additionally, team learning behaviours, such as debriefing, feedback-seeking, and reflection, foster continuous improvement and enhance the team's ability to adapt over time (Ellis, Mendel, & Nir, 2006).

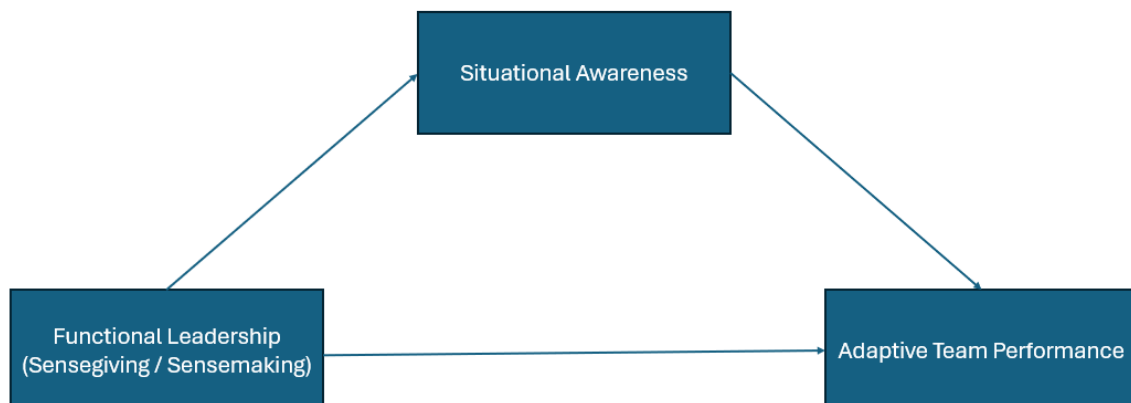
It is generally accepted that leadership plays a crucial role in promoting adaptive team performance. In order to assist teams in overcoming difficult obstacles, leaders who foster open communication, support teamwork, and offer unambiguous direction are essential (Zaccaro, Rittman, & Marks, 2001). According to Burke et al. (2006) and Morgeson, DeRue, and Karam (2010), functional leadership fosters an atmosphere of psychological safety and trust, which improves adaptive ability. It is centred on meeting team requirements and streamlining procedures. To help teams understand unclear situations and come up with suitable answers, effective leaders also use sensegiving (Gioia & Chittipeddi, 1991).

In this thesis, adaptive team performance is viewed as the team's capacity to modify behaviours and strategies dynamically in response to situational demands, as outlined by Baard, Rench, and Kozlowski (2014). This variable will be explored through its core elements, including the recognition of change cues, reframing of strategies, implementation of adaptive responses, and reflection on outcomes (Burke et al., 2006; Christian et al., 2017).

2.5 Conceptual Model and Hypothesis

The conceptual model for this thesis examines the relationships between functional leadership, situational awareness and adaptive team performance. This model proposes that functional leadership influences adaptive team performance, with situational awareness acting as a mediator.

The model can be visualized as follows:



Hypothesis 1 (H1): Situational awareness mediates the relationship between leader's sensegiving and adaptive team performance.

This hypothesis proposes that leaders promote adaptive team performance by shaping how team members interpret environmental complexity through sensegiving, which is a leadership behaviour characterized by the communication of a coherent interpretation of external events (Gioia & Chittipeddi, 1991). Through sensegiving, leaders reduce ambiguity by framing the situation in a way that aligns with team goals and environmental demands, guiding attention to critical cues and their meaning. As a result, team members are expected to develop an emergent cognitive state, which is situational awareness (Endsley, 1995), that refers to their shared understanding of what is happening in the environment and what it means for their performance. According to functional leadership theory (Morgeson, DeRue, & Karam, 2010), such framing helps teams better anticipate changes, align efforts, and respond proactively to disruption. Therefore, situational awareness operates as a mediating cognitive state that links the leader's sensegiving to improved adaptation. This mediation is expected to happen in both team-member and leader ratings of performance, as clarity of interpretation should lead to converging perceptions of effective adaptation (Christian et al., 2017).

Hypothesis 2 (H2): Situational awareness mediates the relationship between leader's promotion of team sensemaking and adaptive team performance.

This hypothesis suggests that leaders foster adaptive team performance by encouraging teams to collaboratively construct meaning around complex or changing conditions, defined as promotion of team sensemaking (Passos, Sinval, Guedes, Santos, & Uitdewilligen., 2019). Instead of offering predetermined interpretations, leaders encourage open discussion, the exchange of diverse viewpoints, and the interpretation of surroundings by both parties. According to Weick, Sutcliffe, and Obstfeld (2005), this dynamic method improves the team's situational awareness by encouraging a shared cognitive construction based on team member contributions rather than by providing top-down instruction. Such emergent awareness is essential for facilitating adaptability that is flexible, creative, and collaborative in dynamic environments. This perspective is supported by functional leadership theory, which holds that capable leaders enable groups to participate in meaning-making activities that promote self-control and responsiveness (Morgeson et al., 2010). Since more awareness facilitates improved decision-making and coordinated action, despite who assesses the results, this mediation effect is anticipated to appear in both self-reported and leader-rated performance, as with sensegiving.

3 Methodology

3.1 Sample

The sample included 31 teams, consisting of a total of 117 team members and 31 team leaders, resulting in 148 participants. These participants work in various sectors, including Finance, Consulting, HR, IT, Marketing, and Administration.

The team members represent 16 different nationalities, with the most prominent being Portuguese (30.9%), German (36%), and Dutch (13.8%). The gender distribution among team members is balanced, with 53% female and 45.3% male participants. In terms of tenure, 14.5% of team members have been with their company for more than 7 years, 7.7% have between 5 and 7 years of experience, 14.5% have between 3 and 5 years, 40.2% have between 1 and 3 years, and 21.4% have less than 1 year with their current employer.

The average team size is 4 members, with the smallest team consisting of 1 member and the largest comprising 8 members.

The team leaders also represent a diverse range of nationalities, with the most prominent being Portuguese (25.9%), German (32.3%), British (9.7%), and Dutch (12.9%). The gender distribution among team leaders is relatively balanced as well, with 51.6% female and 48.4% male participants. Regarding their tenure at the company, 45.2% of team leaders have been with their company for more than 7 years, 25.8% have between 5 and 7 years, 6.5% have between 3 and 5 years, and 22.6% have between 1 and 3 years.

3.2 Research Design and Procedure

The present study is part of a broader research project that examines the interplay between functional leadership, situational awareness and adaptive team performance in dynamic work environments. This project results from the collaboration between master's students and their academic supervisor, aiming to provide empirical insights into leadership and team cognition processes. The data was collected through online questionnaires, specifically designed for both team leaders and team members, and disseminated via professional networks and direct organizational contacts. Both questionnaires are detailed in the Annex B and C. Additionally, a cover letter was also prepared, signed by Professor Ana Margarida Passos, explaining the nature and objectives of the ongoing project.

Furthermore, this study employs a dual-questionnaire approach, with one questionnaire designed for team leaders and another for team members. This strategy enables the capture of complementary perspectives on leadership dynamics, fostering a more comprehensive and rigorous analysis of the relationships between functional leadership, situational awareness, and adaptive team performance. By collecting data from both viewpoints, the study enhances the reliability and validity of the results, minimizing potential biases associated with single-

source responses. The diversity of perspectives enriches the understanding of the examined phenomena, offering a more accurate depiction of team dynamics and revealing alignments or discrepancies in perceptions between leaders and team members. This methodology, successfully applied in previous research projects, strengthens the study's robustness and increases its relevance for investigating leadership and team performance in organizational contexts.

To minimize potential biases and ensure the robustness of the data collection process, the questionnaires were administered online over a period of six weeks, during December and January. Participants were invited to take part in the study through professional networks and organizational contacts, ensuring a diverse sample across different industries. Two distinct questionnaires were distributed: one tailored for team leaders and another for team members, allowing for a comprehensive analysis of leadership dynamics and team processes. Each participant completed the questionnaire individually, without influence from other team members, ensuring independent responses.

At the beginning of the questionnaire, an informed consent form was presented, guaranteeing confidentiality of the participants. Also, the participants were required to meet specific sampling criteria, which was being 18 years or older, currently employed, and working within a team composed of at least one member in addition to the team leader. This way, these criteria ensured that the collected data accurately reflected team-based work environments, reinforcing the study's validity in examining the interplay between functional leadership, situational awareness, and adaptive team performance.

3.3 Measures

To ensure the reliability of the measurement instruments employed in this study, internal consistency was assessed using Cronbach's alpha for all multi-item variables included in the survey. Cronbach's alpha is a widely recognized measure of internal consistency reliability, indicating the extent to which items within a scale are correlated and thus measure the same underlying construct (Cronbach, 1951; Tavakol & Dennick, 2011). This way, ensuring internal consistency is a critical step in validating the psychometric soundness of the instruments used, as it helps minimize measurement error and enhances the accuracy of any inferences drawn from the data.

In the context of behavioural and social sciences research, a Cronbach's alpha coefficient of .70 or above is generally considered to indicate acceptable reliability, while values above .80 are typically regarded as good, and those exceeding .90 suggest excellent internal consistency (Nunnally & Bernstein, 1994). In this study, all variables demonstrated acceptable to high internal consistency based on this criterion, as shown below in the variable

characterization. These results support the reliability of the data collected and reinforce the credibility of subsequent statistical analyses.

Leader Sensegiving (LSG) and Leader Promotion of Team Sensemaking (LSM)

Based on Morgeson, DeRue & Karam's team leadership review of 2010, we identified three items for Leader Sensegiving (LSG) and four items for Leader Promotion of Team Sensemaking (LSM), about which participants indicated how much they agreed on a 7-point Likert scale (from 1 = totally disagree to 7 = totally agree). This way, the list of items forming both variables is shown in Annex A. Both leaders and team members' questionnaires included LSG and LSM questions, but, for the purpose of our model, we used the team members' measures. For example, the LSG scale included items such as "Changes the way the team interprets events or situations the team is faced with," while the LSM scale included items like "Promotes team discussions about different perspectives of events or situations.". Moreover, internal consistency reliabilities for the LSG and LSM scales were .878 and .902, respectively.

Situational Awareness (SA)

Based on Endsley's (1995) conceptualization of Situational Awareness (SA), four items were identified to capture the team members' perception of their awareness of the situational context, including their understanding of current events and ability to anticipate future developments. Participants rated their agreement with these items on a 7-point Likert scale (from 1 = totally disagree to 7 = totally agree). Situational Awareness (SA) was measured only in the team members' questionnaires, with items including statements such as "We are well aware of the environment in which the project is being developed" and "We quickly identify changes that may influence our work.". A full list of the items is provided in Annex A. Additionally, the internal consistency reliability for the SA scale was .853.

Team Adaptation (TA or LTA)

The Team Adaptation process was evaluated using eight items derived from the framework of Marques-Quinteiro et al. (2015), with participants rating their agreement on a 7-point Likert scale (1 = totally disagree to 7 = totally agree). This process was assessed separately from two perspectives: the team members' perception and the leaders' perception, resulting in two distinct variables of Team Adaptation. The internal consistency reliability was .831 for the responses from team members and .871 for the responses from leaders. A list of the items is provided in the Annex A, where for example, items included statements such as "Finding innovative ways to handle unexpected situations" and "Adjusting each member's personal style to the team's collective approach."

4 Results

4.1 Aggregation Data

In this study, the level of analysis was at the team level, and therefore, individual responses from team members were aggregated to reflect team-level data. To justify this aggregation, within-group agreement for each variable was assessed using the Rwg(j) index, a widely used measure for evaluating consensus within groups (James, Demaree, & Wolf, 1993). The Rwg(j) statistic was calculated for all variables, including Team Adaptation as perceived by team members, but excluding the Team Adaptation ratings from the leaders. Since leaders responded individually for each team, calculating the Rwg(j) for this variable was not considered relevant.

A commonly accepted threshold for adequate within-group agreement is a mean Rwg(j) value of .70 or higher, suggesting that the average response is a good representation of the individual responses from team members (James, Demaree, & Wolf, 1993). Although some scholars argue that this cutoff is somewhat arbitrary (Lance et al., 2006), it remains a standard in the field. To further assess the degree of agreement, the Rwg(j) values were also categorized into levels of consensus as suggested by Biemann, Cole, & Voelpel (2012): lack of agreement (ranging from .00 to .30), weak agreement (ranging from .31 to .50), moderate agreement (ranging from .51 to .70), strong agreement (ranging from .71 to .90), and very strong agreement (ranging from .91 to 1.00).

The Rwg(j) mean scores for the variables studied showed strong levels of agreement. For instance, the Sensegiving variable ($M = 0.8358$; $SD = 0.13289$) yielded a mean Rwg(j) of 0.8358, with 3.4% of the values indicating lack of or weak agreement (ranging from .00 to .50), and 93.1% indicating moderate to very strong agreement (ranging from .51 to 1.00). The Promotion of SenseMaking variable ($M = 0.8480$; $SD = 0.10990$) demonstrated a similar pattern, with a mean Rwg(j) of 0.8480 and 0% of values indicating lack of or weak agreement, while 93.1% indicated moderate to very strong agreement.

For Situational Awareness (SA), a variable measured based on team members' responses, the mean Rwg(j) was 0.8295, with 3.4% of the values indicating lack of or weak agreement and 89.7% indicating moderate to very strong agreement.

Regarding Team Adaptation, this variable was only evaluated based on the perception of team members, as the leaders' responses were individual to each team and thus not appropriate for Rwg(j) assessment. The mean Rwg(j) for Team Adaptation (as perceived by team members) was 0.8287, with 3.4% of the values indicating lack of or weak agreement and 93.1% indicating moderate to very strong agreement. Since this variable showed a satisfactory level of within-group agreement, it was also included in the subsequent analyses.

Since all four variables demonstrated acceptable within-group agreement ($Rwg(j) \geq 0.70$), the data were aggregated at the team level for valid subsequent analyses. Even though two teams had only one member plus the leader, making RWG calculation unfeasible, the remaining 29 teams exhibited RWG values above the threshold. Some teams showed low RWG values in one of the variables, but they maintained high or acceptable RWG values in other variables. Given this, all 29 teams were retained for further investigation, as the overall consistency within the teams was deemed satisfactory.

4.2 Hypothesis test

In Table 1, the correlations between study variables are presented, along with their respective means, standard deviations, and $Rwg(j)$ indices at the team level. The analysis reveals distinct patterns across leadership behaviours and perceptual sources.

Significant positive correlations emerged between Leader Promotion of Sensemaking and both Situational Awareness ($r = .576, p < .001$) and Team Adaptation (member-rated) ($r = .550, p = .001$). Notably, this leadership behaviour also showed a positive (though non-significant) association with Leader Team Adaptation ($r = .315, p = .085$), suggesting a trend where leaders who foster shared interpretation may perceive greater adaptive capacity in their teams.

Regarding Leader Sensegiving, results demonstrated a moderate positive correlation with Team Adaptation (member-rated) ($r = .423, p = .018$), but no significant relationship with Leader Team Adaptation ($r = -.001, p = .994$). This contrast indicates that while providing clear direction relates to actual team adaptation, it doesn't necessarily inform leaders' own assessments of their team's performance.

For Situational Awareness, a significant correlation was observed with Team Adaptation (member-rated) ($r = .408, p = .023$), supporting its relevance in explaining perceived team adaptability from the team's perspective. However, the correlation with Leader Team Adaptation ($r = .282, p = .124$) did not reach statistical significance, indicating a weaker or more uncertain association. This pattern provides preliminary support for Situational Awareness as a potential mediator in the member-rated models, while suggesting that alternative mechanisms or contextual factors may shape leader evaluations of team adaptation.

It should be noted that the study's correlational design (Cohen, 1988) requires cautious interpretation of results, as causal relationships cannot be inferred. The mediation hypotheses will be further tested using Macro PROCESS analysis in subsequent sections.

Table 1 – Descriptive Statistics, Rwg(j), and Pearson Correlations Between Main Study Variables

Variable	RWG (j)	M	SD	1	2	3	4	5
1 - Leader Sensegiving	.8358	4.60	0.57	-				
2 - Leader Promotion of Sensemaking	.8480	5.28	0.82	.595**	-			
3 - Situational Awareness	.8295	5.28	0.52	.369*	.576**	-		
4 - Team Adaptation	.8287	5.42	0.42	.423*	.550**	.408*	-	
5 - Leader Team Adaptation	-	5.22	0.75	.001	.315	.282	.112	-

The current study examined whether situational awareness mediates the relationship between functional leadership and adaptive team performance (H1: situational awareness acts as a mediator between leader's sensegiving and adaptive team performance; H2: situational awareness acts as a mediator between leader's promotion of team sensemaking). Following Hayes' (2013) analytical approach, mediation analyses were conducted using Macro Process (Model 4) with 5,000 bootstrap samples to test these competing hypotheses. This approach was preferred over the traditional Baron and Kenny (1986) method due to its ability to directly assess the indirect effect while avoiding problematic normality assumptions (MacKinnon, Lockwood, & Williams, 2004). The analysis generated bias-corrected confidence intervals (95%) for the indirect effect (ab), with mediation being established when the interval excluded zero (Preacher & Hayes, 2008).

Four distinct mediation models were tested to account for different leadership behaviours and perceptual perspectives: (1) sensegiving → situational awareness → team adaptation (member-rated), (2) promotion of sensemaking → situational awareness → team adaptation (member-rated), (3) sensegiving → situational awareness → leader team adaptation, and (4) promotion of sensemaking → situational awareness → leader team adaptation. The bootstrap method proved particularly suitable for the sample size (N = 31), as it maintained statistical power without requiring normal distribution of the sampling distribution (Hayes, 2017). For each model, results were interpreted based on the confidence intervals of the indirect effects, with both hypotheses being supported if the 95% CI excluded zero, and both not being supported if it included zero.

The study's correlational design (Cohen, 1988) prevents causal inferences, though the mediation analysis provides important insights into potential mechanisms linking leadership behaviours to adaptive outcomes. The comparison between member-rated and leader-rated adaptation models offers additional value by examining whether the proposed mediation holds across different perceptual perspectives, addressing calls for multi-source assessments in team research (DeChurch, Mesmer-Magnus, & Doty, 2013). Results are presented separately for each model to allow clear evaluation of both hypotheses across all analysed relationships.

Table 2 - Mediation Model between Leader Sensegiving and Leader Team Adaptation, mediated by Situational Awareness

Note. L (LSG) = Leader Sensegiving; SA = Situational Awareness; LTA= Leader-Team Adaptation
CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit. * $p < .05$ *

Path Estimates	Coefficient (β)	SE	t	p	95% CI [LL, UL]
LSG $\rightarrow$ SA	0.335	0.157	2.13	.041*	[0.015, 0.657]
SA $\rightarrow$ LTA	0.474	0.281	1.68	.100	[-0.102, 1.050]
LSG $\rightarrow$ LTA (controlling for SA)	-0.161	0.256	-0.63	.534	[-0.685, 0.363]
LSG $\rightarrow$ LTA (without SA)	-0.002	0.245	-0.01	.994	[-0.503, 0.500]

Table 3 - Model indirect effects estimate for simple mediation models for Hypothesis 1

Indirect Effect	Coefficient (β)	Bootstrap SE	CI [LL, UL]
LSG $\rightarrow$ SA $\rightarrow$ LTA	0.159	0.103	[-0.075, 0.342]

Hypothesis 1 proposed that the relationship between leader's sensegiving and adaptive team performance would be mediated by situational awareness. The underlying assumption was that leaders who engage in sensegiving behaviours promote higher levels of situational awareness within teams, which in turn would enhance their ability to respond adaptively to environmental challenges and changes.

However, the results do not support the proposed mediation model. The analysis of the LSG $\rightarrow$ SA path revealed a small but statistically significant positive of Leader Sensegiving on Situational Awareness ($B = 0.335$, $t = 2.13$, $p = .041$; 95% CI [0.015, 0.657]), suggesting that functional leadership behaviours can indeed foster greater awareness within teams. Nevertheless, the SA $\rightarrow$ LTA path, which assessed the effect of Situational Awareness on Leader-Team Adaptation, was not statistically significant ($B = 0.474$, $t = 1.68$, $p = .100$; 95% CI [-0.102, 1.050]).

Moreover, the direct effect of Leader Sensegiving on adaptive team performance, when controlling for situational awareness, was also non-significant ($B = -0.161$, $p = .534$). Similarly, the total effect., the effect of Leader Sensegiving on Leader Team Adaptation without accounting for the mediator, was negligible and statistically non-significant ($B = -0.002$, $p = .994$).

The analysis of the indirect effect (LSG $\rightarrow$ SA $\rightarrow$ LTA), conducted using bootstrapping, confirmed these findings. The 95% bootstrap confidence interval included zero ($B = 0.159$; 95% Bootstrap CI [-0.075, 0.342]), indicating the absence of a statistically significant mediation effect.

Based on these results, Hypothesis 1 is not supported, as situational awareness does not significantly mediate the relationship between leader's sensegiving and adaptive team performance. Nonetheless, the significant effect of Leader Sensegiving on Situational Awareness highlights the potential value of this leadership behaviour in enhancing cognitive team processes, which could be further explored in future research.

Table 4 - Mediation Model between Leader Sensegiving and Team Adaptation, mediated by Situational Awareness
Note. LSG = Leader Sensegiving; SA = Situational Awareness; TA = Team Adaptation.

Confidence intervals (CI) calculated using 5,000 bootstrap samples. $p < .05$.

Path Estimates	Coefficient (β)	SE	t	p	95% CI [LL, UL]
LSG $\rightarrow$ SA	0.3354	0.1570	2.14	.041	[0.0142, 0.6565]
SA $\rightarrow$ TA	0.2361	0.1421	1.66	.108	[-0.0549, 0.5271]
LSG $\rightarrow$ TA (controlling for SA)	0.2318	0.1292	1.79	.084	[-0.0329, 0.4965]
LSG $\rightarrow$ TA (without SA)	0.3109	0.1237	2.51	.018	[0.0579, 0.5640]

Table 5 - Model indirect effects estimate for simple mediation models for Hypothesis 1

Indirect Effect	Coefficient (β)	Bootstrap SE	CI [LL, UL]
LSG $\rightarrow$ SA $\rightarrow$ TA	0.0792	0.0601	[-0.0220, 0.2135]

Hypothesis 1 proposed that situational awareness mediates the relationship between Leader's Sensegiving and Adaptive Team Performance. The underlying assumption was that sensegiving behaviours from leaders would enhance teams' situational awareness, which in turn would foster better adaptive performance.

The results partially support the proposed mediation model. Regarding the LSG $\rightarrow$ SA path, Leader Sensegiving was found to have a small but statistically significant positive effect on Situational Awareness ($B = 0.3354$, $t = 2.14$, $p = .041$; 95% CI [0.0142, 0.6565]), indicating that sensegiving leadership contributes to enhancing this cognitive team emergent state. However, the SA $\rightarrow$ TA path, representing the effect of Situational Awareness on Team Adaptation, did not reach statistical significance ($B = 0.2361$, $t = 1.66$, $p = .108$; 95% CI [-0.0549, 0.5271]).

The direct effect of Leader Sensegiving on Team Adaptation, controlling for the mediator, was marginally non-significant ($B = 0.2318$, $p = .084$), while the total effect, without controlling for situational awareness, was statistically significant ($B = 0.3109$, $p = .018$), suggesting a meaningful overall relationship between leadership sensegiving and team adaptation.

In terms of mediation, the indirect effect (LSG $\rightarrow$ SA $\rightarrow$ TA), assessed through bootstrapping, was not statistically significant ($B = 0.0792$; 95% Bootstrap CI [-0.0220,

0.2135]), as the confidence interval included zero. Therefore, although Leader Sensegiving significantly influences Situational Awareness, the mediating role of this variable in the relationship with Team Adaptation is not supported by the data.

As such, while Hypothesis 1 is not fully supported, the significant relationship between Leader Sensegiving and Situational Awareness, and the overall effect on team adaptation, point to the relevance of functional leadership behaviours in promoting team effectiveness in dynamic environments.

Table 6 - Mediation Model between Leader Promotion of Sensemaking and Team Adaptation, mediated by Situational Awareness

Note. LSM = Leader Promotion of Sensemaking; SA = Situational Awareness (mean score); TA = Team Adaptation. Confidence intervals (CI) calculated using 5,000 bootstrap samples. $p < .05$.

Path Estimates	Coefficient (β)	SE	t	p	95% CI [LL, UL]
LSM $\rightarrow$ SA	0.3627	0.0957	3.79	.001	[0.1670, 0.5584]
SA $\rightarrow$ TA	0.1111	0.1546	0.72	.479	[-0.2056, 0.4277]
LSM $\rightarrow$ TA (controlling for SA)	0.2398	0.0974	2.46	.020	[0.0402, 0.4393]
LSM $\rightarrow$ TA (without SA)	0.2800	0.0790	3.55	.001	[0.1185, 0.4416]

Table 7 - Model indirect effects estimate for simple mediation models for Hypothesis 2

Indirect Effect	Coefficient (β)	Bootstrap SE	CI [LL, UL]
LSM $\rightarrow$ SA $\rightarrow$ TA	0.0403	0.0726	[-0.0636, 0.2193]

The results presented in this table are part of the analysis for Hypothesis 2, which proposes that Situational Awareness mediates the relationship between Leader's Promotion of Sensemaking and Team Adaptation. In this case, the focus is on the leadership dimension of Leader Promotion of Sensemaking.

The path from Leader Promotion of Sensemaking to Situational Awareness ($X \rightarrow M$) was statistically significant ($B = 0.3627$, $t = 3.79$, $p = .001$; 95% CI [0.1670, 0.5584]), indicating that leaders who promote sensemaking can enhance their team's situational awareness.

However, the path from Situational Awareness to Team Adaptation ($M \rightarrow Y$) was not statistically significant ($B = 0.1111$, $t = 0.72$, $p = .479$; 95% CI [-0.2056, 0.4277]). This suggests that situational awareness does not significantly predict team adaptation in this model.

The direct effect of Leader Promotion of Sensemaking on Team Adaptation, controlling for Situational Awareness, remained significant ($B = 0.2398$, $p = .020$), indicating that this leadership behaviour has a direct and meaningful impact on adaptive performance. The total effect ($B = 0.2800$, $p = .001$) further supports the influence of Leader Promotion of Sensemaking on Team Adaptation when not accounting for the mediator.

The indirect effect (LSM → SA → TA) was not significant ($B = 0.0403$; 95% Bootstrap CI $[-0.0636, 0.2193]$), as the confidence interval includes zero. Therefore, although the leadership behaviour significantly predicts situational awareness and team adaptation individually, Situational Awareness does not mediate this relationship.

These findings contribute to the overall testing of Hypothesis 2 and suggest that the mediating role of Situational Awareness is not supported in this specific pathway.

Table 8 - Mediation Model between Leader Promotion of Sensemaking and Leader - Team Adaptation, mediated by Situational Awareness

Note. LSM = Leader SenseMaking Promotion; SA = Situational Awareness (mean score); LTA = Leader-Team Adaptation.

Confidence intervals (CI) calculated using 5,000 bootstrap samples. $p < .05$.

Path Estimates	Coefficient (β)	SE	t	p	95% CI [LL, UL]
LSM → SA	0.3627	0.0957	3.79	.001	[0.1670, 0.5584]
SA → LTA	0.2187	0.3157	0.69	.494	[-0.4280, 0.8654]
LSM → LTA (controlling for SA)	0.2084	0.1989	1.05	.304	[-0.1991, 0.6159]
LSM → LTA (without SA)	0.2878	0.1612	1.79	.085	[-0.0420, 0.6175]

Table 9 - Model indirect effects estimate for simple mediation models for Hypothesis 2

Indirect Effect	Coefficient (β)	Bootstrap SE	CI [LL, UL]
LSM → SA → LTA	0.0793	0.1150	[-0.1239, 0.3270]

The results presented in this table are part of the analysis for Hypothesis 2, which proposes that Situational Awareness mediates the relationship between Leader's Promotion of Sensemaking and Team Adaptation.

The path from Leader Promotion of Sensemaking to Situational Awareness ($X \rightarrow M$) was statistically significant ($B = 0.3627$, $t = 3.79$, $p = .001$; 95% CI $[0.1670, 0.5584]$), indicating that leaders who promote sensemaking significantly enhance their team's situational awareness.

However, the path from Situational Awareness to Leader-Team Adaptation ($M \rightarrow Y$) was not statistically significant ($B = 0.2187$, $t = 0.69$, $p = .494$; 95% CI $[-0.4280, 0.8654]$). This suggests that situational awareness does not significantly predict team adaptation in this model.

The direct effect of Leader Promotion of Sensemaking on Leader-Team Adaptation, controlling for Situational Awareness, was not significant ($B = 0.2084$, $p = .304$; 95% CI $[-$

0.1991, 0.6159]). The total effect (without accounting for the mediator) was marginally significant ($B = 0.2878$, $p = .085$; 95% CI [-0.0420, 0.6175]).

The indirect effect (Leader Promotion of Sensemaking $\rightarrow$ Situational Awareness $\rightarrow$ Leader-Team Adaptation) was not significant ($B = 0.0793$; 95% Bootstrap CI [-0.1239, 0.3270]), as the confidence interval includes zero. Therefore, although Leader Promotion of Sensemaking significantly predicts situational awareness, Situational Awareness does not mediate this relationship.

These findings contribute to the overall testing of Hypothesis 2 and suggest that the mediating role of Situational Awareness is not supported in this specific pathway.

In summary, the proposed mediation model was not empirically supported, as analyses revealed no significant evidence for situational awareness mediating the relationship between functional leadership and adaptive team performance. However, two consistent patterns emerged from the data that warrant consideration.

Firstly, functional leadership behaviours, specifically sensegiving and the promotion of sensemaking, demonstrated a positive effect on situational awareness (with standardized coefficients ranging from $\beta = 0.335$ to 0.363 , all statistically significant at $p < .05$). This finding confirms the theoretical proposition that leaders can effectively enhance their teams' environmental perception through these behaviours.

Moreover, situational awareness itself exhibited only marginal or non-significant effects on adaptive team performance measures ($\beta = 0.218$ to 0.474 , $p > .10$ across analyses). This suggests that while leadership may successfully cultivate situational awareness, such cognitive state does not automatically translate into measurable improvements in team adaptation.

Lastly, a particularly noteworthy finding concerns the divergence between evaluation sources. This way, team member-reported adaptation showed substantially stronger associations with situational awareness compared to leader-assessed adaptation. This discrepancy indicates that the potential mediating role of situational awareness may be more perceptible or operate differently at the team member level than from the leadership perspective.

5 Discussion

This study aimed to explore whether situational awareness, as an emergent cognitive state, functions as a mediator in the relationship between functional leadership and adaptive team performance. Despite significant advances in the study of leadership, there remains considerable interest in further understanding this topic and how teams can achieve better outcomes, particularly in dynamic situations that demand adaptation. Furthermore, the concept of situational awareness, according to Endsley (1995), is an emergent cognitive state that is highly related to an individual's ability to comprehend and analyse the existing context, serving as a key principle for adaptive capacity. However, there is a notable gap in the literature regarding situational awareness, with very few studies exploring its application within business environments. Therefore, this study aims to investigate whether this emergent cognitive state, which has been positively validated in military and aviation settings, can also be connected to and have a positive impact within the business context, when associated with an established leadership style and performance concept that have already been demonstrated to be effective in such environments.

The first approach of this study was to understand how functional leadership, supported by the concepts of sensegiving and sensemaking, could promote situational awareness within teams. Building on Endsley's conceptualization of situational awareness, it was hypothesized that this cognitive state would be fostered by functional leadership and would subsequently enhance adaptive team performance. In this sense, situational awareness was considered a mediating cognitive state through which functional leadership may influence a team's ability to adapt to complex and dynamic contexts. In this initial approach, the concepts of sensegiving and sensemaking, as defined by Gioia and Chittipeddi (1991), Morgeson (2010), and Weick (1995), were analysed. These concepts refer to the communication of a leader's interpretation of environmental information and the provision of a conceptual framework that helps team members understand the rationale and context of collective actions, as well as the ability to comprehend changes in the environment and the context in which they operate. Thus, an effort was made to distinguish the concepts of sensegiving and sensemaking, which characterize functional leadership, in order to more specifically understand the relationship between each of these concepts and the concept of situational awareness, seeking to identify which of the two processes has a greater influence on the development of this emergent cognitive state, and consequently affect adaptive team performance positively. Finally, this study also aims to assess how the promotion of situational awareness within teams can be beneficial and enhance their adaptive capacity.

As a second approach, the study also aimed to examine whether this relationship and the mediating role of situational awareness were perceived and experienced both by team

members, who are directly influenced by leadership practices, and by leaders themselves, who enact functional leadership and ultimately shape team adaptation. In this case, the perspective of this study is also based on understanding whether the concept of situational awareness and its influence within a team are perceived differently among team members, and whether it has an equal effect across them. In this way, it will be possible to identify both the positive aspects of this relationship and some of its limitations.

Regarding the methodology, this study followed a standard mediation model, which is widely used in the literature to explore the causal relationships between independent and dependent variables through a mediating factor (Baron & Kenny, 1986; Preacher & Hayes, 2004). In this case, the model aimed to test whether situational awareness acted as a mediator in the relationship between functional leadership and adaptive team performance. The use of a two-way survey, which included both team members and leaders, provided a more robust framework for examining how these concepts are processed and understood by different individuals within the organization. By gathering data from both perspectives, the study seeks to gain a deeper understanding of the roles that functional leadership and situational awareness play in influencing adaptive team performance and how these roles may differ depending on the perceptions of leaders and team members.

Turning to the results, both first and second hypothesis, which suggested that situational awareness mediates the relationship between functional leadership and adaptive team performance, was not supported by the data. This finding implies that situational awareness does not function as a mediating variable in the way it was initially anticipated within the organizational context.

In the present study, some slight positive results were observed between functional leadership and situational awareness. This suggests that functional leadership, characterized by sensegiving and sensemaking (Morgeson, DeRue, & Karam, 2010), may play a role in fostering the emergent cognitive state of situational awareness, enhancing team members' ability to analyse and interpret the surrounding context. Thus, this modest positive relationship indicates the relevance of continuing efforts to encourage the adoption of functional leadership practices, aiming to strengthen teams' capacity to understand dynamic organizational environments and to respond effectively to ongoing changes. These findings align with the theoretical propositions of Morgeson et al. (2010), who emphasized that functional leadership could foster critical cognitive states, such as situational awareness, within teams. By enhancing situational awareness, functional leadership practices may lay the foundation for improved team adaptation, especially in dynamic and complex organizational environments.

Moreover, the results show that the mediating effect of situational awareness on team adaptation was slightly positive but statistically insignificant, indicating a practically null effect. Based on these findings, it can be suggested that the concept of situational awareness, as

developed by Endsley (1995) and validated in military and aviation contexts, may not fully translate to corporate teams. Given that business environments, while dynamic and demanding, differ significantly from the high-reliability contexts typically described by Weick and Sutcliffe (2007), such as aviation and military operations, which are characterized by high pressure and formal hierarchies combined with operational flexibility, it becomes important to consider whether situational awareness should be slightly adapted or reinterpreted to better fit organizational contexts. These differences in leadership flexibility, pressure intensity and organizational structure may affect the relevance and functioning of situational awareness in corporate teams. Therefore, future research should explore potential adjustments to the conceptualization of situational awareness to ensure its applicability and impact within business environments.

In terms of team adaptation, the results provide interesting insights. As mentioned earlier, this study also aimed to observe how the mediation of situational awareness would influence different parts of the teams, namely team leaders and team members. The variable team adaptation was treated separately, capturing results from the team members' survey (team adaptation) and the team leaders' survey (leader team adaptation).

When analysing the findings, it becomes apparent that some differences, although not highly discrepant, can be observed between the two groups. These differences may offer relevant insights into how leadership and adaptation are perceived and integrated within teams today. Specifically, team members appear to recognize that situational awareness, fostered by functional leadership behaviours, has a slight positive effect on their adaptive capacity. In contrast, leaders perceive this effect as weaker, suggesting that they believe that team adaptation is less influenced by situational awareness cognitive states.

These findings raise several important questions about team functioning and leadership practices. Firstly, it is essential to consider whether leaders have an accurate and realistic understanding of their teams' current cognitive states. Previous studies have pointed out that leaders often develop idealized expectations that do not always align with the team's actual experiences and capabilities (Morgeson, DeRue, & Karam, 2010; Zaccaro, Rittman, & Marks, 2001). A misalignment in perception can lead to overestimated performance expectations and a lack of targeted support for cognitive states crucial for team adaptation.

Secondly, these results suggest that leaders may not be fully aware of the cognitive processes emerging within their teams or may not recognize the importance of reinforcing these processes. Research by Salas et al. (2015) has shown that leaders play a critical role in promoting shared mental models and situational awareness, which in turn are key drivers of team performance in dynamic environments. If leaders are unable to identify or nurture these cognitive processes and states, the potential positive effects on team adaptation are likely diminished.

Thirdly, it is worth questioning whether leaders are sufficiently connected to the day-to-day experiences of their teams, because the discrepancy observed between the perceptions of leaders and team members may indicate a communication gap or a lack of cognitive convergence, which could negatively affect the development of team-level situational awareness (Endsley, 1995; Salas et al., 2015).

From the perspective of the team members, although the positive effect of functional leadership on their perceived adaptation is only slight, it still suggests that leadership practices grounded in sensegiving and sensemaking (Mumford, Marks, Connelly, Zaccaro, & Reiter-Palmon, 2000) can help support adaptive capacities. However, if leaders are not fully aware of or committed to reinforcing situational awareness, this emergent cognitive state may not be sufficiently developed, limiting its beneficial impact on team adaptation.

Overall, while both hypotheses were not supported, confirming that situational awareness does not mediate the relationship between functional leadership and adaptive team performance, the broader analysis revealed several interesting insights. Notably, a positive relationship was identified between functional leadership behaviours, such as sensegiving and sensemaking, and the development of situational awareness within teams. In addition, the data showed that team members perceived a slightly stronger link between situational awareness and team adaptation than leaders did, suggesting that members' cognitive processing may play a more decisive role in adaptive outcomes. Although the mediation effect was not confirmed as initially expected, the isolated relationships between the variables demonstrated encouraging patterns, indicating potential for further exploration. Therefore, this study not only fulfils its primary goal of analysing the mediation relationship but also raises important questions for future research and offers practical insights for improving leadership practices and team adaptation. Moreover, the results reinforce the need to continue examining how leadership can foster emergent cognitive states that are critical for enhancing team performance in increasingly dynamic environments.

5.1 Limitations

One of the limitations of this study lies in the fact that the sample is not fully representative of the broader working population, which, therefore, does not allow for the generalization of the findings to all teams operating across different sectors, organizational cultures and individual profiles. Although this study included a relevant number of teams from various contexts, it remains constrained by the specific environments and members associated with those teams. Considering the vast diversity of companies, organizational cultures, and individual personalities that characterize the working world, extending the conclusions of this study to all organizational settings would be inherently complex.

Another limitation of this study relates to the characterization of the variable situational awareness, because the scale used to assess this construct was based on Endsley's model, which, while widely used, is relatively general and underdeveloped due to the limited research available on this cognitive state. Furthermore, although the concept was originally designed for aviation and military contexts, it has always had a more general connotation, which still lacks specific relevance to the business environment. This way, this may have limited respondents' perceptions and, consequently, the depth of the data collected. To address this limitation, future research should consider revising the situational awareness scale and developing a more comprehensive and contextually relevant instrument, which would provide richer and more accurate insights into this cognitive variable in organizational settings.

There is also another limitation, which is the use of self-report questionnaires in this study, where participants assessed their own leadership, situational awareness, and team performance, may lead to challenges in introspection and an accurate understanding of one's own abilities, which are often subjective. This issue is particularly relevant for both team members and leaders, as self-assessments can be influenced by individual biases, such as overestimating or underestimating one's capabilities. Furthermore, leaders may face additional challenges in evaluating their team's adaptive performance, where they could either overlook weaknesses in their leadership or, conversely, be overly critical of their team, setting excessively high standards. Given that all responses were self-reported, the results may reflect various biases, which could influence the accuracy and validity of the findings (McCrae & Costa, 1987). Future studies could benefit from integrating external assessments or objective measures to provide a more comprehensive and unbiased evaluation of leadership and team performance.

Lastly, another limitation of this study is the potential influence of uncontrolled variables such as organizational climate, prior leadership experience and team characteristics, which may have unintentionally masked the relationship between leadership, situational awareness and team performance. These variables, although not directly addressed in the research design, could have overshadowed or confounded the observed effects. For instance, in teams with high cohesion or leaders with substantial prior experience in dynamic environments, the positive outcomes associated with functional leadership or situational awareness might not have been as apparent, as other factors could have been driving adaptive team performance. Therefore, without accounting for these contextual influences, the true impact of leadership and situational awareness on adaptive team performance might have been diluted or distorted. So, future research should aim to control for such factors to ensure that the effects of leadership and situational awareness are more accurately isolated and understood.

5.2 Future Research

Future research should seek to address the limitations identified in the present study, to enhance the accuracy, validity, and generalizability of findings in this field. By refining methodologies, developing more specific measurement tools, expanding sample diversity, and controlling for additional contextual variables, subsequent studies can produce more robust conclusions. Such improvements will contribute to a deeper and more nuanced understanding of how functional leadership, cognitive competencies, and adaptive team performance are interrelated across different organizational environments.

Building on the findings of the present study, it is important to highlight that, although the results did not support the mediation relationship, the data suggest that there are indeed meaningful influences between the variables studied. Therefore, this indicates that it remains worthwhile to further investigate whether the emergent cognitive state of situational awareness could play a decisive role in team functioning within organizational contexts. As previously discussed, modern organizations operate in increasingly dynamic environments that demand constant adaptation from teams. This way, cognitive states such as situational awareness may be key elements in enabling this adaptation. However, to rigorously assess this possibility, future research should focus on further developing and consolidating the conceptualization of situational awareness. It is crucial to create a more detailed and context-appropriate definition alongside refined measurement tools specifically adapted to organizational settings, enabling more reliable and insightful empirical studies in this area.

Moreover, the concept of team adaptation is broad and multifaceted. Therefore, future research would benefit from distinguishing between different types of adaptation, such as technical, interpersonal, and strategic adaptation, and examining which forms are most strongly associated with functional leadership behaviours and with the cognitive emergent state of situational awareness.

Finally, future studies should also investigate the current dynamics within teams, particularly focusing on the relationship between leaders and team members and the development of cognitive states and processes within teams. A deeper understanding of how leaders and team members perceive these cognitive states and adaptive capabilities is essential, as this study suggests that their perceptions may differ significantly. Ideally, members of the same team should share a similar perception of their environment and adaptive capacity, yet the reality often reflects different subjective experiences. Future research should explore whether today's leaders are aware of how to foster and strengthen cognitive competencies like situational awareness within their teams and whether they are conscious of the specific needs and characteristics of their teams in dynamic contexts.

6 Conclusion

In a dynamic, global, and constantly changing environment like the one organizations face today, team adaptation has become critical to organizational success. To thrive in such contexts, teams must be able to adapt rapidly and effectively to the demands of their surroundings. This way, adaptive team performance is increasingly seen as essential not only for team survival but also for sustaining overall organizational competitiveness.

This study aimed to contribute to the growing field of leadership by examining how functional leadership can enhance adaptive team performance through a cognitive emerging state such as situational awareness. So, functional leadership, through concepts like sensegiving and sensemaking, addresses the immediate needs of the team while adapting to evolving demands. Through helping team members interpret and make sense of the environment, functional leadership may create conditions that foster situational awareness, which could potentially influence team adaptation and performance.

Although the mediation effect was not confirmed, the findings indicated a slightly positive association between functional leadership and situational awareness, suggesting that functional leadership might have some influence on team members' awareness of their environment. However, the link between situational awareness and adaptive team performance, as well as the proposed mediation relationship, was not strongly supported in this study. These results point to the need for further exploration into how functional leadership promotes situational awareness and affects team adaptation, highlighting the importance of refining both the conceptualization and measurement of situational awareness within organizational settings, as current concepts and scales may not fully capture the complexity of this construct in these contexts, potentially limiting the accuracy of future studies.

Moreover, the findings suggest that different perceptions between leaders and team members regarding team adaptation and situational awareness may influence the assessment of team functioning. Such discrepancies underline the necessity to explore further how leaders promote these types of cognitive states and whether teams and leaders interpret dynamic environments in similar ways.

These insights offer meaningful implications for organizations, suggesting that by investing in the development of functional leadership skills and fostering environments where situational awareness can emerge and be shared, teams may become better prepared to face the demands of a volatile market. Therefore, future research should continue to improve the constructs involved, explore different types of adaptation processes, and deepen the understanding of how cognitive states influence real-world team performance.

Through a better integration of leadership practices and cognitive competencies, organizations will be able to build teams that are not only efficient but truly adaptive and capable of navigating complexity with resilience and intelligence.

7 Bibliography

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8 Appendix

Annex A. Items list per variable

Leader Sensegiving

- Changes the way the team interprets events or situations the team is faced with.
- Alters the way the team thinks about events or situations the team is faced with.
- Modifies how the team thinks about events or situations the team is faced with.

Leader Promotion of Sensemaking

- Encourages the team to collectively interpret things that happen to the team.
- Promotes team discussions about different perspectives of events or situations.
- Encourages team members to provide their unique viewpoint on events or situations.
- Promotes the development of a shared understanding of events or situations among the team members.

Situational Awareness

- We are well aware of the environment in which the project is being developed.
- We clearly understand the variables that influence the success of the project.
- We quickly identify changes that may influence our work.
- We have clear information about the tasks/project we are developing.

Team Adaptation

- Taking creative actions to solve problems that lack straightforward answers.
- Finding innovative ways to handle unexpected situations.
- Adapting and managing unforeseen events by quickly refocusing and taking appropriate actions.
- Developing alternative action plans in a short time to address contingencies.
- Seeking and developing new skills to respond to situations/problems.
- Adjusting each member's personal style to the team's collective approach.
- Improving interpersonal relationships while considering the needs and aspirations of each member.
- Maintaining focus even when handling multiple situations and responsibilities.

Leader Team Adaptation

- Taking creative actions to solve problems that lack straightforward answers.
- Finding innovative ways to handle unexpected situations.
- Adapting and managing unforeseen events by quickly refocusing and taking appropriate actions.
- Developing alternative action plans in a short time to address contingencies.
- Seeking and developing new skills to respond to situations/problems.
- Adjusting each member's personal style to the team's collective approach.
- Improving interpersonal relationships while considering the needs and aspirations of each member.
- Maintaining focus even when handling multiple situations and responsibilities.

Annex B. Team Members Survey

Team members Survey

1. This questionnaire is part of a research project carried out by a group of researchers from ISCTE - University Institute of Lisbon, focused on team effectiveness in a business context. The main objective of this project is to identify factors related to teamwork that contribute to the effectiveness of projects and the satisfaction of both clients and consultants.
2. The data collected will be exclusively analyzed by the research team, ensuring anonymity.
3. The questions are designed in such a way that you only need to select the answer that seems most appropriate to you. Try to answer without spending too much time on each question.
4. There are no right or wrong answers. What matters to us is your personal opinion.
5. For each question, there is a scale. You may use any point on the scale that you consider appropriate.
6. Please complete the entire questionnaire in one go, without interruptions.

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

Thank you for your collaboration!

I am 18 years old and I agree to participate in this study: Yes No

To answer this questionnaire, please think about the project you are currently involved in and the team you are working with.

1. The following questions aim to describe the behaviours of the team. 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

My team is effective in

1.	Taking creative actions to solve problems that lack straightforward answers.	1	2	3	4	5	6	7
2.	Finding innovative ways to handle unexpected situations.	1	2	3	4	5	6	7
3.	Adapting and managing unforeseen events by quickly refocusing and taking appropriate actions.	1	2	3	4	5	6	7

4.	Developing alternative action plans in a short time to address contingencies.	1	2	3	4	5	6	7
5.	Seeking and developing new skills to respond to situations/problems.	1	2	3	4	5	6	7
6.	Adjusting each member's personal style to the team's collective approach.	1	2	3	4	5	6	7
7.	Improving interpersonal relationships while considering the needs and aspirations of each member.	1	2	3	4	5	6	7
8.	Maintaining focus even when handling multiple situations and responsibilities.	1	2	3	4	5	6	7

2. The following statements refer to feelings some teams experience about their work.

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 relate to how your team works.

1.	Our team works in a well-coordinated manner.	1	2	3	4	5	6	7
2.	Our team has very few misunderstandings about what to do.	1	2	3	4	5	6	7
3.	Our team often has to go back and start over.	1	2	3	4	5	6	7
4.	We perform tasks smoothly and efficiently.							
5.	There is a lot of confusion about how to perform tasks.							
6.	We anticipate what each team member does / needs at a given moment.	1	2	3	4	5	6	7
7.	We adjust our behavior to anticipate the actions of other members.	1	2	3	4	5	6	7
8.	We synchronize our work with minimal necessary communication.	1	2	3	4	5	6	7

4. The following questions concern the leader's behaviour. Indicate to what extent you agree with each of the following statements.

The leader of my team

1.	Changes the way the team interprets events or situations the team is faced with.	1	2	3	4	5	6	7
2.	Alters the way the team thinks about events or situations the team is faced with.	1	2	3	4	5	6	7
3.	Modifies how the team thinks about events or situations the team is faced with.	1	2	3	4	5	6	7
4.	Encourages the team to collectively interpret things that happen to the team.	1	2	3	4	5	6	7
5.	Promotes team discussions about different perspectives of events or situations.	1	2	3	4	5	6	7
6.	Encourages team members to provide their unique viewpoint on events or situations.	1	2	3	4	5	6	7
7.	Promotes the development of a shared understanding of events or situations among the team members.	1	2	3	4	5	6	7

5. Regarding the leader's behaviour, please indicate to what extent you agree or disagree with each of the following statements.

The leader of my team

1.	Encourages all of us to voice our opinions.	1	2	3	4	5	6	7
2.	Ensures that all members are valued for their contributions.	1	2	3	4	5	6	7
3.	Makes sure that everyone's unique strengths are leveraged.	1	2	3	4	5	6	7
4.	Creates an environment in which we can be ourselves.	1	2	3	4	5	6	7
5.	Encourages everyone to be unique.	1	2	3	4	5	6	7
6.	Enables us to see differences as an advantage rather than as a disadvantage.	1	2	3	4	5	6	7

7.	Helps us to see how differences among us can be an added value for our team.	1	2	3	4	5	6	7
8.	Helps us to solve disagreements to make better decisions for the team.							
9.	Encourages us to listen to perspectives that are different from our own.							
10.	Helps us to understand that different views are needed to understand the bigger picture.							

6. Now think about how your team works. Please indicate to what extent you agree or disagree with each of the following statements.

1.	In my team, we actively attack problems.	1	2	3	4	5	6	7
2.	In my team, we quickly use opportunities to attain goals.	1	2	3	4	5	6	7
3.	In my team, we usually do more than we are asked to do.	1	2	3	4	5	6	7
4.	In my team, we are particularly good at realizing ideas.	1	2	3	4	5	6	7

7. Please continue thinking of your team as a whole. Indicate to what extent you agree or disagree with each of the following statements:

1.	If we find ourselves in a jam, we can think of many ways to get out of it.	1	2	3	4	5	6	7
2.	Right now, we see ourselves as being pretty successful as a team.	1	2	3	4	5	6	7
3.	We can think of many ways to reach our current goals.	1	2	3	4	5	6	7
4.	We are looking forward to the life ahead of us.	1	2	3	4	5	6	7
5.	The future holds a lot of good in store for us.	1	2	3	4	5	6	7
6.	Overall, we expect more good things to happen to us than bad.	1	2	3	4	5	6	7
7.	Sometimes, we make ourselves do things whether we want to or not.	1	2	3	4	5	6	7
8.	When we're in a difficult situation, we can usually find our way out of it.	1	2	3	4	5	6	7
9.	It's okay if there are people who don't like us.	1	2	3	4	5	6	7
10.	We are confident that we could deal efficiently with unexpected events.	1	2	3	4	5	6	7
11.	We can solve most problems if we invest the necessary effort.	1	2	3	4	5	6	7
12.	We can remain calm when facing difficulties because we can rely on our coping abilities.	1	2	3	4	5	6	7

8. Please now think about the results of your team's work and indicate to what extent you agree or disagree with each of the following statements.

1.	My team has a good performance.	1	2	3	4	5	6	7
2.	We are satisfied to be working in this team.	1	2	3	4	5	6	7
3.	My 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

9. Think now about how your team members relate to each other.

1.	I am able to count on my team members for help if I have difficulties with my job.	1	2	3	4	5	6	7
2.	I am confident that my team members will take my interests into account when making work-related decisions.	1	2	3	4	5	6	7
3.	I am confident that my team members will keep me informed about issues that concern my work.	1	2	3	4	5	6	7
4.	I can rely on my team members to keep their word.	1	2	3	4	5	6	7
5.	I trust my team members.	1	2	3	4	5	6	7
6.	It is safe for me to make suggestions.	1	2	3	4	5	6	7
7.	It is safe to give my opinions.	1	2	3	4	5	6	7
8.	It is safe for me to speak up around here.	1	2	3	4	5	6	7

10. Think now about the project your team is involved in.

1.	We are well aware of the environment in which the project is being developed.	1	2	3	4	5	6	7
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2.	We clearly understand the variables that influence the success of the project.	1	2	3	4	5	6	7
3.	We quickly identify changes that may influence our work.	1	2	3	4	5	6	7
4.	We have clear information about the tasks/project we are developing.	1	2	3	4	5	6	7

11. Think now about the organization you work for and answer to the following questions.

1.	In my organization, there are opportunities for career progression.	1	2	3	4	5	6	7
2.	It is possible to communicate openly and directly about career aspirations.	1	2	3	4	5	6	7
3.	The organization helps me identify other positions within the organization that match my interests.	1	2	3	4	5	6	7
4.	This organization is a springboard for future employment opportunities.	1	2	3	4	5	6	7
5.	In my organization, salaries are adequate.	1	2	3	4	5	6	7
6.	There are rewards for additional work.							
7.	HR practices are designed to meet personal needs.							
8.	The organization recognizes exceptional work.							
9.	The organization has a good reputation and is perceived as socially responsible.							
10.	I feel good about working for this organization.							
11.	My organization's HR practices are guided by ethical principles.							
12.	My organization contributes significantly to society through solidarity actions.							

12. Think about your team as a whole and indicate to what extent you agree with each of the following statements

1.	My team is globally very diverse.	1	2	3	4	5	6	7
2.	My team is very diverse in terms of ethnic composition.	1	2	3	4	5	6	7
3.	My team is very diverse in terms of gender.	1	2	3	4	5	6	7
4.	My team is very diverse in terms of academic background.	1	2	3	4	5	6	7
5.	My team is very diverse in terms of age.	1	2	3	4	5	6	7
6.	I am very aware of the differences among my colleagues.	1	2	3	4	5	6	7

13. Now focus on yourself and indicate how much you agree with each of the following statements.

1.	In this team, I can be my unique self.	1	2	3	4	5	6	7
2.	In this team, I can use my unique skills and abilities.	1	2	3	4	5	6	7
3.	In this team, I feel that I belong.	1	2	3	4	5	6	7
4.	In this team I feel connected with other team members.	1	2	3	4	5	6	7
5.	In this team, I feel like an outsider.	1	2	3	4	5	6	7

14. In the next set of questions, we ask you to imagine a scenario where you would be collaborating with not only your human colleagues but also an AI agent as part of your team. An AI agent, in this context, is an autonomous system that acts as a team member with a clear, distinct role and collaborates interdependently with the team.

Please reflect on how working in a team with human and non-human team members might impact your behaviour. Your insights will help us understand the potential benefits, challenges, and dynamics of collaboration between humans and AI agents.

1.	When I've learned something new, I would tell my colleagues about it.	1	2	3	4	5	6	7
2.	I would share information I have with my colleagues.	1	2	3	4	5	6	7
3.	I think it is important that my colleagues know what I am doing.	1	2	3	4	5	6	7
4.	I would regularly tell my colleagues what I am doing.	1	2	3	4	5	6	7
5.	When I need certain knowledge, I would ask my colleagues about it.	1	2	3	4	5	6	7
6.	I would like to be informed of what my colleagues know.	1	2	3	4	5	6	7
7.	I would ask my colleagues about their abilities when I need to learn something.	1	2	3	4	5	6	7
8.	When my colleague is good at something, I would ask them to teach me how to do it.	1	2	3	4	5	6	7

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

1. Gender: ☐ Male ☐ Female 2. Age: _____ years

3. Which nationality do you identify with most? _____

4. Role in the company: _____

5. How long have you worked for this company?

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

6. Team size (excluding the leader): _____

7. Do you have a hybrid working model? (In this context, hybrid includes all working models that do not require a full-time, on-site presence and have implications for an inclusive workplace with less or no face-to-face interaction.) YES or NO

8. Do you have any agent / AI member in your team? YES or NO

THANK YOU VERY MUCH FOR YOUR PARTICIPATION!

Annex C. Leaders Survey

Leaders Survey

1. This questionnaire is part of a research project carried out by a group of researchers from ISCTE - University Institute of Lisbon, focused on team effectiveness in a business context. The main objective of this project is to identify factors related to teamwork that contribute to the effectiveness of projects and the satisfaction of both clients and consultants.
2. The data collected will be exclusively analyzed by the research team, ensuring anonymity.
3. The questions are designed in such a way that you only need to select the answer that seems most appropriate to you. Try to answer without spending too much time on each question.
4. There are no right or wrong answers. What matters to us is your personal opinion.
5. For each question, there is a scale. You may use any point on the scale that you consider appropriate.
6. Please complete the entire questionnaire in one go, without interruptions.

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

Thank you for your collaboration!

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

1. The following statements describe your team's behaviours. 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.	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 ask this team to work 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
6.	This team actively attacks problems.	1	2	3	4	5	6	7
7.	This team quickly uses opportunities to attain goals.	1	2	3	4	5	6	7
8.	This team usually does more than they are asked to do..	1	2	3	4	5	6	7
9.	This team is particularly good at realizing ideas.	1	2	3	4	5	6	7

2. Now think about your behaviour as a leader. Indicate to what extent you agree with each of the following statements:

1.	I encourage all team members to voice their opinions.	1	2	3	4	5	6	7
2.	I ensure that all team members are valued for their contributions.	1	2	3	4	5	6	7
3.	I make sure that everyone's unique strengths are leveraged.	1	2	3	4	5	6	7
4.	I create an environment in which team members can be themselves.	1	2	3	4	5	6	7
5.	I encourage everyone to be unique.	1	2	3	4	5	6	7
6.	I enable the team to see differences as an advantage rather than as a disadvantage.	1	2	3	4	5	6	7
7.	I help the team to see how differences among them can be an added value for our team.	1	2	3	4	5	6	7
8.	I help team members to solve disagreements to make better decisions for the team.	1	2	3	4	5	6	7
9.	I encourage team members to listen to perspectives that are different than their own.	1	2	3	4	5	6	7
10.	I help team members to understand that different views are needed to understand the bigger picture.	1	2	3	4	5	6	7

3. Now think about yourself in relation to the team. Indicate the extent to which you agree with each of the following statements:

1.	In this team, I can be my unique self.	1	2	3	4	5	6	7
2.	In this team, I can use my unique skills and abilities.	1	2	3	4	5	6	7
3.	In this team, I feel that I belong.	1	2	3	4	5	6	7
4.	In this team I feel connected with the other team members.	1	2	3	4	5	6	7
5.	In this team, I feel like an outsider.	1	2	3	4	5	6	7

4. The following questions aim to describe team behaviours. Please indicate to what extent you agree with each of the following statements.

This team is

1.	Taking creative actions to solve problems that lack straightforward answers.	1	2	3	4	5	6	7
2.	Finding innovative ways to handle unexpected situations.	1	2	3	4	5	6	7
3.	Adapting and managing unforeseen events by quickly refocusing and taking appropriate actions.	1	2	3	4	5	6	7
4.	Developing alternative action plans in a short time to address contingencies.	1	2	3	4	5	6	7
5.	Seeking and developing new skills to respond to situations/problems.	1	2	3	4	5	6	7
6.	Adjusting each member's personal style to the team's collective approach.	1	2	3	4	5	6	7
7.	Improving interpersonal relationships while considering the needs and aspirations of each member.	1	2	3	4	5	6	7
8.	Maintaining focus even when handling multiple situations and responsibilities.	1	2	3	4	5	6	7

5. In the next set of questions, we ask you to imagine a scenario where you would be leading a team not only with your human colleagues but also an AI agent as part of the team. An AI agent, in this context, is an autonomous system that acts as a team member with a clear, distinct role and collaborates interdependently with the team.

Please reflect on how leading a team with human and non-human team members might impact your behavior and the team's effectiveness. Your insights will help us understand the potential benefits, challenges, and dynamics of collaboration between humans and AI agents.

1.	I would encourage the team to collectively interpret things that happen to the team.	1	2	3	4	5	6	7
2.	I would promote team discussions about different perspectives of events or situations.	1	2	3	4	5	6	7
3.	I would encourage team members to provide their individual viewpoint on events or situations.	1	2	3	4	5	6	7

4.	I would promote the development of a shared understanding of events or situations among the team members.	1	2	3	4	5	6	7
5.	When an AI agent is integrated into the team, the quality of the work will increase.	1	2	3	4	5	6	7
6.	When an AI agent is integrated into this team, the quantity of the work will increase.	1	2	3	4	5	6	7
7.	When an AI agent is integrated into this team, the general effectiveness will increase.	1	2	3	4	5	6	7
8.	When an AI agent is integrated into this team, it will be more productive.	1	2	3	4	5	6	7
9.	When an AI agent is integrated into this team, it will be more efficient.	1	2	3	4	5	6	7
10.	When an AI agent is integrated into this team, team members could work well on future projects.	1	2	3	4	5	6	7
11.	When an AI agent is integrated into this team, team members will be satisfied working together.	1	2	3	4	5	6	7
12.	When an AI agent is integrated into this team, the team members would be willing to continue working in this team.	1	2	3	4	5	6	7

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

1. Gender: ☐ Male ☐ Female

2. Age: _____ years

3. Which nationality do you identify with most? _____

4. Role in the company: _____

5. How long have you worked for this company?

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