

Leadership Function Framework to Foster Team Flow in R&D Project Teams



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Research and Development (R&D) in futuristic technologies, executed by R&D project teams, steers the global economy and human progress. Team flow, an emerging topic in team science, is reported to improve team effectiveness and enhance team performance. Nurturing team flow in project teams is the responsibility of the project team leader. In this first-of-its-kind study involving R&D project leaders of DRDO, based on a novel 5R framework of team flow, qualitative methodologies were used to explore leadership functions which can foster team flow in R&D teams. The study concludes by proposing a framework of twelve leadership functions for R&D project team leaders.

Keywords: Team Flow, Leadership, R&D Project Teams, 5R Framework, Leader Behaviours

1. Introduction

Technological organisations place great importance on their research and development (R&D) activities, which are a pivotal foundation for their growth and success. By consistently investing in R&D, these organisations gain a competitive edge in a rapidly evolving marketplace (Zhou & Shalley, 2003). Over the past two decades, there has been a notable surge in focus on nurturing creativity and fostering innovation within R&D project teams. These teams are essential to the survival of organisations operating in today's fiercely competitive environment. In this process, they encounter many unique and complex situations that can significantly impact their effectiveness. These include intricate technical problems requiring sophisticated solutions, ambiguous objectives, and constant pressure to keep pace with swift technological advancements.

"Creativity and innovation in the workplace involve developing and implementing new methods to improve procedures, practices, or products. The creativity stage focuses on idea generation, while innovation is about putting those ideas into action, leading to identifiable benefits" (Anderson et al., 2014). These elements are vital for R&D projects, driving organisational growth and maintaining competitive advantage. In the past two decades, companies have prioritised fostering creativity and innovation in project teams, crucial for survival and growth, as well as the development of new products and services (Madjar et al., 2002; Im & Workman, 2004).

R&D project teams give organisations a competitive edge in today's fast-paced market. However, these teams often grapple with various intricate challenges that can impede their success. Clarity is frequently lacking in the initial phases of R&D projects, and teams may find themselves navigating unconventional technical processes. This ambiguity, combined with the inherent complexity of innovative projects, significantly heightens the risk of failure, as Farokhad et al. (2019) noted.

Furthermore, R&D teams must contend with many external factors, such as rapid technological advancements and shifting market demands, while operating under tight deadlines and limited resources. The necessity for groundbreaking solutions adds another layer of pressure. To effectively tackle these challenges, team members must work cohesively and build a strong foundation of trust, open communication, and mutual commitment.

A pivotal element in enhancing this collaborative environment is strong team leadership. Effective leaders play a crucial role in shaping the performance and productivity of R&D teams through their active and daily involvement. This includes tasks such as strategic planning, continuous monitoring of progress, and the astute utilisation of each team member's unique strengths and skills. In recognition of the evolving nature of R&D projects, there has been a shift towards developing new frameworks for leading these teams, acknowledging that traditional leadership models may no longer suffice, as highlighted by Thamhain (2008).

Given these dynamics, it becomes increasingly vital to delve into the intricacies of team interactions and performance. In this context, studying team flow within R&D project teams emerges as a crucial area of inquiry—one that holds the potential to unlock insights into boosting their productivity and ingenuity amidst the challenges they face.

2. Team Flow in R&D Project Teams

Over the past few decades, a significant body of research has been dedicated to enhancing the effectiveness of teams within organisations, particularly regarding the various processes that govern team dynamics. One intriguing concept that has emerged from this body of work is known as "team flow." This phenomenon represents a collective experience of flow—a state of heightened focus and effortless engagement that individuals can achieve when immersing themselves in a particular activity.

Team flow manifests during collaborative efforts where members execute interdependent tasks for the team's greater good, leading to a harmonised and optimised dynamics. This state relies on seven essential prerequisites and encompasses four fundamental characteristics, as identified by van den Hout et al. (2018). Research indicates that when teams experience flow together, they do not just enjoy the process; they also see tangible improvements in their performance, as evidenced by Gaggioli et al. (2017), and exhibit heightened creativity (van Oortmerssen et al., 2015). This makes pursuing team flow a critical area of interest for organisations aiming to foster collaboration and innovation among their teams.

R&D teams encounter challenges that can hinder their effectiveness. Among these challenges is the rapid pace of advancements in science and technology, making it difficult for teams to stay ahead. Additionally, the varied expertise of team members can create communication barriers and complicate collaboration. Compounding these

issues is the often-ambiguous nature of metrics used for evaluating progress, leaving teams without clear benchmarks for success (Clarke, 2002).

In today's fiercely competitive global landscape, R&D teams must exhibit adaptability to thrive. This often involves forging strategic alliances with other organisations and stakeholders to pool resources and knowledge. Teams increasingly prioritise the development of practical applications over purely fundamental research, recognising the need to bring innovations to market quickly. Outsourcing specific tasks and activities also enables teams to focus on their core competencies, ensuring that projects are completed efficiently and adhere to specified timelines and budget constraints (Farris & Cordero, 2002).

The successful execution of projects within these teams hinges on a series of interdependent processes. These processes transform inputs— ideas, resources, and expertise—into desirable outcomes. Achieving this transformation requires collaborative efforts characterised by cognitive, verbal, and behavioural actions that engage all team members in a shared vision. Ultimately, the aim is to align their strengths and contributions toward accomplishing collective goals, resulting in impactful and innovative solutions (Marks et al., 2001).

Govind & Sidharth (2024) introduced the innovative 5R Team Flow Model for R&D project teams. This model outlines five crucial processes instrumental in cultivating a state of team flow, enhancing both effectiveness and overall performance. The processes are Resonant, Reflection, Response, Resultant, and Reinforcing. The Resonant process focuses on creating harmonious interactions within the team, fostering an environment where ideas can flourish. Reflection encourages team members to step back, analyse their strategies and outcomes, and learn from their experiences. Response emphasises the importance of agility and adaptability in addressing challenges as they arise. The resultant measures the collective outcomes of the team's efforts, ensuring that the goals are met efficiently. Finally, the Reinforcing process strengthens the positive behaviours and practices within the team, ensuring sustained performance over time.

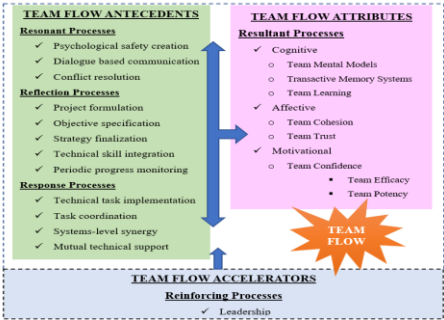


Figure 1 5R Model for Nurturing Team Flow in R&D Project Teams (Govind & Sidharth, 2024)

In a subsequent study, Govind and Sidharth (in press) delved deeper into the factors that impact team flow from the R&D perspective. They linked these factors

to each of the five processes in the model, providing a comprehensive understanding of how to optimise team dynamics in research settings. Figure 1 visually represents the structure and interactions of the 5R Team Flow Model, offering a clear depiction of its components and their interconnections.

3. Objectives of the Present Study

The 5R model shows that leadership is crucial in enhancing Team flow in R&D teams. The R&D team leader fosters key elements—resonant, reflective, responsive, and resultant processes—that promote team flow. Leadership roles in these processes are summarised in Table 1.

Table 1 Role of the R&D Project Leader in Facilitating 5R Team Processes

Processes Influencing Team Flow	Role of R&D Project Team Leader in Facilitating the Process
Resonant processes	Creating a psychologically safe team culture, instilling dialogue-based communication techniques, amicable resolution of conflicts, coaching and mentoring
Reflection processes	Initiating innovative ideas, planning and strategising, project review and monitoring, and creative problem-solving
Response processes	Organising task activities, coordinating, gatekeeping, and system-level monitoring
Resultant Processes	Facilitating the emergence of resultant cognitive, affective, and motivational states by ensuring effective inter-dynamics of resonant, reflection and response processes.

Thamhain (2003) highlighted that the innovative performance of R&D teams is significantly enhanced when team members' personal and professional needs are prioritised. This approach fosters an environment where individuals feel valued and motivated to contribute their best efforts. Furthermore, Gupta and Singh (2013) illustrated that by concentrating on relationship-oriented, task-oriented, and emergent processes, R&D teams can evolve from being a collection of individual experts into cohesive and collaborative workgroups. In this context, the role of the R&D project leader becomes crucial. A skilled leader nurtures a supportive environment that facilitates effective teamwork and empowers the team to leverage the organisation's competencies fully. This collaborative dynamic is essential for the team to reach its strategic goals and drive successful project outcomes.

In R&D environments, the requirements for effective leadership diverge significantly from those found in traditional business models. This discrepancy calls for a departure from conventional leadership frameworks, favouring innovative alternatives tailored specifically for R&D contexts (Arnold et al., 2000; Khatri, 2005). The concept of team flow in R&D project teams is relevant in this context. However, the precise leadership behaviours that promote this desirable state of team flow, especially within R&D teams, remain largely an unexplored territory.

This paper seeks to fill that critical gap by proposing a novel leadership framework to enhance team flow in R&D environments. To achieve this, the study engages in comprehensive interviews with leaders and team members in the field, alongside a

thorough analysis of existing literature. The goal is to uncover and define the key leadership behaviours that significantly impact the dynamics of team flow. Ultimately, this research aims to present a preliminary inventory of these essential behaviours, providing valuable insights for leaders striving to foster an environment conducive to innovation and collaboration in R&D settings.

4. Methodology

A detailed methodology was employed to create a comprehensive inventory of leader behaviours, including conducting in-depth interviews and performing a thorough literature search. This approach is aligned with the recommendations of Churchill and Iacobucci (2006), who advocate for in-depth interviews as a valuable tool for exploratory research endeavours. Similarly, the framework established by Eisenhardt (1989) supports using qualitative interviews when investigating less familiar topics, highlighting their relevance in this context.

The literature search served as a crucial complementary step, enriching the preliminary findings from the interviews. This aligns with the insights provided by Strauss & Corbin (2008), who emphasise the importance of integrating existing research with new data. These methods gathered valuable information from professionals in R&D roles. This data was systematically analysed and aligned with established studies to construct a structured framework of leader behaviours that significantly enhance team flow within R&D teams. The resulting inventory aims to provide actionable insights into leadership dynamics in fostering collaborative and effective team environments in innovative settings.

Yukl & Falbe (1990) proposed a taxonomy of fourteen leader behaviours. Gupta & Singh (2012) adapted this taxonomy into a framework specifically for the Indian R&D context based on research with scientists from five government-funded laboratories. They categorised leader behaviours into five groups: 1. Relation-oriented: inspiring, supporting, developing, recognising, informing; 2. Task-oriented: clarifying, problem-solving, monitoring, buffering; 3. Empowering: consulting, empowering; 4. Team-building; 5. Leading by example. Gupta et al. (2013) validated this model quantitatively using data from 11 laboratories. Morgeson et al. (2010) also described 15 team leadership functions, organised into transition and action phases of team performance. These taxonomies, alongside insights from interviews and literature, informed the development of new leadership behaviour categories. Based on this, the research questions derived were as follows:

RQ1: Which leadership behaviours enable Resonant Processes in an R&D team?

RQ2: Which leadership behaviours enable Reflection Processes in an R&D team?

RQ3: Which leadership behaviours enable Response Processes in an R&D team?

4.1 Respondents

Twenty-five R&D professionals were selected through purposive sampling as participants in the study. Each participant held a leadership position in R&D project teams within a defence R&D establishment, and they were leading teams of knowledge workers in the role of project directors, deputy project directors or senior members of the team. They were identified by top management and are recognised

experts in their technical areas. With 18 to 34 years of experience in R&D, their expertise in project teams ranges from 8 to 19 years, providing valuable insights into leadership processes essential for this study. Table 2 provides the detailed demography of participants in the study.

Table 2 Demography of Participants in the Study

Participant	Role	Experience in the R&D field (years)	Age (years)	Qualification	Gender
P1	Project Director	32	55	Post-Graduate	F
P2	Project Director	33	56	PhD	F
P3	Project Director	32	58	Post-Graduate	F
P4	Project Director	28	53	PhD	M
P5	Project Director	28	52	Post-Graduate	F
P6	Project Director	22	50	PhD	M
P7	Project Director	28	50	Post-Graduate	M
P8	Project Director	26	54	Post-Graduate	F
P9	Project Director	22	46	Post-Graduate	M
P10	Project Director	22	45	Post-Graduate	M
P11	Dy Project Director	19	40	Post-Graduate	M
P12	Dy Project Director	21	42	Post-Graduate	F
P13	Dy Project Director	20	41	Post-Graduate	M
P14	Dy Project Director	22	42	Post-Graduate	M
P15	Dy Project Director	18	42	PhD	F
P16	Dy Project Director	19	41	Post-Graduate	M
P17	Dy Project Director	18	43	PhD	M
P18	Dy Project Director	22	47	Post-Graduate	M
P19	Senior Member	22	42	Post-Graduate	F
P20	Senior Member	23	41	Post-Graduate	M
P21	Senior Member	23	44	Post-Graduate	F
P22	Senior Member	17	42	PhD	M
P23	Senior Member	21	44	Post-Graduate	F
P24	Senior Member	19	46	PhD	M
P25	Senior Member	21	49	PhD	M

4.2 Data Collection

The first author meticulously conducted face-to-face interviews, engaging each participant in a two-part conversation to delve deeply into their experiences. Participants were encouraged to share their insights about working within R&D teams in the initial phase. This segment fostered a free-flowing dialogue, where participants expressed their perspectives on leadership and discussed various leadership styles they had encountered or employed. The aim was to uncover their attitudes and behaviours as leaders, and the challenges in those roles, creating a rich tapestry of personal and professional narratives.

Transitioning to the second part of the interview, respondents were introduced to the concepts of flow, team flow, and the 5R processes—frameworks crucial for understanding how effective leadership can enhance team dynamics. They were informed that the interview's primary objective was to investigate how leader behaviours can cultivate a sense of team flow within R&D teams. Following this introduction, the conversation shifted to targeted questions regarding their experiences in facilitating the 5R processes, prompting them to reflect on specific strategies and outcomes related to team collaboration.

Each interview was thoughtfully structured and lasted 60 to 90 minutes, allowing ample time for in-depth exploration of these topics. After each session, detailed notes were compiled to create a comprehensive report for the participants to review. To ensure clarity and accuracy, some participants were contacted again through follow-up calls to address any ambiguities or expand upon specific points made during the interviews. Table 3 provides sample responses from participants to the research questions posed.

Table 3 Sample Responses to Research Questions

RQ1	Leader Behaviours that enable Resonant Processes	P3: Doing R&D is like moving to an uncharted territory for the first time. There are many unknown factors with potential risks. In this scenario, the leader needs to be a genuine listener. He should be capable of understanding the feelings and emotions of team members and facilitating transparency in the team. P4: The leader should be able to make sure that each team member is heard. (S)He should also convince the team members to strive towards an imagined future as a unified force. P19: The leader should be able to create and nurture a shared, collective purpose among his team members. (S)He should encourage open discussions on conflicting ideas, but ensure that team members do not take criticisms personally or escalate them into ego-based fights. P22: The leader should ensure that team members' strengths and interests match their project responsibilities. (S)He should provide constructive feedback, recognise contributions, and help them learn and evolve.
RQ2	Leader Behaviours that enable Reflection Processes	P1: The leader should provide a vision for the team, which all members can admire and yearn for. This vision should unite and guide us, especially when facing challenges, roadblocks or rough patches. P7: From the initial stages of the project, the leader needs to define

		‘what is to be achieved when clearly’. The team must prepare these SMART goals collectively so that every member owns them. P24: In R&D teams, all members are experts in their unique fields of specialisation. So, the leader has to specify the roles and responsibilities of each team member so that everyone is clear about what is expected of them. P19: The leader has a significant role in regular monitoring and periodic feedback on work progress. This is critical for corrective actions to be taken at the right time.
RQ3	Leader Behaviours that enable Response Processes	P21: In an R&D project, the team leader must ensure that everyone is aligned and collaborating smoothly on their tasks. Timing and coordination are vital for maintaining adequate progress. P5: The team leader must spot potential issues early on, keep everyone in the loop, and devise workable solutions. P8: One of the big tasks for a leader is to connect with what’s happening outside the team. This means managing outside influences, building relationships, tapping into resources, and looking out for the team’s interests. P17: A key part of being a leader is seeing the team and everything they do as a big picture. It’s about understanding how things connect, noticing new trends, and making the most of any uncertainties.

4.3 Data Analysis

Each interview report was thoroughly examined to identify recurring themes and patterns aligned with the study’s objectives. In the initial phase, both authors undertook an independent review of the reports, meticulously categorising the data based on various criteria for leadership in R&D teams. After completing their analyses, the authors engaged in collaborative discussions to address discrepancies or differing interpretations, ultimately working towards a consensus that established a cohesive classification system.

To complement the analysis of the interview reports, a comprehensive literature review was conducted to pinpoint relevant leadership behaviours that are particularly effective within R&D environments. This review considered theoretical frameworks and empirical studies, allowing the authors to understand how specific leadership styles can influence team dynamics, creativity, and overall performance in R&D contexts.

The analysis of the interviews was a comprehensive process involving several methodological techniques aimed at gaining a nuanced understanding of the collected data. Three primary approaches- structural, descriptive, and conceptual- were utilised during the initial coding cycle to facilitate this.

Descriptive coding served as the foundational technique for the analysis. The researchers developed context-specific phrases that effectively encapsulated the essence of the interviewees’ narratives. This approach focused on capturing the richness of the participants’ experiences and viewpoints, thereby providing a solid groundwork for understanding the core messages within the data.

Building upon this, structural coding was implemented to enhance the descriptive codes by assigning precise labels or words representing key ideas identified in the interviews. This technique allowed for a more organised data categorisation,

ensuring that essential concepts were systematically highlighted and easily referenced.

Lastly, conceptual coding was employed to connect the specific insights gathered from the interviews to broader themes and overarching ideas. This method proved invaluable in helping researchers identify patterns and relationships within the data, thus facilitating a holistic view of the findings. Utilising these interrelated coding techniques, the analysis successfully captured the critical factors contributing to team flow, ensuring that essential themes and insights were thoroughly analysed and understood. An example of coding the responses for the question ‘Which leadership behaviours enable resonant processes in your R&D project team?’ is shown in Figure 2.

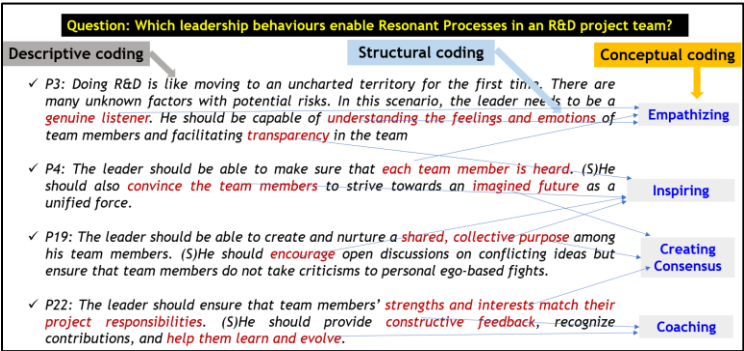


Figure 2 An Example of the Coding Cycle Followed

Based on the data analysis, an inventory of twelve leader behaviours influencing team flow in R&D teams was developed. The results are discussed in the next section.

5. Results

A crucial insight has emerged from a thorough data analysis, an extensive literature review, and the author's rich experience spanning two decades in R&D project management: effective leadership behaviours are pivotal in cultivating a seamless flow within R&D teams. These leadership practices enhance three fundamental processes: Resonant, Reflection, and Response. By actively nurturing these processes, leaders can create an environment that encourages the development of Resultant Processes, which emerge from dynamic interactions among team members. This interplay fosters an atmosphere conducive to a heightened flow, where individuals experience intensified focus, enhanced creativity, and collaborative synergy.

Table 2 offers a detailed inventory of the leadership behaviours identified in this study to provide a more precise understanding. Each behaviour is accompanied by a concise definition, elucidating the characteristics and attributes that exemplify effective leadership within the context of R&D teams. This comprehensive framework aims to guide leaders in optimising team performance and fostering an inspiring work environment.

Table 2 *Twelve Leader Behaviours Likely to Nurture Team Flow in R&D Teams*

Leader behaviours nurturing team flow in R&D teams	Definition	Comparison with the leader behaviours proposed by similar models	
Resonant process enabling functions		Gupta et al., (2013)	Morgeson et al., (2010)
Empathising	Being an attentive listener, empathising with team members' feelings, and fostering open dialogue within the team	Supporting	Not available
Inspiring	Inspiring team members to envision a shared future and encouraging them to work together as a cohesive unit.	Inspiring	Not available
Creating consensus	Establishing a collective understanding of the team's shared purpose and ensuring that task-based conflicts do not escalate into relationship-based conflicts.	Not available	Not available
Coaching	Encouraging team learning by developing members' skills and strengths, providing constructive feedback, and ensuring timely recognition.	Developing, Recognising	Training and developing the team
Reflection process enabling functions			
Visioning	Defining the team's overall purpose and ensuring that all team members have a shared understanding of it.	Not available	Defining mission
Goal setting	Establishing team goals and clearly defining performance expectations for each team member.	Not available	Establishing expectations and goals
Strategising	Clarifying the roles, strategies, and timelines necessary for achieving the team's goals.	Not available	Structuring and planning
Monitoring	Periodically reviewing team activities, assessing progress, and giving feedback for necessary adjustments.	Monitoring	Monitoring the team
Response process enabling functions			
Coordination	Making sure that team members carry out interdependent activities in a coordinated and timely manner.	Not available	Not available
Problem-solving	Identify potential problems early, keep the team informed, and develop satisfying solutions.	Problem-solving,	Solving problems
Boundary spanning	Engaging with the external environment, moderating outside influences, forming networks, accessing resources, and protecting the team's interests.	Buffering	Managing team boundaries
Systems thinking	Considering the team and its activities as a whole, recognising interrelationships and emerging features, and capitalising on uncertainties.	Not available	Not available

6. Discussions

6.1 Conclusions and Implications

R&D project teams are crucial in addressing complex challenges and creating innovative, cost-effective solutions. To achieve this, it is essential to harness the diverse skills and expertise of all team members. Research indicates that fostering an

environment that encourages team flow—the state where individuals work together seamlessly—can significantly enhance these teams' effectiveness and overall performance. One pivotal framework in understanding this phenomenon is the 5R model of team flow, which emphasises the transformative impact of leadership on facilitating team flow experiences. Leader behaviours that can positively influence and improve individual and collective performance of the teams have been a field of research for quite a long time (Bass, 1990; Yukl et al., 2002; Yukl, 2008). This paper seeks to enrich the existing literature by presenting a detailed inventory of leadership behaviours that influence team dynamics. In particular, it focuses on three essential processes identified in the 5R model: Resonance, Reflection, and Response. Through careful analysis, the study identifies four distinct behaviours leaders exhibit that can effectively facilitate each of these critical processes. By focusing on these behaviours, leaders can cultivate an environment where team members thrive, collaborate more effectively, and ultimately produce groundbreaking solutions to their challenges.

Through extensive literature review and in-depth interviews, twelve leader behaviour constructs have been identified that are proposed to influence team flow within R&D project teams. These behaviours vary widely; some are general and applicable to any leadership role, while others are specifically tailored to the R&D environment and designed to foster creativity and innovation. Three of Gupta et al.'s (2012) leadership functions—inspiring, problem-solving, and monitoring—were retained. Six constructs were combined into new constructs: supporting and consulting became Empathizing; developing and recognising formed Coaching; and consulting and empowering became Aligning. Redundant constructs were eliminated or redefined, such as combining 'informing' and 'clarifying' into 'monitoring' and redefining 'buffering' as 'managing team boundaries.' Seven of Morgeson et al.'s (2010) leadership functions were also included, covering all Reflection process enabling functions and two Response process allowing functions. Additionally, 'creating consensus' and 'systems thinking' emerged from interviews, supported by recent research.

Each process in the 5R framework has four influencing leader behaviours. The resonant processes, including psychological safety, dialogue-based communication, and conflict resolution, which are intended to bring the team members into a state of resonance, are influenced by leader behaviours like empathising, inspiring, creating consensus and coaching. The reflection processes, including R&D project formulation, objective specification, strategy finalisation, technical skill integration and periodic progress monitoring, during which the R&D team reflects on the project's activities, are influenced by leader behaviours like visioning, establishing goals, strategising, and monitoring. The response processes include technical task implementation, task coordination, systems-level synergy, mutual technical support and course corrections, which involve the execution of the R&D task activities and are found to be influenced by leader behaviours like coordination, problem-solving, boundary spanning and systems thinking (Govind & Sidharth, 2024).

Among the 12 leadership behaviours identified, some—such as 'creating consensus' and 'systems thinking'—are particularly critical in the context of R&D projects (Shaw et al., 2011; Tate, 2010). For instance, R&D team leaders who utilise

systems thinking can view the project holistically, allowing them to anticipate potential problems and implement solutions proactively. Additionally, these leaders can present a broader perspective to team members who are specialists in their respective fields. This ability helps persuade team members to step beyond their comfort areas and collaborate effectively toward synergistic solutions.

6.2 Limitation and Future Research

The present study acknowledges several limitations that can inform future research endeavours. Given that it relies exclusively on qualitative methods, conducting a follow-up survey on a larger scale is essential. This broader survey would help ascertain which of the identified leadership behaviours genuinely influence team flow processes meaningfully. A diverse range of leadership behaviours has been proposed throughout this study, stemming from a limited set of interviews and an extensive review of relevant literature. These suggestions are also rooted in the author's two decades of professional experience in critical roles within the field. However, despite this comprehensive foundation, the proposed behaviours have not yet been ranked or prioritised based on their impact and significance. Further quantitative research is necessary to enhance the depth of understanding. This approach could help streamline the extensive list of proposed behaviours to focus on more manageable core dimensions. For example, 'monitoring' and 'coordination' might be integrated to form a broader construct, as both share overlapping characteristics that could be better understood when considered together.

Another notable limitation of this study is its narrow focus on the R&D project domain, which restricts its findings to a specific context. The interviews were exclusively conducted with R&D project leaders overseeing intricate defence R&D projects at a single defence research laboratory. This exclusive approach overlooks the rich experiences and insights that could be gathered from similar teams operating in other research environments, such as space exploration and related scientific fields. For instance, considering the realm of defence R&D, the landscape is further complicated by diverse stakeholders, including the armed forces, who serve as the primary customers for defence-related innovations. Public and private sector industries and academic institutions also play vital roles in this ecosystem. By studying how leaders in these varied sectors navigate the complexities of their projects, valuable strategies and insights that might enhance project management practices across different domains can be uncovered. Exploring these dynamics could yield a deeper understanding of the collaborative efforts required to succeed in complex, multidisciplinary R&D projects.

This study interviewed R&D team leaders to gain insights into the behaviours driving effective leadership within R&D contexts. While these leaders' perspectives are valuable, it is equally important to incorporate team members' views about leadership. Their insights can enrich our understanding and potentially uncover crucial elements missing from the proposed framework of leadership behaviours. Moreover, it is essential to consider the various contingency factors that can impact the dynamics of an R&D project scenario. Future research should investigate how leaders can actively shape the organisational environment. By doing so, they can foster conditions that promote a sense of team flow among R&D project teams, ultimately enhancing creativity, collaboration, and productivity.

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