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V. Kiran Govind, Sumati Sidharth

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An inventory of leader behaviours for nurturing team flow in research and development project teams

V. Kiran Govind* and Sumati Sidharth

Department of Technology Management,
Defence Institute of Advanced Technology (DU),
Pune, 411025, India

Email: kirangovind.npol@gov.in

Email: sumatisidharth73@gmail.com

*Corresponding author

Abstract: R&D project teams create a competitive advantage for organisations by advancing technological knowledge and delivering innovative services and solutions. These projects comprise experts in diverse fields, who must be transformed into cohesive teams working towards realising project objectives. Team flow, an emerging topic in team science, can significantly improve team effectiveness and performance with positive outcomes. The onus is on the R&D team leader to nurture a state of team flow by instilling the right team processes and fostering team emergent states. 5R-framework (resonant, reflection, response, resultant and reinforcing), a new model to foster team flow in R&D project teams, is the basis for the present study. Based on 5R-framework, in-depth interviews with R&D team leaders and an exhaustive literature search were conducted to create an inventory of 12 leader behaviours. The proposed leader behaviours can likely influence the 5R team processes and nurture team flow in R&D project teams.

Keywords: team flow; R&D project teams; leader behaviours; team effectiveness; 5R framework; team performance; team processes; team emergent states.

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Biographical notes: V. Kiran Govind is a senior scientist at the Naval Physical and Oceanographic Laboratory (NPOL), DRDO, Kochi, India. He is parallelly pursuing his Doctoral degree as a DRDO-sponsored candidate at the Department of Technology Management, Defence Institute of Advanced Technology (DU), Pune, India. He has over 20 years of experience as a project manager and leader in critical defence technology-related Research and Development (R&D) projects. His areas of interest include R&D technology management and project management, with a particular focus on measures to enhance project team effectiveness. His present area of research is on fostering team flow and analysing its influence on defence R&D project teams.

Sumati Sidharth is an Associate Professor and Head of the Department of Technology Management, Defence Institute of Advanced Technology (DU), Pune, India. Before her academic career, she gained broad on-field management experience during her stint in leading business firms, including

M/s Reliance Infocomm, for over a decade. Her active areas of research include performance management systems, strategic management, leadership, organisational behaviour, and human resource management. She has conducted extensive collaborative research and intervention projects with public and private organisations and produced several refereed publications in national and international journals.

1 Introduction

“Creativity and innovation at work are the processes, outcomes, and products of attempts to develop and introduce new and improved ways of doing things. The creativity stage of this process refers to idea generation and innovation to the subsequent stage of implementing ideas toward better procedures, practices, or products. Creativity and innovation invariably result in identifiable benefits” (Anderson et al., 2014). Creativity and innovation are critical features of any R&D project. They propel organisations on a growth path and help sustain their competitive advantage (Zhou and Shalley, 2003). In the last two decades of this millennium, organisations have given thrust to boost creativity and innovation in project teams, as these factors are found to ensure organisational survival and growth (Madjar et al., 2002) and the development of new products, solutions, and services (Im and Workman, 2004).

R&D project teams are expected to provide a competitive advantage to organisations, but the challenges they address are complex and ambiguous. The clarity at the initial stages of R&D projects is low compared to typical projects in other fields, and they must follow unconventional technical processes, with more failure probability (Farokhad et al., 2019). These projects also have several challenges, such as rapid external changes, tight schedules, resource limitations, and the demand for flexible and innovative solutions. To meet these challenges, the project team must perform as a cohesive unit with a common purpose, enjoying mutual trust, communication, and commitment. This shift in the organisational landscape has necessitated evolving new frameworks for leading and managing teams, as it is becoming evident that traditional models are not more effective (Thamhain, 2008).

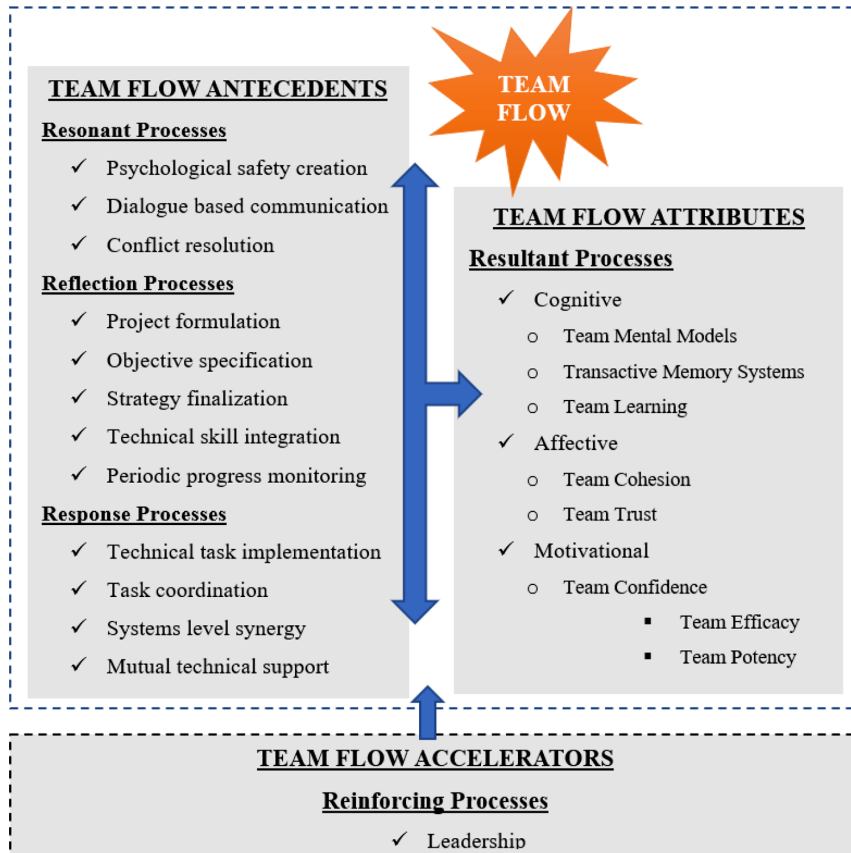
The most effective and direct force that can aid this process is the leadership of these teams. Leaders influence the R&D team’s performance through their daily interventions in the project, including planning and executing activities, monitoring and coordinating, and effectively utilising the teams’ human potential.

2 Team flow in R&D project teams

The past few decades have witnessed extensive research on enhancing the effectiveness of teams in organisations, with a thrust on various team processes. In this context, the concept of flow (an optimal psychological state experienced by an individual when she is effortlessly involved in an activity with total focus) has been applied to teams through a novel construct, ‘team flow’. Team flow is “a shared experience of flow during the

execution of interdependent personal tasks in the interest of the team, originating from an optimised team dynamic and typified by seven prerequisites and four characteristics” (van den Hout et al., 2018). Studies have found that team flow fosters team performance (Gaggioli et al., 2017) and creativity (van Oortmerssen et al., 2015).

Figure 1 5R model for nurturing team flow in R&D project teams (see online version for colours)



Source: Govind and Sidharth (2023a)

R&D teams are confronted with unique challenges like quick advances in science and technology, diverse technical disciplines of team members and the absence of well-defined metrics for progress evaluation (Clarke, 2002). In the highly competitive global scenario, R&D project teams also have to evolve by creating alliances with other teams, focusing more on the development part than fundamental research, outsourcing those activities which can be done by different industries and ensuring fruitful completion of projects with no time or cost overruns (Farris and Cordero, 2002). As any project team carries out its mission, it must undergo specific team processes defined as “members’ interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioural activities directed toward organising taskwork to achieve collective goals” (Marks et al., 2001). In a study specific to R&D project teams, Govind and Sidharth (2023a) proposed the 5R team flow model, which suggests a framework of 5 team

processes – Resonant, Reflection, Response, Resultant, and Reinforcing- which the team needs to undergo to nurture team flow and thus enhance the team effectiveness and performance. Govind and Sidharth (2023b) also conducted a systematic scoping review of factors influencing team flow from an R&D project team perspective. They identified vital factors belonging to each of these processes. The 5R team flow model is shown in Figure 1.

3 Objectives of the present study

The 5R model reveals that reinforcing processes, especially leadership, play a significant role in accelerating or facilitating Team flow in R&D teams. The R&D team leader is responsible for nurturing the antecedents and attributes of team flow – resonant, reflection, response, and resultant processes – in a team. Leadership roles in each of these team processes are shown in Table 1.

Thamhain (2003) has found that the most significant factors that boost the innovative performance of R&D teams belong to the human dimension, catering to team members' personal and professional needs. Gupta et al. (2013), based on a study on Indian R&D laboratories, proposed that by focusing on the relationship-oriented processes(resonant) and the task-oriented processes (reflect and response) and emergent processes(resultant), R&D teams can be transformed from a group of individual experts to cohesive work groups. The R&D project leader creates a climate conducive to effective teamwork that can utilise organisational competencies and achieve the team's mission. The objective of the present study is to carry out in-depth interviews and analyse the literature to discover the critical leader behaviours that can likely influence each of these processes. Finally, it will propose a preliminary inventory of leader behaviours.

Table 1 Processes influencing team flow and the role of the R&D project leader in facilitating them

<i>Processes influencing team flow</i>	<i>Role of R&D project team leader in facilitating the process</i>
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, creative problem-solving
Response processes	Organising task activities, coordinating, gatekeeping, 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

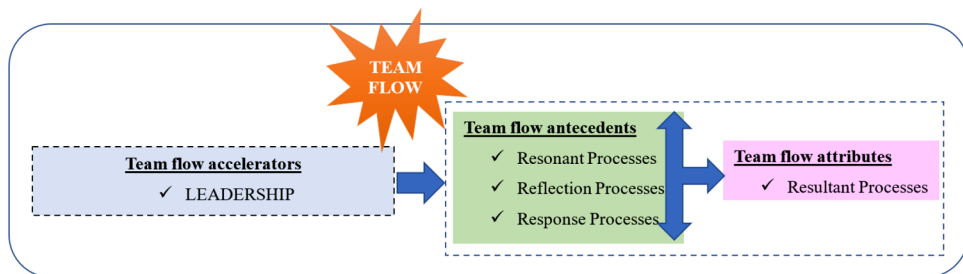
4 Leadership in R&D project teams

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). Research in the earlier days focused on the two-factor

conceptual models of leadership, broadly classified as two meta categories – relationship-oriented behaviours and task-oriented behaviours. Later, a third dimension, change-oriented leadership, was added to these. Research has been quite active in this area, focusing on leadership structure – the ‘what’ of leadership- including several well-established leadership theories like transformational leadership, leader-member exchange and fresher approaches like empowering leadership, servant leadership and shared leadership. Studies are also there on the leadership process- the ‘how’ of leadership- which focuses on leadership from a team context like dynamic leadership, which complements the structure-based leadership theories. However, leadership requirements in R&D environments differ from regular businesses, and traditional models must be replaced with specific custom-developed models (Arnold et al., 2000; Khatri, 2005). For instance, leadership behaviours for nurturing team flow, an upcoming area of research in team effectiveness, are yet to be fully developed, especially in the R&D team scenario. In this paper, we try to plug that gap by proposing a new leadership framework for nurturing team flow in R&D teams.

The current study focuses on certain leader behaviours that influence team flow in R&D project teams. The apparent contrasts between the leadership requirements of regular business environments and empowered environments like R&D suggest that standard leadership metrics may be only moderately applicable in the latter areas (Arnold et al., 2000). Instruments designed for traditional workplaces may not cover the full range of behaviours required for effective leadership in R&D organisations. As a result, it appears that a new and more sophisticated behavioural measure of leadership relevant to the R&D context is required (Arnold et al., 2000; Yukl, 2008). The foundation of the present study is based on the 5R model (Ref Figure 1), which defines the relationship between leadership and team flow. The reconfigured model is shown in Figure 2.

Figure 2 Reconfigured 5R model depicting the relationship between leadership and team flow (see online version for colours)



5 Methodology

A combination of in-depth interviews and a literature search was followed to develop the inventory of leader behaviours. This is based on Churchill and Iacobucci (2006), who suggested in-depth interviews as a qualitative research technique suitable for explorative studies on a particular subject and developing initial propositions. Eisenhardt (1989) proposed in-depth interviews as an appropriate research technique for studying relatively unexplored topics. The literature search is taken up so that it can complement the results from the preliminary exploratory research (Strauss and Corbin, 1990). Thus, information

was collected from working R&D professionals and corroborated with existing studies before theorising a leader behaviour framework for nurturing team flow in R&D teams.

5.1 Respondents

12 R&D professionals were selected through purposive sampling as participants. Each participant was a project leader/deputy project leader of R&D project teams in a defence R&D establishment. All of them had led/were leading teams of knowledge workers as part of their daily work. They were identified by the top management of the establishment for involving in this study and all of them were experts in their technical domains. As leaders of R&D project teams, they were involved in developing complex technologies and systems for use by the defence forces. Their experience working in the R&D field ranges from 18 to 34 years. Specifically, their expertise in executing leadership roles in R&D project teams ranges from 8 to 19 years, thus ensuring considerable involvement and knowledge in leadership processes, which are vital for this study. Their details are given in Table 2.

Table 2 Details of participants in the study

<i>Participant</i>	<i>Role</i>	<i>Experience in the R&D field (years)</i>	<i>Experience in leadership roles (years)</i>	<i>Age (years)</i>	<i>Qualification</i>	<i>Gender</i>
1	Project director	30	16	56	Post graduate	M
2	Project director	29	14	52	Post graduate	M
3	Project director	34	19	54	Post graduate	F
4	Project director	32	16	55	Post graduate	F
5	Project director	22	9	43	Doctorate	M
6	Project director	26	11	49	Post graduate	M
7	Deputy project director	21	11	42	Post graduate	F
8	Deputy project director	19	8	40	Post graduate	M
9	Deputy project director	21	12	42	Post graduate	F
10	Deputy project director	19	9	40	Post graduate	M
11	Deputy project director	18	8	41	Post graduate	M
12	Deputy project director	20	12	43	Post graduate	M

5.2 Data collection

Face-to-face interviews were conducted by the first author with each participant in a generally unstructured format in two parts. In the first part, the respondents were asked about their general experiences as a part of R&D teams in different roles, their perspectives on leadership, and their specific leadership styles. After these warm-up questions, the participants were encouraged to have a free-wheeling conversation about their attitudes, behaviours, and challenges as leaders of R&D teams. The initial response from the participants and further probing for elaboration set the overall direction of the interview. In the second part, respondents were briefed about the concept of flow, team flow and the 5R processes. It was also revealed to the respondents that the purpose of the interview was to explore what leader behaviours can likely nurture team flow in R&D teams. This was followed by more direct questions on how leaders can facilitate each of the 5R processes. The interview lasted for 60-90 minutes. After each interview, comprehensive notes of answers were converted into a detailed report, which the respondents subsequently vetted. In a few cases, clarifications were done through follow-up questions by telephone.

5.3 Analysis

Each interview report was studied to identify common patterns about the purpose of the study. Initially, both authors independently analysed the reports and categorised the results. Further, based on mutual discussions, differences were resolved, and a synergistic categorisation was achieved. An exhaustive literature review was carried out to identify the pertinent leadership behaviour items applicable to R&D teams. Yukl and Falbe (1990) presented a leader behaviour taxonomy in the Managerial Practices Survey comprising 14 leader behaviours. Based on this, Gupta and Singh (2012) proposed a leadership behaviour framework specifically valid to the Indian R&D milieu after an exhaustive study conducted with scientists from five government-funded R&D laboratories in different parts of India. From this study, they identified the following leader behaviours, classified under five categories: Relation-oriented (inspiring, supporting, developing, recognising, informing), Task-oriented (clarifying, problem-solving, monitoring, buffering), Empowering (consulting, empowering), Team building and leading by example. Gupta et al. (2013) further validated this qualitative model through a quantitative analysis based on data collected from 11 Indian R&D laboratories. Along similar lines, Morgeson et al. (2010) described 15 team leadership functions categorised under the transition phase (composing a team, defining a mission, establishing expectations and goals, structuring and planning, training and developing the team, sense-making and providing feedback) and action phase (Monitoring the team, managing team boundaries, challenging the team, performing team tasks, solving problems, providing resources, encouraging team self-management and supporting social climate) of the team performance cycle. Adopting both these taxonomies as the foundation, the inputs and insights emerging from interviews and literature were used to develop and categorise potential new categories of leadership behaviours.

Through an iterative process combining interview data and available theoretical studies, an inventory of 12 leader behaviours that have a likely influence on team

flow in R&D teams evolved. Three of Gupta et al.'s (2012) leadership functions were also retained in the present study (inspiring, problem-solving, monitoring). Six other constructs were combined to form new constructs (supporting and consulting – Empathising, developing, and recognising-Coaching, consulting and empowering-Aligning). Other constructs were dropped if they felt redundant or were redefined or refocused to reflect the information from interviewees. For instance, 'informing' and 'clarifying' were redefined as a single construct, namely 'monitoring.' 'Buffering' was redefined as 'Managing team boundaries' to accommodate a broader perspective. Other leadership functions were dropped from the final inventory as they were not featured in interviews or found in current literature linking leadership in R&D teams. Seven of Morgeson et al.'s (2010) leadership functions, including all four Reflection process enabling functions and two Response process enabling functions, were also featured in the present study. Also, two new leader behaviours that emerged from interviews and duly supported by the latest research were added – 'creating consensus' and 'systems thinking.' The results are discussed in the next section.

6 Results

Table 3 presents the inventory of leader behaviours that evolved based on this study. The table also gives a brief definition of each leader's behaviour.

Table 3 Twelve leader behaviours likely to nurture team flow in R&D teams

<i>Leader behaviours nurturing team flow in R&D teams</i>		<i>Comparison with leader behaviours proposed by similar models</i>	
	<i>Definition</i>	<i>Gupta et al. (2013)</i>	<i>Morgeson et al. (2010)</i>
Resonant process enabling functions			
Empathising	Being a genuine listener, understanding the feelings and emotions of team members and facilitating dialogue-based communication in the team	Supporting	Not available
Inspiring	Showing the team members an imagined future and boosting them to strive towards it as a cohesive unit	Inspiring	Not available
Creating consensus	Creating a collective understanding of the team's shared purpose and ensuring task-based conflicts do not blow out into relationship-based conflicts	Not available	Not available
Coaching	Enabling team learning by developing member's skills and strengths, providing constructive criticisms, and ensuring timely recognition	Developing, Recognising	Training and developing the team

Table 3 Twelve leader behaviours likely to nurture team flow in R&D teams (continued)

<i>Leader behaviours nurturing team flow in R&D teams</i>		<i>Comparison with leader behaviours proposed by similar models</i>	
	<i>Definition</i>	<i>Gupta et al. (2013)</i>	<i>Morgeson et al. (2010)</i>
Reflection process enabling functions			
Visioning	Defining the team's overall purpose and ensuring its shared understanding among team members	Not available	Defining mission
Goal setting	Setting team goals and outlining clear performance expectations among team members	Not available	Establishing expectations and goals,
Strategising	Determining the roles, strategies, and timelines for achieving team goals	Not available	Structuring and planning,
Monitoring	Reviewing the team activities periodically, evaluating the progress and providing feedback for necessary course corrections	Monitoring	Monitoring the team
Response process enabling functions			
Coordination	Ensuring the team members execute interdependent team activities in a synchronous manner	Not available	Not available
Problem-solving	Identifying possible problems early on, keeping the team informed and evolving satisficing solutions	Problem-solving,	Solving problems
Boundary spanning	Interacting with the outside environment, buffering external forces, building networks, availing resources, and safeguarding the interests of the team	Buffering	Managing team boundaries
Systems thinking	Viewing the team and team activities holistically, recognising interrelationships and emergent features, and exploiting uncertainties.	Not available	Not available

Based on an exhaustive literature review and the authors' implicit experiences in R&D project management for the last 20 years in various roles, the following leader behaviours have been identified as potential factors that can nurture team flow in R&D teams. These leader behaviours cater to strengthening the Resonant, Reflection and Response Processes in R&D teams, from which the Resultant Processes emerge, collectively leading to team flow experiences for team members.

6.1 *Leader behaviours reinforcing resonant process*

To carry out the project tasks in an R&D project, the team members must go through dynamic, interdependent team processes, which necessitate high levels of interpersonal interactions. During these activities, team members must intermingle, keeping their personal selves at bay, and work together towards meeting the team's mission. Before taking up their roles and responsibilities in the team, the members must understand each other and nurture strong interpersonal bonds (Katz and Kahn, 1978; Kozlowski and

Hults, 1986) to transform into a cohesive, resonating unit. Leaders should actively concentrate on this team-building aspect, thus equipping the team to collectively address all the task processes and challenges, providing innovative and effective solutions. The ‘resonant’ category involves key process dimensions like psychological safety, dialogue-based communication, and conflict resolution. The four key leader behaviours that influence these processes include:

6.1.1 Empathising

Most interviewees felt that the first and foremost thing the leaders should do is to listen patiently, understand team members’ perspectives and enable a climate of trustworthiness and open communication. Words like “understand my feelings” and “trying to see things from my point of view” were echoed by the majority. One person stated, “Being a leader, I see my team member as a holistic individual playing multiple roles in office, family, society, community, etc. An issue in any of these spheres can impact her performance in the team. My responsibility is to create a climate of empathy where she can share the issue, examine it from different perspectives and arrive at possible solutions”. Another participant touched upon the necessity for the leader to proactively ensure the emotional well-being of team members to improve their effectiveness at work.

This brings in empathy, which signifies a vital conceptual feature in the field of emotional intelligence. It is defined in literature as “the ability to comprehend another’s feelings and to re-experience them oneself” (Salovey and Mayer, 1990). In recent decades, organisational research has also begun to understand the critical role of empathy in interpersonal relations in teams. Empathy is “the fundamental competence of social awareness” (Goleman et al., 2002). Influential leaders can enable their team members to experience positive emotions and a productive work environment when they create a resonant climate in the teams. Goleman et al. (2002) propose that “empathy makes resonance possible; lacking empathy, leaders act in ways that create dissonance”. Empathy enhances positive communication and improves the quality of relationships between team members, enabling mutual trust and a climate of collaboration (George, 2000). A leader’s understanding of her team members helps her to use the proper management technique to extract the best performance from them (Westerman et al., 2018). This understanding also strengthens the interpersonal bonding between the leader and the team member, resulting in a feeling of empowerment and psychological safety for the member (Edmondson and Lei, 2014; Mayfield and Mayfield, 2012). Empathetic leadership also provides a platform for dialogic communication in teams (Hermans and Hermans-Konopka, 2010). Such a positive climate can result in affective emergent team states like team trust, team cohesion etc.

6.1.2 Inspiring

Many interviewees spoke about the necessity for a leader to be inspiring. “As the team leader, it is my responsibility to show my team members the purpose of the team and encourage them to work towards achieving that”, said one participant. According to another, the team members look up to the leader to motivate them, especially when the going gets tough. One participant compared a team leader to a bird who sits on the topmost perch of a tree and can see things the team members are not yet able to imagine.

Another added that it is the responsibility of the project team leader to inspire the team members to move in a direction and to a destination they have not imagined possible.

In literature too, inspiration is defined as a breathing in or infusion of some idea, purpose, etc. into the mind; the suggestion, awakening, or creation of some feeling or impulse, especially of an exalted kind” (Thrash and Elliot, 2004). Inspired leaders motivate those around them and stimulate them intellectually (Rabiul and Yean, 2021). Beyond the four dimensions of transformational leadership (Avolio, 2005) lies the quality of inspiration, wherein the leader communicates a vision, boosting the team members to strive to achieve it (Joshi et al., 2009). Passion, team member confidence (Yukl, 2010), running the extra mile (Howell and Avolio, 1993) and mutual trust between team members (Joshi et al., 2009) are all strictly related to inspiring leadership. Transformational leaders engage their team members through open communication and innovative solutions and boost their morale (Schmitt et al., 2016; Bui et al., 2017). The team members are inspired by the leader’s qualities like openness, passion, desire and innovative attitude (Dai et al., 2020). These leaders inspire their team members to perform their tasks with pride and self-respect (Khuroosani, 2018) and positively enhance their psychological safety (Avolio, 2005). Under the influence of such leaders, the team members invent innovative ways of doing things, identify more with their work, become more involved and experience more positive feelings (Sosik, 2006).

6.1.3 Creating consensus

A leader behaviour that all the interviewees highlighted was the ability of the leader to transform a group of individual experts into a cohesive project team by creating a sense of unity. One interviewee noted, “In R&D teams, every member is a domain expert and cannot be replaced by others. Hence, authority and hierarchical power structures will not work here. R&D project team leader should create a level of mutual trust between team members to intervene in conflicting situations, enable members to see different perspectives and facilitate synergistic solutions.” Yet another respondent remarked that as a project leader, he felt a lot of confidence in achieving the project objective whenever the team was united in spirit. Creating consensus in the team thus becomes a significant leadership behaviour in R&D teams for fostering team flow.

Consensus in a team means having a collective understanding and agreement about the purpose of the team and the strategies adopted by the team to achieve that purpose. Research has shown that team members sharing a common purpose and mutually agreed goals are more likely to feel inspired, empowered, and devoted to their team and tasks (Kirkman and Rosen, 1999; Mathieu et al., 2008). R&D teams include members of varied specialisations and expertise, and it is the leader’s responsibility to communicate and clarify goals and create a shared understanding of the team’s strategy among experts. Strategic consensus in the team prevents prioritising individual personal goals over the team’s shared objectives (Ketokivi and Castaner, 2004), facilitating transparent communication, collective cooperation, and task coordination for strategy realisation (Kellermanns et al., 2005). Another aspect related to consensus building is the leader’s ability to handle conflicts. Conflict resolution may be defined as the capacity to find cordial solutions when a conflict happens between team members (Spaho, 2013). Functional conflicts are healthy, constructive disagreements, while dysfunctional ones are unhealthy disagreements between groups or individuals (Brykman and O’Neill, 2021). Leaders must ensure that task-based conflicts never blow out into relationship-based

conflicts, as teams may benefit from task conflicts when they occur without relationship conflicts (Shaw et al., 2011).

6.1.4 Coaching

Many interviewees felt that the leader must also act as a coach or mentor. “R&D leaders possess large amounts of tacit technical and techno-managerial knowledge due to their experience working with complex systems for several years. This unwritten knowledge can be passed on to future generations only through pro-active one-to-one coaching by the leader”, noted one interviewee. Another respondent believed that even though an R&D leader will not have the luxury of coaching all team members, she should identify one or two whom she can personally mentor and pass the baton of leadership if required. Most respondents used the terms coaching/mentoring interchangeably during the interview.

Though coaching/mentoring appears to share many features, it is essential to differentiate them based on the distinction proposed by Grant (2001): “The key issue in comparing coaching to mentoring is that mentoring traditionally involves an individual with expert knowledge in a specific domain passing on this knowledge to an individual with less expertise. In contrast, coaching is a process in which the coach facilitates learning in the coachee. The coach need not be an expert in the coachee’s learning area (p.18)”. In an R&D team, however, such distinctions between the roles and responsibilities of coach and mentor regularly overlap and are mostly blurred. The blending of these roles denotes a holistic shift which focuses on strengthening individual skills and self-efficacy (Rath and Conchie, 2008), open communication, appreciative inquiry (Orem et al., 2007) and emotional intelligence (Neale et al., 2011), resulting in the development of purposeful and productive relationships between team members. As a coach and mentor, the leader (a) assesses his team members for their specific strengths, talents, and passion, (b) assigns the team tasks to individuals with matching skills, (c) supports, challenges, and develops their strengths and d) provides periodic, constructive feedbacks, recognitions and acknowledgements (Rath and Conchie, 2008). Leaders must also communicate openly and have courageous conversations with team members (Reynolds, 2015), which involve positive criticism and candid opinions. This will enable team members to openly share, listen, explore, and examine personal and collective assumptions, resulting in new ways of thinking and evolving synergistic solutions (Hollywood et al., 2016).

6.2 Leader behaviours reinforcing the reflection process

During reflection processes, the R&D team takes time to stand back from the thick of task activities and focus on planning, monitoring, and evaluating their progress. In the reflection category, the critical process dimensions include project formulation, project planning, strategy finalisation, technical skill integration and periodic progress monitoring. The four key leader behaviours that influence these processes include:

6.2.1 Visioning

Most respondents echoed the significance of providing a clear vision by the team leader. One respondent elaborated on its necessity in R&D teams in flowing words: “In the R&D

organisational scenario, many pre-project activities need to be completed before the formal sanction of the project. Normally, the project leader designate and a small core team of experts will carry out these activities. The actual project team formation happens only after the R&D project is formally sanctioned and the cost and time schedules come into force. At this time, several new members became part of the project, representing various technical disciplines, who would not know the basic purpose for which the project was sanctioned. At this juncture, it becomes the team leader/ project director's responsibility to ensure that the team's vision and mission are clearly communicated and shared among the team members". This view was recurring in other responses, too. According to them, the first leadership behaviour towards reinforcing the reflection process is defining the team's vision.

Visioning helps interdisciplinary teams accurately outline the problem to be solved and the scope of the project, evolve team goals, and chart out strategies for effectively utilising member expertise (Salazar et al., 2012; Zaccaro et al., 2001). Clearly defining the team's mission in the early stages of team formation and ensuring there is no ambiguity about it among the team members is vital for leading the team towards its accomplishment. This leader behaviour lays the foundation for future teamwork over which the team members can form cohesive interpersonal networks and a shared identity (Dionne et al., 2004). This also guarantees alignment of the team's goals, strategies and plans with that of the larger organisation. Several studies have emphasised the role of leadership processes in defining and accentuating a collective mission for the team (Pielstick, 2000; Kouzes and Posner, 2008). Some studies, like Barry (1991), also highlight the importance of creating a shared understanding of this mission among the team members. In studies specific to R&D projects, Waldman and Bass (1991) suggest that transformational leadership behaviours are required in the preliminary stages of the project to create a vision and provide intellectual stimulation.

6.2.2 Establishing team goals

The subsequent leader behaviour towards reinforcing task processes in a team is to set team goals. Respondents repeated this point consistently, which is evident from their specific words. One respondent said, "As an R&D project team leader, in the initial team meetings, I ensure that the team sits together and converts the team's purpose into clear, measurable goals with timelines agreeable to all. This provides high levels of clarity and makes my job simpler." Another interviewee said that charting out team goals in detail and ensuring every member agrees will help the leader provide the smooth execution and monitoring of project activities. Yet another example of this was the following response, "R&D team leader may categorise team goals based on task performances and relationship performances. Task goals involve those related to the core project mission, including developing sub-systems, integration, testing, etc. Relationship goals include those pertaining to team building, team learning and team development. The leader must sit with team members and help them determine their specific goals, the measures of performance expected from them, and the metrics for evaluation".

Numerous studies in team leadership also provide convincing proof that this leader behaviour is one of the critical aspects for ensuring the adequate performance of teams. Establishing exciting but realistic SMART goals and clearly outlining performance expectations has a significant role in the team achieving its mission (Knight et al., 2001). In an extensive study involving knowledge workers, Amabile et al. (2004) documented

that setting clear objectives and challenging goals are important leader behaviours that enhance team creativity and innovation. Some studies specific to R&D projects have found that defining project goals and expected results in the early stages of the project enhances team motivation and synergy (Anantatmula, 2010; Chaudhry and Javed, 2012). R&D projects are expertise-dependent, and the role of the team leader is to help the team members finalise their domain goals and establish relative performance metrics. This will result in enhanced performance and learning behaviour of team members (Gibson and Vermeulen, 2003). The criticality of this leader behaviour lies in the fact that (a) clear, challenging goals stimulate team member motivation for action towards achieving them, (b) it establishes a singular identity among team members and improves their commitment mutually and towards team goals, and (c) the team becomes a cohesive, tight-knit unit (Durham et al., 1997; Wegge, 2000).

6.2.3 *Strategising*

Six interviewees indicated the necessity of an R&D leader to define clear strategies for achieving the team goals and the team's overall mission. One interviewee explained, "A collective understanding among the team members about each other's responsibilities, ways to coordinate their activities and how to work together to achieve the team goals needs to be created". Another response was as follows, "The R&D leader needs to finalise the strategies to be followed by team members to achieve the team goals. These include identification of critical tasks, analysis of risks and risk mitigation plans".

R&D project leaders need to have strategic thinking competencies which enable them to visualise several possibilities by thinking outside the box and employing creativity and imagination (Gavetti, 2011; Moon, 2013). The strategising function will involve determining how the goals are pursued (methods, approaches, procedures), who is responsible for each task (technical skill integration) and when the tasks will be carried out (schedule, plan, workflow). Combining these aspects, an integrated work plan can be finalised at the beginning of the project that coordinates individual member's efforts, establishes execution strategies, develops standardised team processes, and sets metrics for evaluating team performance. Assigning tasks matching team member skills and specifying strategies like Work Breakdown Structure and Product Breakdown Structure enhance teams' efficiency and effectiveness (Henderson and Lee, 1992). This leader behaviour, if shared by all team members, can be implemented more effectively by making dynamic adjustments to their actions on a day-to-day basis.

6.2.4 *Monitoring*

All participants unanimously stressed the necessity of the leader to consistently monitor performance, as the team members execute the task activities based on the defined mission and set goals. "Periodic review meetings to monitor progress and elicit feedback have positively impacted my project", said one respondent. Another response emphasised that leaders must implement mechanisms for periodic monitoring and review of the team's performance against previously defined milestones, performance metrics and achieved progress. If the progress is not satisfactory, the team may need to revisit its earlier plans and determine new ways of operating. One interviewee felt that task-based conflicts can often be prevented from spilling over to personalised conflicts with the timely intervention of the team leader. He added that enabling channels for obtaining

informal, on-the-ground feedback can help the leader understand fundamental issues and take corrective action at the right time.

Leadership studies suggest that monitoring involves examining the team's tasks and evaluating the progress, availability of resources, dynamics in the external environment and individual performance of the team members (Yukl and Falbe, 1990). Monitoring and facilitating feedback provide critical information to the leader, which he can use in several other leader behaviours. A sincere assessment of the previous and present actions and their outcomes can equip the team to adopt changes and adapt itself for an evolving future. The leader must give and take feedback on specific areas in an objective, timely and well-balanced way, encouraging team members to bring out their issues in the open. Through such a feedback process, team members will become aware of the team's performance skills, get confidence to review and modify their work methods and equip the team to respond dynamically to the external environment (Kozlowski et al., 1996).

Encouraging feedback from team members is also critical as a) it enables the effective functioning of the team by facilitating task processes and relationship processes, and b) it creates a positive psychological impact on the team members. Feedback opens communication channels between leader and team members, stimulating interpersonal networks, coordination, and collective enthusiasm, thus enhancing team creativity (Taggar, 2002). By implementing a systematic feedback mechanism, team leaders could encourage processes like team identification and mutual commitment among members (Sivunen, 2006). It also increases strong bonding between team members and the leader (Morgeson et al., 2010).

6.3 Leader behaviours reinforcing the response process

Response processes involve all R&D task activities carried out by team members in their area of technical expertise towards achieving the project objectives. In the response phase, the critical process dimensions include technical task implementation, task coordination, systems-level synergy, mutual technical support and course correction. The four key leader behaviours that influence these processes include:

6.3.1. Coordination

The centralised organising of a team's interdependent task activities is coordination (Marks et al., 2001). It is the process by which team personnel resources, material resources, and responses are organised to ensure tasks are integrated, synchronised, and completed in time (Cannon-Bowers et al., 1995). The present study's respondents identified coordination as a critical leader behaviour in R&D project teams. "Once a project reaches the execution stage, the leader's major role is to ensure that all activities fall in place", remarked one interviewee. Another pointed out that, in such complex projects, multiple project-related tasks, which depend on each other, will be executed by different team members simultaneously. As the project progresses, the leader needs to evaluate the progress of each of these dynamic and interdependent activities and make necessary changes to align them with the project objectives.

In leadership literature, coordination is also recognised as a challenging task for the project leader, given that the in-depth knowledge and expertise required to assess diverse tasks lie with the respective team members (Faraj and Sproull, 2000; Moreland, 1999). The leader should make sure that interdependent project tasks are carried out by R&D

team members in a synchronous and mutually consistent manner. This necessitates quick adaptation to evolving situations by facilitating dynamic adjustments in strategies and member behaviours (Banks et al., 2016; Gabelica et al., 2016). The leader can also delegate the responsibility for coordination to capable team members and empower them through training. This will enable them to anticipate the task requirements and ‘push’ for information or action from other members instead of waiting for members to ‘pull’ the same from each other (Entin and Serfaty, 1999). The leader’s success in facilitating such implicit team coordination will improve team performance (Kleinman and Serfaty, 1989).

6.3.2 *Problem-solving*

Respondents of the present study emphasised problem-solving as a critical leader behaviour. A factor consistently featured in the interviews was the unexpected challenges and disruptions R&D projects face during their course, as the ill-defined problems lack a unique solution due to the complex nature of activities being carried out. “Our projects are riddled with technological and people-related problems daily. As a leader, I need to quickly analyse the situation, find satisfactory solutions, and ensure fast implementation”, told a project director. Swift decision-making is necessary for solving functional issues and thus boosting team member morale, said another interviewee. She went on to add that good leaders must always be watchful to find initial signs of serious problems, encourage inputs from team members, respond at the right time by identifying the cause of the problem and ensure that they do not recur during the remaining duration of the project. When faced with significant issues, team members often look up to the project leader to analyse the problem and provide necessary guidance to find the right solutions. Timely, appropriate information from the leader on how the problem is addressed will create a climate of openness and transparency in the team as the members cope with challenging situations.

Studies also suggest that solving such operational problems is an effective leader behaviour (Morgeson, 2005; Yukl and Falbe, 1990). Diagnosing and solving problems that hinder teams from effectively utilising their potential is a significant team leadership function (Zaccaro et al., 2001). Problem-solving is “identifying and diagnosing task-related problems, carefully using a team’s combined expertise to analyse problems, and arriving at effective solutions” (Hiller et al., 2006). Leaders can directly engage with problems or support the team in assessing, developing, and implementing the solutions. Yukl et al. (2002) have summarised broad guidelines for leaders to employ problem-solving behaviour, which includes (a) Early anticipation and preparation to face operational problems, (b) Timely recognition of early warning signs, (c) Quick analysis of the cause of the problem and its scope (d) Understanding the connections underlying the problem (e) Executing the solution confidently and decisively f) Keeping the team updated about the problem and action to resolve it and g) Always being open to innovative solutions.

6.3.3 *Boundary spanning*

The R&D project leaders interviewed in this study were acutely aware of the larger organisational context in which their projects are executed and their role in managing boundaries. “With top management and user representatives, my job is to convey and clarify expectations, create a positive picture, and safeguard the interest of my team.

With peer groups inside the organisation – both technical and administrative- my role is to ensure the availability of resources and synchronise the task activities. As an R&D leader, I also need to understand project-specific developments in global scenarios and utilise external expertise when necessary”, elaborated one interviewee.

Literature review shows that managing team boundaries is a significant leader behaviour. The leader has to coordinate the dynamic external forces and buffer the team from their direct impact while integrating the team’s work in line with the organisational vision (Sundstrom et al., 1990). The boundary management functions of the leader include scout activities – scanning the external environment, accumulating information, resource mapping and gathering feedback – and sentry activities – sifting and conveying relevant information to the team members (Ancona and Caldwell, 1988). The leader also needs to build networks and social capital in the organisation to ensure the availability of team resources and smoothly execute team activities (Kline, 2003). Druskat and Wheeler (2003) suggest that team leaders must also understand the power dynamics in a larger organisational context and exploit it to the team’s advantage. As the teams become more efficient and adaptive, the boundary-spanning functions are likely to become the significant responsibility of the team leader compared to team internal coordination functions (Zaccaro et al., 2004).

6.3.4 Systems thinking

R&D project teams are involved in developing complex systems involving multiple sub-systems and interfaces. The respondents expressed the necessity to adopt new forms of thinking, involving a holistic view of the tasks and identifying the interactions between sub-systems to understand the system better. “Leading an R&D team, where every member is an expert in her domain, is challenging in fostering a holistic perspective. The integration of independent sub-systems and technologies to realise a final solution needs to take care of issues arising from interconnections and emergent properties, not envisaged initially”, opined an interviewee. The leader needs to have a total systems perspective, and he should effectively convey its necessity to team members, too, felt another respondent.

Arnold and Wade (2015) define systems thinking “as a set of synergistic analytic skills used to improve the capability of identifying and understanding systems, predicting their behaviours, and devising modifications to them to produce desired effects. These skills work together as a system”. By applying systems thinking principles, the leader can (a) comprehend complex problems, interrelationships between parts and the recurring cause-and-effect-cycles and (b) create new ways to strategise, find leverage points and integrate new ideas within the system context (Palaima and Skaržauskienė, 2010). According to Tate (2010), leaders who follow systems thinking principles practise the following traits – (a) they try to see the system from a holistic perspective, (b) they understand the connections between various sub-systems and their dynamics through patterns and feedback loops, (c) they look for emergence, (d) they welcome chaos and exploit uncertainty. R&D teams require divergent thinking (exploring) and convergent thinking (idea comparison and selection) skills. Still, there is a tendency to rush towards the latter as it is a natural thinking mode which reduces complex situations into comprehensible pieces and enables fast decision-making with available information (Stempfle and Badke-Schaub, 2002; Gigerenzer and Todd, 1999). In such scenarios, a leader can facilitate collaborative systems thinking, which is defined as “an emergent

behaviour of teams resulting from the interactions of team members and utilising a variety of thinking styles, design processes, tools, and communication media to consider systems attributes, interrelationships, context and dynamics towards executing systems design” (Lamb and Rhodes, 2008).

7 Discussions

7.1 *Conclusions and implications*

R&D project teams must capitalise on their team members’ collective capabilities to solve complex problems and provide sustainable, cost-effective solutions. Studies have found that facilitating the right environment for the emergence of team flow experiences among team members can aid in improving team effectiveness and team performance. The 5R model of team flow identified the role of leadership as an accelerating factor of team flow. This paper aims to contribute to the literature on team flow by providing an inventory of influencing leader behaviours. The effort was to identify behaviours influencing the three critical processes – Resonant, Reflection and Response- as per the 5R model. The study identified four leader behaviours for facilitating each of these processes.

Drawing on an exhaustive literature review and in-depth interviews, 12 leader behaviour constructs have been identified that are proposed to influence team flow in R&D project teams. These behaviours come in a wide range. Some are general in nature and applicable to any leading profession. The latter is particular to the R&D environment and specifically suited for stimulating creativity and innovation.

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.

Among these 12 leader behaviours, certain behaviours, like ‘creating consensus’ and ‘systems thinking,’ are critical specifically in the R&D project scenario. For example, R&D team leaders who apply systems thinking skills can holistically view the project, anticipate potential problems and initiate solutions. They are also more equipped to show a larger picture to the team members, who are experts in their specific areas, convincing them of the necessity to move beyond pockets of comfort and work cohesively towards synergistic solutions.

7.2 Limitations and future research

The present study has certain limitations that provide a guideline for future research. As this study is confined to using only qualitative techniques, a follow-up survey on a broader scale is to be taken to determine which of the proposed leadership behaviours do indeed have the intended influence on team flow processes. The study has suggested a wide range of leadership behaviours based on the limited set of interviews and literature review, collating them based on the authors' professional experience in the field in several critical roles for the last 20 years. However, they are yet to be prioritised based on their impact and relevance. Further quantitative research may further limit the proposed list to a lesser number of underlying dimensions. For example, 'monitoring' may be combined with 'coordination' to form a broader construct, as they both have some aspects in common.

Another limitation is the exclusive nature of this study, limiting it to the R&D project domain. The interviews were also limited to R&D project leaders handling complex defence R&D projects in a single defence R&D laboratory. There may be much to learn from similar teams in other R&D establishments, such as space research and collaborating fields. For example, in the case of defence R&D projects, other stakeholders include the armed forces (who are the primary customers of defence R&D), public & and private industries and academia. Studying how leaders in these fields handle such complex projects will be interesting.

Also, this study's interviews were limited to R&D team leaders as a source of relevant behaviours. Team members' views of leadership are also significant, and including them in interviews can provide a more comprehensive and even missing link in the proposed leadership behaviour framework. Finally, the contingency factors that can influence an R&D project scenario must also be investigated. Future research should address the role of leaders in shaping the organisational environment so that the context facilitates team flow experiences in R&D project teams.

References

- Amabile, T.M., Schatzel, E.A., Moneta, G.B. and Kramer, S.J. (2004) 'Leader behaviours and the work environment for creativity: perceived leader support', *The Leadership Quarterly*, Vol. 15, No. 1, pp.5–32.
- Anantatmula, V.S. (2010) 'Project manager leadership role in improving project performance', *Engineering Management Journal*, Vol. 22, No. 1, pp.13–22.
- Ancona, D.G. and Caldwell, D.F. (1988) 'Beyond task and maintenance: defining external functions in groups', *Group & Organization Studies*, Vol. 13, No. 4, pp.468–494.
- Anderson, N., Potočník, K. and Zhou, J. (2014) 'Innovation and creativity in organizations: a state-of-the-science review, prospective commentary, and guiding framework', *Journal of Management*, Vol. 40, No. 5, pp.1297–1333.
- Arnold, J.A., Arad, S., Rhoades, J.A. and Drasgow, F. (2000) 'The empowering leadership questionnaire: the construction and validation of a new scale for measuring leader behaviours', *Journal of Organizational Behavior*, Vol. 21, No. 3, pp.249–269.
- Arnold, R.D. and Wade, J.P. (2015) 'A definition of systems thinking: a systems approach', *Procedia Computer Science*, Vol. 44, pp.669–678.
- Avolio, B.J. (2005) *Leadership Development in Balance: Made/Born*, Psychology Press, New York.

- Banks, G.C., Pollack, J.M. and Seers, A. (2016) 'Team coordination and organizational routines: bottoms up—and top down', *Management Decision*, Vol. 54, No. 5, pp.1059–1072.
- Barry, D. (1991) 'Managing the bossless team: lessons in distributed leadership', *Organizational Dynamics*, Vol. 20, No. 1, pp.31–47.
- Bass, B.M. (1990) 'From transactional to transformational leadership: learning to share the vision', *Organizational Dynamics*, Vol. 18, No. 3, pp.19–31.
- Brykman, K.M. and O'Neill, T.A. (2021) 'Beyond aggregation: how voice disparity relates to team conflict, satisfaction, and performance', *Small Group Research*, Vol. 52, No. 3, pp.288–315.
- Bui, H.T., Zeng, Y. and Higgs, M. (2017) 'The role of person-job fits the relationship between transformational leadership and job engagement', *Journal of Managerial Psychology*, Vol. 32, No. 5, pp.373–386.
- Cannon-Bowers, J.A., Salas, E., Tannenbaum, S.I. and Mathieu, J.E. (1995) 'Toward theoretically based principles of training effectiveness: a model and initial empirical investigation', *Military Psychology*, Vol. 7, No. 3, pp.141–164.
- Chaudhry, A.Q. and Javed, H. (2012) 'Impact of transactional and laissez-faire leadership style on motivation', *International Journal of Business and Social Science*, Vol. 3, No. 7, pp.258–264.
- Churchill, G.A. and Iacobucci, D. (2006) *Marketing Research: Methodological Foundations (Vol. 199, No. 1)*, Dryden Press, New York.
- Clarke, T.E. (2002) 'Unique features of an R&D work environment and research scientists and engineers', *Knowledge, Technology & Policy*, Vol. 15, No. 3, pp.58–69.
- Dai, Y.D., Zhuang, W.L., Ko, A. and Okumus, F. (2020) 'The 'if-then' rules matter more? The roles of regulatory focus and leader–member exchange', *International Journal of Hospitality Management*, Vol. 90, p.102602.
- Dionne, S.D., Yammarino, F.J., Atwater, L.E. and Spangler, W.D. (2004) 'Transformational leadership and team performance', *Journal of Organizational Change Management*, Vol. 17, No. 2, pp.177–193.
- Druskat, V.U. and Wheeler, J.V. (2003) 'Managing from the boundary: the effective leadership of self-managing work teams', *Academy of Management Journal*, Vol. 46, No. 4, pp.435–457.
- Durham, C.C., Knight, D. and Locke, E.A. (1997) 'Effects of leader role, team-set goal difficulty, efficacy, and tactics on team effectiveness', *Organizational Behavior and Human Decision Processes*, Vol. 72, No. 2, pp.203–231.
- Edmondson, A.C. and Lei, Z. (2014) 'Psychological safety: the history, renaissance, and future of an interpersonal construct', *Annu. Rev. Organ. Psychol. Organ. Behav.*, Vol. 1, No. 1, pp.23–43.
- Eisenhardt, K.M. (1989) 'Building theories from case study research', *Academy of Management Review*, Vol. 14, No. 4, pp.532–550.
- Entin, E.E. and Serfaty, D. (1999) 'Adaptive team coordination', *Human Factors*, Vol. 41, No. 2, pp.312–325.
- Faraj, S. and Sproull, L. (2000) 'Coordinating expertise in software development teams', *Management Science*, Vol. 46, No. 12, pp.1554–1568.
- Farokhad, M.R., Otegi-Olaso, J.R., Pinilla, L.S., Gandarias, N.T. and de Lacalle, L.N. L. (2019) 'Assessing the success of R&D projects and innovation projects through project management life cycle', *2019 10th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications (IDAACS)*, IEEE, Vol. 2, pp.1104–1110.
- Farris, G.F. and Cordero, R. (2002) 'Leading your scientists and engineers 2002', *Research-Technology Management*, Vol. 45, No. 6, pp.13–25.
- Gabelica, C., Van den Bossche, P., Fiore, S.M., Segers, M. and Gijssels, W.H. (2016) 'Establishing team knowledge coordination from a learning perspective', *Human Performance*, Vol. 29, No. 1, pp.33–53.

- Gaggioli, A., Chirico, A., Mazzoni, E., Milani, L. and Riva, G. (2017) 'Networked flow in musical bands', *Psychology of Music*, Vol. 45, No. 2, pp.283–297.
- Gavetti, G. (2011) 'The new psychology of strategic leadership', *Harvard Business Review*, Vol. 89, Nos. 7–8, 118–125.
- George, J.M. (2000) 'Emotions and leadership: the role of emotional intelligence', *Human Relations*, Vol. 53, No. 8, pp.1027–1055.
- Gibson, C. and Vermeulen, F. (2003) 'A healthy divide: subgroups as a stimulus for team learning behaviour', *Administrative Science Quarterly*, Vol. 48, No. 2, pp.202–239.
- Gigerenzer, G. and Todd, P.M. (1999) 'Fast and frugal heuristics: the adaptive toolbox', *Simple Heuristics that Make us Smart*, Oxford University Press, New York, pp.3–34.
- Goleman, D., Boyatzis, R. and McKee, A. (2002) 'The emotional reality of teams', *Journal of Organizational Excellence*, Vol. 21, No. 2, pp.55–65.
- Govind, V.K. and Sidharth, S. (2023a) *Fostering Team Flow in R&D Project Teams: A Novel Framework*, Manuscript submitted for publication.
- Govind, V.K. and Sidharth, S. (2023b) *Factors Influencing Team Flow: What can R&D Project Teams in High Technology Organizations Learn from Other Fields? A Systematic Scoping Review*, Manuscript submitted for publication.
- Grant, A.M. (2001) *Towards a Psychology of Coaching*, Unpublished Manuscript, Sydney.
- Gupta, V. and Singh, S. (2012) 'How leaders impact employee creativity: a study of Indian R&D laboratories', *Management Research Review*, Vol. 36, No. 1, pp.66–88.
- Gupta, V., Singh, S. and Khatri, N. (2013) 'Creativity in research and development laboratories: a new scale for leader behaviours', *IIMB Management Review*, Vol. 25, No. 2, pp.83–90.
- Gupta, V., Singh, S., Kumar, S. and Bhattacharya, A. (2012) 'Linking leadership to employee creativity: a study of Indian R&D laboratories', *Indian Journal of Industrial Relations*, pp.120–136.
- Henderson, J.C. and Lee, S. (1992) 'Managing I/S design teams: a control theories perspective', *Management Science*, Vol. 38, No. 6, pp.757–777.
- Hermans, H. and Hermans-Konopka, A. (2010) *Dialogical Self-Theory: Positioning and Counter-Positioning in a Globalizing Society*, Cambridge University Press, Cambridge, UK.
- Hiller, N.J., Day, D.V. and Vance, R.J. (2006) 'Collective enactment of leadership roles and team effectiveness: a field study', *The Leadership Quarterly*, Vol. 17, No. 4, pp.387–397.
- Hollywood, K.G., Blaess, D.A., Santin, C. and Bloom, L. (2016) 'Holistic mentoring and coaching to sustain organizational change and innovation', *Creighton Journal of Interdisciplinary Leadership*, Vol. 2, No. 1, pp.32–46.
- Howell, J.M. and Avolio, B.J. (1993) 'Transformational leadership, transactional leadership, locus of control, and support for innovation: key predictors of consolidated-business-unit performance', *Journal of Applied Psychology*, Vol. 78, No. 6, p.891.
- Im, S. and Workman Jr, J.P. (2004) 'Market orientation, creativity, and new product performance in high-technology firms', *Journal of Marketing*, Vol. 68, No. 2, pp.114–132.
- Joshi, A., Lazarova, M.B. and Liao, H. (2009) 'Getting everyone on board: the role of inspirational leadership in geographically dispersed teams', *Organization Science*, Vol. 20, No. 1, pp.240–252.
- Katz, D. and Kahn, R.L. (1978) *The Social Psychology of Organizations* (Vol. 2, p.528), Wiley, New York.
- Kellermanns, F.W., Walter, J., Lechner, C. and Floyd, S.W. (2005) 'The lack of consensus about strategic consensus: advancing theory and research', *Journal of Management*, Vol. 31, No. 5, pp.719–737.
- Ketokivi, M. and Castaner, X. (2004) 'Strategic planning as an integrative device', *Administrative Science Quarterly*, Vol. 49, No. 3, pp.337–365.
- Khatri, N. (2005) 'An alternative model of transformational leadership', *Vision*, Vol. 9, No. 2, pp.19–26.

- Khurosani, A. (2018) 'Transformational leadership, employee creativity and organizational innovation, the intervening role of organizational learning culture', *Advanced Science Letters*, Vol. 24, No. 4, pp.2557–2560.
- Kirkman, B.L. and Rosen, B. (1999) 'Beyond self-management: antecedents and consequences of team empowerment', *Academy of Management Journal*, Vol. 42, No. 1, pp.58–74.
- Kleinman, D.L. and Serfaty, D. (1989) 'Team performance assessment in distributed decision making', *Proceedings of the Symposium on Interactive Networked Simulation for Training*, April, University of Central Florida, Orlando, FL, pp.22–27.
- Kline, T.J. (2003) 'The psychometric properties of scales that assess market orientation and team leadership skills: a preliminary study', *International Journal of Testing*, Vol. 3, No. 4, pp.321–332.
- Knight, D., Durham, C.C. and Locke, E.A. (2001) 'The relationship of team goals, incentives, and efficacy to strategic risk, tactical implementation, and performance', *Academy of Management Journal*, Vol. 44, No. 2, pp.326–338.
- Kouzes, J.M. and Posner, B.Z. (2008) 'It's not just the leader's vision', *Facilities Manager*, Vol. 24, No. 4, pp.22–23.
- Kozlowski, S.W. and Huels, B.M. (1986) 'Joint moderation of the relation between task complexity and job performance for engineers', *Journal of Applied Psychology*, Vol. 71, No. 2, p.196.
- Kozlowski, S.W., Gully, S.M., Salas, E. and Cannon-Bowers, J.A. (1996) 'Team leadership and development: theory, principles, and guidelines for training leaders and teams', in Beyerlein, M., Johnson, D. and Beyerlein, S. (Eds.): *Advances in Interdisciplinary Studies of Work Teams: Team Leadership*, JAI Press, Greenwich, CT, Vol. 3, pp.251–289.
- Lamb, C.T. and Rhodes, D.H. (2008) 'Systems thinking as an emergent team property: ongoing research into the enablers and barriers to team-level systems thinking', *2008 2nd Annual IEEE Systems Conference*, April, IEEE, Montreal, QC, Canada, pp.1–7.
- Madjar, N., Oldham, G.R. and Pratt, M.G. (2002) 'There's no place like home? The contributions of work and nonwork creativity support to employees' creative performance', *Academy of Management Journal*, Vol. 45, No. 4, pp.757–767.
- Marks, M.A., Mathieu, J.E. and Zaccaro, S.J. (2001) 'A temporally based framework and taxonomy of team processes', *Academy of Management Review*, Vol. 26, No. 3, pp.356–376.
- Mathieu, J., Maynard, M.T., Rapp, T. and Gilson, L. (2008) 'Team effectiveness 1997–2007: a review of recent advancements and a glimpse into the future', *Journal of Management*, Vol. 34, No. 3, pp.410–476.
- Mayfield, M. and Mayfield, J. (2012) 'Logo leadership: breathing life into loyalty and putting meaning back into work', *Development and Learning in Organizations: An International Journal*, Vol. 26, No. 2, pp.11–15.
- Moon, J.A. (2013) *Reflection in Learning and Professional Development: Theory and Practice*, Routledge, London.
- Moreland, R.L. (1999) 'Transactive memory: learning who knows what in work groups and organizations', in Thompson, L.L., Levine, J.M. and Messick, D.M. (Eds.): *Shared Cognition in Organizations: The Management of Knowledge*, Erlbaum, Mahwah, NJ, pp.3–31.
- Morgeson, F.P. (2005) 'The external leadership of self-managing teams: intervening in the context of novel and disruptive events', *Journal of Applied Psychology*, Vol. 90, No. 3, p.497.
- Morgeson, F.P., DeRue, D.S. and Karam, E.P. (2010) 'Leadership in teams: a functional approach to understanding leadership structures and processes', *Journal of Management*, Vol. 36, No. 1, pp.5–39.
- Neale, S., Spencer-Arnell, L. and Wilson, L. (2011) *Emotional Intelligence Coaching: Improving Performance for Leaders, Coaches and the Individual*, Kogan Page Publishers, London.
- Orem, S.L., Binkert, J. and Clancy, A.L. (2007) *Appreciative Coaching: A Positive Process for Change*, John Wiley & Sons, London.

- Palaima, T. and Skaržauskienė, A. (2010) 'Systems thinking as a platform for leadership performance in a complex world', *Baltic Journal of Management*, Vol. 5, No. 3, pp.330–355.
- Pielstick, C.D. (2000) 'Formal vs. informal leading: a comparative analysis', *Journal of Leadership Studies*, Vol. 7, No. 3, pp.99–114.
- Rabiul, M.K. and Yean, T.F. (2021) 'Leadership styles, motivating language, and work engagement: an empirical investigation of the hotel industry', *International Journal of Hospitality Management*, Vol. 92, 102712.
- Rath, T. and Conchie, B. (2008) *Strengths-based Leadership: Great Leaders, Teams, and why People Follow*, Gallup Press, New York.
- Reynolds, L. (2015) *Courageous Conversations at Work: How to Create a High-Performing Team where People Love to Work*, Troubador Publishing Ltd., Leics, UK.
- Salazar, M.R., Lant, T.K., Fiore, S.M. and Salas, E. (2012) 'Facilitating innovation in diverse science teams through integrative capacity', *Small Group Research*, Vol. 43, No. 5, pp.527–558.
- Salovey, P. and Mayer, J.D. (1990) 'Emotional intelligence', *Imagination, Cognition and Personality*, Vol. 9, No. 3, pp.185–211.
- Schmitt, A., Den Hartog, D.N. and Belschak, F.D. (2016) 'Transformational leadership and proactive work behaviour: a moderated mediation model including work engagement and job strain', *Journal of Occupational and Organizational Psychology*, Vol. 89, No. 3, pp.588–610.
- Shaw, J.D., Zhu, J., Duffy, M.K., Scott, K.L., Shih, H.A. and Susanto, E. (2011) 'A contingency model of conflict and team effectiveness', *Journal of Applied Psychology*, Vol. 96, No. 2, p.391.
- Sivunen, A. (2006) 'Strengthening identification with the team in virtual teams: the leaders' perspective', *Group Decision and Negotiation*, Vol. 15, pp.345–366.
- Sosik, J.J. (2006) 'Full range leadership: model, research, extensions and training', *Inspiring Leaders*, pp.33–66.
- Spaho, K. (2013) 'Organizational communication and conflict management', *Management – Journal of Contemporary Management Issues*, Vol. 18, No. 1, pp.103–118.
- Stempfle, J. and Badke-Schaub, P. (2002) 'Thinking in design teams-an analysis of team communication', *Design Studies*, Vol. 23, No. 5, pp.473–496.
- Strauss, A. and Corbin, J. (1990) *Basics of Qualitative Research*, Sage Publications, Thousand Oaks, London.
- Sundstrom, E., De Meuse, K.P. and Futrell, D. (1990) 'Work teams: applications and effectiveness', *American Psychologist*, Vol. 45, No. 2, p.120.
- Taggar, S. (2002) 'Individual creativity and group ability to utilize individual creative resources: a multilevel model', *Academy of Management Journal*, Vol. 45, No. 2, pp.315–330.
- Tate, W. (2010) 'Think, manage and lead systemically', *Business Strategy Review*, Vol. 21, No. 2, pp.48–53.
- Thamhain, H.J. (2003) 'Managing innovative R&D teams', *R&D Management*, Vol. 33, No. 3, pp.297–311.
- Thamhain, H.J. (2008) 'Team leadership effectiveness in technology-based project environments', *IEEE Engineering Management Review*, Vol. 36, No. 1, pp.165–180.
- Thrash, T.M. and Elliot, A.J. (2004) 'Inspiration: core characteristics, component processes, antecedents, and function', *Journal of Personality and Social Psychology*, Vol. 87, No. 6, p.957.
- van den Hout, J.J., Davis, O.C. and Weggeman, M.C. (2018) 'The conceptualization of team flow', *The Journal of Psychology*, Vol. 152, No. 6, pp.388–423.
- van Oortmerssen, L.A., van Woerkum, C.M. and Aarts, N. (2015) 'When interaction flows: an exploration of collective creative processes on a collaborative governance board', *Group & Organization Management*, Vol. 40, No. 4, pp.500–528.

- Waldman, D.A. and Bass, B.M. (1991) 'Transformational leadership at different phases of the innovation process', *The Journal of High Technology Management Research*, Vol. 2, No. 2, pp.169–180.
- Wegge, J. (2000) 'Participation in group goal setting: some novel findings and a comprehensive model as a new ending to an old story', *Applied Psychology*, Vol. 49, No. 3, pp.498–516.
- Westerman, C.Y.K., Reno, K.M. and Heuett, K.B. (2018) 'Delivering feedback: Supervisors' source credibility and communication competence', *International Journal of Business Communication*, Vol. 55, No. 4, pp.526–546.
- Yukl, G. (2008) 'How leaders influence organizational effectiveness', *The Leadership Quarterly*, Vol. 19, No. 6, pp.708–722.
- Yukl, G. (2010) *Leadership in Organizations*, 7th ed., Prentice Hall, Upper Saddle River, NJ.
- Yukl, G. and Falbe, C.M. (1990) 'Influence tactics and objectives in upward, downward, and lateral influence attempts', *Journal of Applied Psychology*, Vol. 75, No. 2, p.132.
- Yukl, G., Gordon, A. and Taber, T. (2002) 'A hierarchical taxonomy of leadership behaviour: integrating a half-century of behaviour research', *Journal of Leadership & Organizational Studies*, Vol. 9, No. 1, pp.15–32.
- Zaccaro, S.J., Kemp, C. and Bader, P. (2004) 'Leader traits and attributes', *The Nature of Leadership*, Vol. 101, p.124.
- Zaccaro, S.J., Rittman, A.L. and Marks, M.A. (2001) 'Team leadership', *The Leadership Quarterly*, Vol. 12, No. 4, pp.451–483.
- Zhou, J. and Shalley, C.E. (2003) 'Research on employee creativity: a critical review and directions for future research', *Research in Personnel and Human Resources Management*, Vol. 22, pp.165–217.