

THE ABILITY-MOTIVATION-OPPORTUNITY FRAMEWORK FOR TEAM INNOVATION: EFFICACY BELIEFS, PROACTIVE PERSONALITIES, SUPPORTIVE SUPERVISION AND TEAM INNOVATION

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Received: 28 June 2015

Accepted: 3 January 2016

ABSTRACT: *Based on ability-motivation-opportunity theoretical framework, the study explores the interplay among team members' proactive personalities (abilities), collective efficacy (motivation), and supportive supervision (opportunity), and their interaction in predicting team innovation. Multi-level study of 249 employees nested within 64 teams from one German and three Slovenian hi-tech companies showed that collective efficacy was positively related to team innovation. However, the effect of collective efficacy on team innovation was weaker when high levels of supportive supervision and proactivity moderated this relationship. When teams perceived lower levels of collective efficacy, team proactivity, and supportive supervision were more important for achieving higher levels of team innovation as they were when teams perceived lower levels of motivation. We discuss theoretical and practical implications.*

Keywords: *team innovation, ability-motivation-opportunity theory, collective efficacy*

JEL Classification: M1

DOI: 10.15458/85451.17

INTRODUCTION

Studies highlighted innovation as one of the primary sources of competitive advantage where the chances of an organization to survive, to be successful and effective in challenging environments are becoming ever more dependent on innovation (Amabile, 1993; Anderson & King, 1991; Chi, Huang, & Lin, 2009; Post, 2012). Organizations seek to exploit the ideas and suggestions of their employees that are a source of idea generation

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and implementation (Anderson, De Dreu, & Nijstad, 2004). Yet, innovation is a complex, multilevel, and emergent phenomenon that requires skillful leadership in order to maximize the benefits of new and improved ways of working (Anderson, Potocnik & Zhou, 2014). With business processes becoming more complex, organizations reorganized work around teams in order to provide faster and more flexible responses to changes in environment (Kozlowski & Ilgen, 2006). Teams have become the basic organizational working unit (Chen et al., 2002), and over 80% of today's work in Fortune 1000 companies is based on a team-work (Hollenbeck, Beersma, & Schouten, 2012). Therefore, teams are the ones who usually propose new ideas and pursue the ideas toward implementation. For any creative proposal to be worked up toward an organizational-level innovation, these meso-analytical influences are critically important (Anderson & King, 1993; Shalley & Gilson, 2004). Even if the importance of innovation has been recognized by scholars, businesses and governments, too little attention is being devoted to organizational teams and how they can facilitate or inhibit innovation (Anderson & West, 1998; Eisenbeiss, van Knippenberg, & Boerner, 2008; Somech & Drach-Zahavy, 2011).

Team environments can foster collaboration and form a desirable basis for implementing new ideas (Černe, Jaklič, & Škerlavaj, 2013), which is why the ability to function effectively as a team member has become vital. Axtell et al. (2000) theorized the importance of efficacy beliefs as an important driver of team innovation. In addition, team proactive personality was positively related to a number of crucial team-level outcomes (Crant, 2000; Kirkman & Rosen, 1999). And finally, a relatively recent meta-analysis by Hulsheger, Anderson, and Salgado (2009) identified support for innovation as one of the strongest predictors of team innovative performance. As such, it is important to understand different drivers as well as their interactions with team innovation across micro and meso-levels.

Innovation research has only recently predominantly focused on company-level outcomes—performance, growth, profit, etc. Both situational and personal elements predict innovation (Chen, Farh, Campbell-Bush, Wu, & Wu, 2013; Somech & Drach-Zahavy, 2011). By engaging in innovation processes, team members exchange knowledge and examine different perspectives (Peralta, Lopes, Gilson, Lourenço & Pais, 2015). The dynamics behind team innovation indicate that individuals are the ones who usually generate new ideas or improved ways of doing things (West, 1987), whereas the team context could considerably influence the implementation of ideas (Scott & Reginald, 1994). Hence, team innovation success depends not only on members individually but also on their combined skills and ways of approaching and solving problems. It has been separately shown that efficacy beliefs and support for innovation influence team innovation (Axtell et al., 2000; Hulsheger et al., 2009), but we do not yet know the nature of their joint effects and how are they related with team members' proactivity. Scholars have applied the ability-motivation-opportunity (AMO) model (Appelbaum, Bailey, Berg, & Kalleberg, 2000) mostly at the individual-level; however, it can also be applied to explain team-level outcomes. Our understanding of innovation as a broader, multilevel phenomenon therefore needs to address important interactive questions, such as "How do the employees' motivation, ability and opportunity interplay in influencing team innovative outcomes?"

In order to fully address this question and to understand the factors that could facilitate or inhibit team innovation, we outline and test a multilevel model by building upon the AMO model. The AMO framework is assembled from basic concepts of psychology: motivation has been perceived as the incentive toward a behavior; ability as skills and capabilities essential to the performance of a behavior; and opportunity as contextual and situational constraints relevant to the performance of the behavior. Efficacy beliefs can be perceived as an adjacent motivational mechanism by reflecting the extent to which individuals view themselves as capable of accomplishing tasks and how it motivates them to engage in innovative behaviors (Bandura, 1997; Chen et al., 2013). The proactive personality is a personal disposition toward proactive behavior (Bateman & Grant, 1993). Proactive personality is a relatively stable propensity involving expressing initiative, identifying opportunities, taking action, and insisting in attempts to endorse change (Bateman & Crant, 1993). Proactive individuals possess a creative, self-responsible, positive thinking skills, they are pathfinders who find and solve problems (Leavitt, 1988). We argue that proactive personality signifies the skills for an individual to engage in active changing of the work environment. Hence, it reflects ability as it represents skills and knowledge related to the action. Finally, supportive supervision reflects opportunity to perform, as opportunity denotes the invitation to participate and take part, or get involved. Leaders with their behavior (Collings & Mellahi, 2009) can create opportunity to encourage employees' personal and professional growth (Contino, 2004), enable employees' skill development (Deci & Ryan, 1987) and create opportunities to participate. Under supportive supervision, work environment provides team members needed support. Our analysis extends understanding of how the team context can motivate members to engage in team innovative behavior. In addition, we generate new knowledge of how leadership support and member abilities can simultaneously motivate team members to perform innovatively. Therefore, we propose that it is of an outmost importance to concurrently examine at multi levels what drives team members to engage in team innovation process.

Thus, our main aim is to contribute to the literature by investigating the joint influence of team proactive personality, efficacy, and perceptions of supportive supervision on team innovation. First and most generally, by building upon the AMO framework and adopting a micro-meso perspective that integrates models of individual beliefs, personalities, support, and team innovation, we seek to contribute to the innovation literature by offering a more complete account of team innovation. In addition, we also contribute empirically to the leadership and innovation literature by suggesting certain leadership practices and by exploring the combined role of structural and interpersonal conditions for team innovation by clarifying the mechanisms through which individuals influence innovation. Second, an important theoretical contribution of the paper is in applying the AMO model, generally investigated and used at the individual level, to the team level. We believe that the three-way interaction model proposed here represents a useful application of this approach to acquiring insights into key aspects of the team innovation process.

And finally, our third contribution is to multilevel theory by incorporating emergent constructs at the individual level to achieve the outcome on team level. Organizations

are made of interacting levels (such as departments, teams, and individuals) with some degree of interdependence that consequently leads to bottom-up and top-down influence mechanisms (Costa et al., 2013). As Morgeson and Hofmann (1999, p. 258) stated, the composition of a unit can have "*a pronounced influence on collective behavior and systems of interaction, thereby influencing the phenomena that ultimately emerge*". The model in the paper assumes that there is a hierarchical data set, with one single outcome variable that is measured at the team level and explanatory variables at individual and team levels. According to Kozlowski and Bell (2003), p.7) "*teams don't behave, individuals do; but they do so in ways that create team level phenomena*". Individuals are nested within teams, and teams in turn are linked to and nested in organization, a larger multi-level system. This hierarchical nesting, which is characteristic of organizational systems, necessitates the use of levels approach in efforts to understand and investigate team phenomena (Kozlowski & Bell, 2003). According to Kozlowski and Klein (2000) individual cognitions, attitudes, and behaviors can also influence the performance and outcomes of teams and organizations (bottom-up effects). In addition, Morgeson and Hofmann (1999) suggest that emergent constructs (e.g. collective personality) may originate from different sources yet maintain similar meanings and functions to their individual-level counterparts. Beyond theoretical basis among team innovation models, we posit that our multilevel approach is likely to account for differences in team innovative performance better than would individual- or team-level models alone. Thus, by adopting a multilevel perspective that integrates models of team innovation, we seek to contribute to the literature by attaining a fuller understanding of the innovation process as a whole.

1 THEORETICAL BACKGROUND AND HYPOTHESIS

The dynamics of today's discontinuous, complex, and global economy have challenged the doctrines of traditional business operations. Organizations can no longer remain static, they must constantly adjust and redefine themselves. The AMO framework has become an established theoretical basis for explaining work performance (Blumberg & Pringle, 1982). Organization needs to increase employees' abilities, motivation and opportunities to participate in order to effectively enhance employees' innovative behavior as those are critical to direct the effort towards the desired outcome (Schimansky, 2014). AMO model proposes that ability dimension (proactive personality) of the model guarantees that employees have the appropriate skill levels to use the opportunity to engage in active changing of the work environment. Employees also need the motivation (collective efficacy) to use the elective effort, and the opportunity (supportive supervision), which refers to involvement in the decision-making process of the company (Appelbaum et al, 2000). Additionally, Hutchinson (2013) argues that ability can be influenced by recruitment and selection to ensure that capable employees are recruited in the first instance, and by training, learning and development. Motivation can be influenced by extrinsic (e.g. financial) and intrinsic rewards (e.g. interesting work) performance reviews, feedback, and work-life balance. Opportunity can be influenced by communication, involvement initiatives, teamworking, and autonomy.

Although researchers have conceptualized efficacy beliefs at multiple levels of analysis, only limited bottom-up multilevel research has been conducted (Chen & Bliese, 2002; Tasa, Sears, & Schat, 2011). There is strong reason to believe that development of efficacy beliefs is not isomorphic at individual and team levels. Factors that shape the evolution of collective efficacy are different from the antecedents of self-efficacy (Chen & Bliese, 2002), and perception of “*can I accomplish this task?*” is different from “*can we accomplish this task?*” (Mischel & Northcraft, 1997).

Perceived efficacy beliefs play a crucial role in individual's and team's functioning by affecting behavior of each person directly and indirectly (Fernández-Ballesteros, Díez-Nicolás, Vittorio Caprara, Barbaranelli, & Bandura, 2002). They influence the way people think, whether they think unpredictably or strategically, whether they see situations optimistically or pessimistically, how high they set their goals, and how much effort and commitment they put forth to achieve them (Bandura, 2000). However, people commonly do not live their lives in autonomy, and many of their goals are achievable only through interdependent efforts of their team. Hence, they have to work together with other team members, coordinating their actions to accomplish together what they are not able to do on their own, and they will most probably be influenced by the views, motivation, effectiveness, and performance of their colleagues.

Collective efficacy is both a cognitive product arising out of group interaction and a motivational force in teams (Tyran & Gibson, 2008). It refers to “*a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments*” (Bandura, 1997, p.477). Therefore, the core of perceived collective efficacy resides in the minds of team members because the team operates throughout the behavior of its individual members (Bandura, 2000). Research has demonstrated that teams with a strong group belief in their ability are more effective (Tyran & Gibson, 2008). Indeed, expectations of efficacy beliefs define the extent of individuals' task-related effort and whether and for how long they persevere. Bandura (1997) argued that there is an important difference between possessing skills and being able to use them well. In order for a team to be successful, team members have to believe in their capabilities to exercise control over events to accomplish desired goals. Therefore, teams with the same skills may perform poorly, adequately, or extraordinarily, depending on whether their perceived collective efficacy beliefs boost or harm their motivational state (Bandura, 1990).

Consistent with Gully et al. (2002) and others (e.g., Jex & Bliese, 1999; Parker, 1994), we suggest that collective efficacy perceptions reside within individuals and therefore propose to measure it at the individual level and aggregate it to the collective level. Collective efficacy refers to individual members' perceptions of their team's competency (Bandura, 1986) or aggregated ability to successfully complete a designated task (Guzzo, Yost, Campbell, & Shea, 1993). Therefore, collective efficacy beliefs develop into homogenous beliefs due to regular contacts and mutual experiences. Individuals working in the team are likely to be a part of the same process and collect similar information (Hinsz, Tindale, & Vollrath, 1997). As result, all members probably concentrate on similar information when assessing their collective efficacy leading to emergence of collective efficacy as a

shared referent-shift construct (Chan, 1998; Chen, Mathieu, & Bliese, 2005), where the referent of collective efficacy shifts from individual to team level.

In teams, it is especially important to observe collective efficacy as research found that efficacy beliefs determine whether an individual will decide to engage in certain behavior, and if so, how much effort will be invested to accomplish particular tasks (Bandura, 1997). Efficacy beliefs positively predict teamwork behaviors displayed by team members (Tasa, Taggar, & Seijts, 2007), team outcomes (Gully, Incalcaterra, Joshi, & Beaubien, 2002), job attitudes, and job performance (Chen et al., 2002). Bandura (1986) believed efficacy beliefs provide the foundation for human motivation. Unless people believe that their actions can produce the outcomes they desire, they have little incentive to act or to persevere in the face of difficulties. Such sense of confidence generated by high levels of efficacy helps teams carry on when facing difficulties. Moreover, collective efficacy has long been argued as a critical enabler of shared goal commitment that contributes to a high team willingness to innovate and perform (Griffin, Neal, & Parker, 2007; Liu, Chen, & Tao, 2015). Collective efficacy thus can motivate two major sets of behavioral tasks (i.e., idea generation and idea implementation), which result in innovation performance in teams. It also motivates members to engage in innovative behaviors, as it captures confidence in the ability to generate and implement new ideas. In line with theoretical arguments suggesting that efficacy beliefs capture confidence in the ability to generate, promote and implement new ideas or initiatives, Chen et al. (2013) found a positive relationship between efficacy beliefs and individual innovative performance. This justifies our focus on efficacy belief for the present study.

Employees' proactive personality is increasingly important for organizations seeking to adapt and survive in uncertain economic environments (Bal, Chiaburu, & Diaz, 2011; Grant & Ashford, 2008; Parker, Bindl, & Strauss, 2010). Study made by Buss (1987) showed that individuals influence their situations with their behavior and people are not just passive recipients of environmental forces but they influence their own environments. People are assumed capable of intentionally altering situations and directly changing their current circumstances, including their physical environment (Buss, 1987). Moreover, individuals differ in this proclivity. In triadic reciprocal causation, the relative influence of person, behavior, and environment varies not only across activities and circumstances, but across people (Bandura, 1986). Buss (1987) found strong differences in people's use of manipulation tactics across contexts, and considers the use of such tactics a type of individual personality difference. The proactive personality, as Bateman and Crant (1993) conceive it, is one who is relatively unconstrained by situational forces, and who effects environmental change. At the individual level, proactive personality has been found to predict individual innovation (Seibert, Kraimer, & Crant, 2001).

The importance of teamwork is increasing in last decades, hence investigating whether the impact of proactive personality extends to the team level is an important step in understanding how team composition relates to team innovation. We focus on team-level proactive personality, a behavioral tendency involving showing initiative, identifying opportunities, taking action, and insisting in attempts to enact change (Bateman &

Crant, 1993). Study made by Williams, Parker and Turner (2010) showed that the most proactive teams had members with higher-than-average proactive personalities and lower heterogeneity in proactive personality. Team members with proactive personalities are motivated to present ideas and suggestions how to improve the way the work is done, to recognize potential problems and think of ways to get around them. Thus, the stronger personalities team members have the more suggestions and ideas the team will consider. In addition, interaction amongst team members with proactive personalities is likely to stimulate team discussions resulting in the team anticipating problems and/or generating collective ideas about different ways of improving things.

Team-level proactive personality has theoretical similarity with individual-level proactive personality and thus defines the extent to which a team engages in self-starting, future-focused action that aims to change the external situation or the team itself. Team-level proactive personality is about the way the team behaves as a group, that is, as an interdependent and goal-directed combination of individuals (Morgeson & Hofmann, 1999). Examples of proactive teams include the team introduction of new work methods, team's prevention of problems rather than just reacting to them, and team's scanning the environment in order to identify probable opportunities (Erkutlu, 2012).

As such, team proactive personality is not the same as the sum of individual proactive team members but is collective in emphasis. Team members with a proactive personality are inclined to propose ideas and make suggestions as to how to improve the way work is done, as well as to identify potential problems and think of ways to get around them. Consequently, the greater the number of members with proactive personalities the more ideas and viewpoints the team will deliberate. Additionally, interaction amongst members with proactive personalities is likely to encourage team discussions resulting in the team predicting problems and/or generating collective ideas. There might be proactive members within a team, but unless their effort is coordinated, the team itself might not be proactive. It is the mean of individual proactive personality measure aggregated to the team level (Parker & Sprigg, 1999). Therefore, it can be proposed that the mean level of proactive personality in the team will be positively related to team innovative behavior.

Team proactive personality develops into emergent, homogenous construct due to regular contacts and interactions of team members (Williams et al., 2010). Through these interactions, team members develop shared and lasting ways of responding to challenges. Proactive team members put forward ideas on work improvement and suggestions how to avoid problems. Consequently, interaction amongst proactive team members likely encourages team discussions, which lead to the generation and implementation of collective ideas. We therefore propose that team-level proactive personality emerges as a consensus construct (Chan, 1998; Chen et al., 2005; Williams et al., 2010), as it maintains the same meanings across different levels of analysis, and it uses an individual as the construct's referent.

Team team-level proactive personality can be viewed as a moderating mechanism on the relationship between collective efficacy and team innovation. Leveraging Chen and

Kanfer's (2006) conceptualization, we propose that proactive personality refers to the relatively stable propensity to promote change and take action to influence the environment (Bateman & Crant, 1993). Research supports positive link between proactive personality and innovation (Seibert et al., 2001) Indeed, proactive personality has been shown to relate positively to innovation and to influence the transition from idea generation to idea implementation (Seibert, Kraimer, & Crant, 2001). Furthermore, Sheikhani, Bindu and Fakouri (2011) argued that proactive personality is one of the most important factors that has an impact on efficacy beliefs.

Perceptions of efficacy beliefs may facilitate beneficial outcomes, such as innovation, when combined with proactive personality (Chen et al., 2013). Accordingly, while perceived team-level proactive personality should represent an important condition for individual perceptions of collective efficacy to predict team innovation, its impact may depend on the level of perceived supervisory support. Studies report reciprocal relationship between team innovation and supervisory support (Ettlie, 1983; Mohamed, 2002), as rapid changes in business environment call for faster innovations (Mohamed, 2002). Therefore, to remain competitive, it is crucial to obtain innovation support of supervisors.

Eisenberger, Huntington, Hutchison and Sowa (1986) argue that when an employee believes that his or her organization or immediate supervisor is supportive, the employee will demonstrate more favorable work-related attitudes and behaviors (Marique, Stinglhamber, Desmette, Caesens, & De Zanet, 2013; Wang, Walumbwa, Wang, & Aryee, 2013). Du, Shin and Choi (2015) showed that collective efficacy perceptions significantly predicted employees' job performance. In addition, growth curve analysis showed that such perceptual congruence increased over time when the focal employee experienced a high level of support from team leaders. Support for innovation portrays the "*expectation, approval and practical support of attempts to introduce new and improved ways of doing things in the work environment*" (West, 1990, p. 315). In a work environment where supervisor supports innovation, attempts to innovate that are not successful are more likely to be tolerated, and team members may be more likely to take risks to implement new ideas (Sethi, Smith, & Park, 2001). Supervisory support is exhibited through various behaviors, such as creating opportunities to participate, strengthening the group's collective skills and approach, clarifying purpose and goals, building commitment, removing externally-imposed obstacles, and creating opportunities for performance (Katzenbach & Smith, 1993).

Supportive supervision is hence a variable that reflects the extent to which supervisor of the team displays supportive behaviors. If team members hold similar perceptions of supportive supervision, it is operationalized as a group-level construct. Supportive supervision develops into a homogenous construct due to regular contacts within the team and its perceptions converge in a team, both because team members are subject to the same set of structural influences and because these perceptions develop out of salient shared experiences. We therefore propose that supportive supervision emerges as a shared referent-shift construct that maintains the same meanings across different levels of analysis but it uses the aggregate – not the individual – as the construct's referent (Chan, 1998; Chen et al., 2005).

Research on supportive supervision has examined several dimensions of supervisory process, including its effect on efficacy beliefs. Supervisors who enable subordinates to understand their goals and assist in their goal realization contribute to their subordinate's experiences (Ballantine & Nunns, 1998). As a result, supportive supervision contributes to perceptions of efficacy beliefs, and supportive behaviors are likely to enhance individual perceptions of collective efficacy.

Supportive supervisors promote a safe environment for team members to express novel and original ideas as well as provide them with the resources to do so effectively (Hunter & Cushenberry, 2011). During the implementation phase, supervisors support some ideas whereas discarding others and push the ones that do appear viable into the production phase. Supportive supervision creates opportunities for team members' exploratory and critical thinking processes, and so it may establish a working environment where unconventional and risk-taking approaches are strongly valued and innovation is given high priority. Supportive supervision captures teams' shared belief that innovation is important and valued in their team, as well as shared expectations regarding the likely success of engaging in innovation (Chen & Kanfer, 2006). When support for innovation is high, team members are more likely to initiate and persist in innovative behaviors themselves as well as coordinate their innovative efforts with others. In addition, supportive supervision aims to lead team members to expend their effort and go beyond the expected.

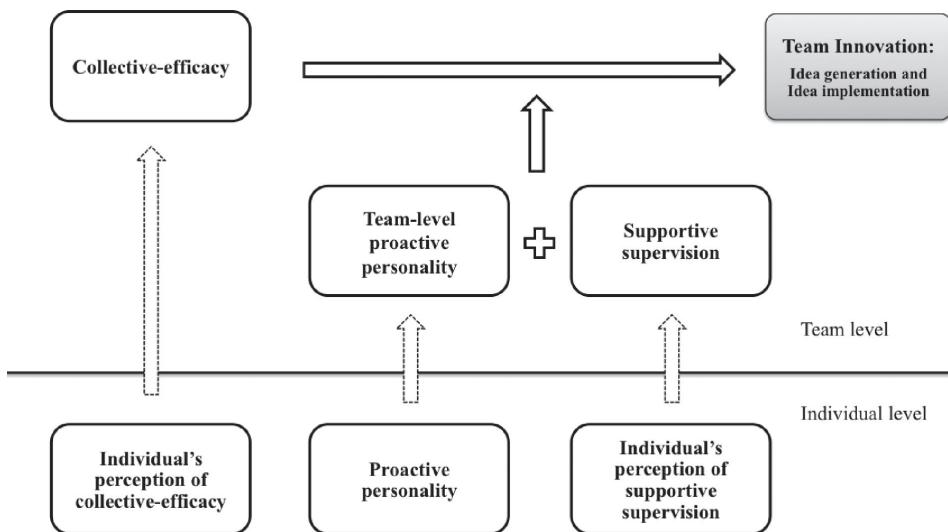
Based on the considerations above, we expect a three-way interaction between individuals' perceptions of collective efficacy team-level proactive personality and supportive supervision in relation to team innovation. The interaction postulated by the AMO model (i.e., the outcome is a function of ability, motivation and opportunity) should hold for individuals' perceptions of collective efficacy, team-level proactive personality and supportive supervision. We propose that individuals' perceptions of collective efficacy can be viewed as a motivational mechanism through which team innovative behavior is influenced. In addition, although team members may have an accurate assessment of their capabilities, they may not necessarily engage in innovative behaviors if they lack proactive personality. To successfully achieve the desired outcome, team must possess the belief that they are capable of achieving the goal. However, without proactive actions, team members less likely overcome barriers that they are facing. Hence, it is reasonable to expect a positive relationship between collective efficacy and team innovation to be contingent upon team-level proactive personality.

Furthermore, perceived supervisor support can, for instance, represent a condition under which the supervisor creates opportunities for employees not to be afraid of taking risk, trusting in their collective capabilities and proactively responding to different situations. Williams, Parker and Turner (2010) found that the most proactive teams were those with higher levels of transformational team leaders, and a higher-than-average level of proactive personality. Supportive supervision decreases job stress that interferes with work performance and provides team members with opportunities that encourage their collective efficacy. This, in turn, should make members reporting high levels of proactive

personality more willing to introduce new work methods, prevent and react to problems, and scan the environment to identify potential opportunities implied by perceptions of collective efficacy. On the other hand, if members perceive lower levels of supervisory support, they might feel less secure in their work role, regardless of their belief in their collective capabilities and proactive personality. We therefore hypothesize the following:

H: *The relationship between individuals' perceptions of collective efficacy and team innovation is jointly moderated by individuals' perceptions of team-level proactive personality and supportive supervision. Specifically, collective efficacy more strongly relates to team innovation at higher levels of perceived team proactive personality and supportive supervision.*

Figure 1: *Efficacy beliefs, proactive personality, supportive supervision and team innovation*



2 RESEARCH METHOD

2. 1 Sample and Procedures

Participants were 249 employees (185 team members and 64 team leaders) working in 64 R&D teams from a German hi-tech electronics company and three Slovenian hi-tech biotechnology, electronics, and IT companies. Studied companies varied by size (from small, medium to large enterprises) with range of employees from 50 to more than 10.700. We sampled R&D teams across firms from information technology, telecommunication, biotechnology and electronics industries, which allowed us to control for industry-level differences that could affect team innovativeness. Also, we worked closely with team leaders

in all companies to ensure that each sampled team (a) was primarily responsible for R&D activities, (b) included members from different functions who worked interdependently with each other towards collective goals, and (c) included members worked together for a minimum of two months so shared perceptions of team leader and behavior could emerge. As such, teams were similar in key design features, such as team membership, types of team tasks, and team interdependence. A comparison of respondents to non-respondents provided no evidence of response bias.

Complete data were obtained from 185 team members (71% response rate) and 64 team leaders (83% response rate) of 77 R&D teams in four companies. Average team size in the final sample was 3.28 (range = 3 to 6 members per team – including leader). Of team members, average company tenure was 7.5 years and average age was 35 years; 85% were male, 7.6% had doctoral degrees, 30.8% had master degrees, 40.5% had university degrees, 15.2% had higher education degree, 4.3% had high school degrees, and 1.6% had professional middle school degrees. Of team leaders average company tenure was 10.6 years and average age was 40 years; 92.2% were male, 32.8% had doctoral degrees, 21.9% had master degrees, 35.9% had university degrees, and 9.4% had higher education degree.

2.2 Measures

In order to avoid problems with common method bias, we used following approaches. First, because one of the major causes of common method variance is obtaining measures of both predictor and dependent variables from the same rater (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), data were collected by two separate questionnaires: one for team members and the other for their leaders. Leaders were asked to evaluate team innovation and because the data came from different sources we linked them together with identifying variable (team ID). Second, the items used in our study are part of a larger-scale questionnaire; the respondents would therefore likely not have been able to guess the purpose of the study and force their answers to be consistent. Third, five items in questionnaire were reverse-coded.

Efficacy beliefs: Collective efficacy was measured using seven items that addressed individuals' belief in their team's capabilities to organize and execute the courses of action adapted from and from Riggs et al. (1994). Responses for this scale were based on a 7-point scale ranging from 1 "completely inaccurate" to 7 "completely accurate". Items included "*The team I work with has above average ability*"; and "*This team is not very effective*" ($\alpha=.92$).

Proactive personality: The mean level of proactive personality was measured by aggregating individual proactive personality measure to the team level. Individual-level proactive personality was assessed using four of the highest loading items from Bateman and Crant (1993). This measure has proven reliability and validity (e.g., Bateman & Crant, 1993) and the same abbreviated scale has been used elsewhere (e.g., Parker & Sprigg, 1999; Williams et al., 2010). Responses for this scale were based on a 5-point scale ranging from 1 "not

true at all" to 5 "very true". Example items included: "*If I believe in an idea, no obstacle will prevent me from making it happen*" and "*I am excellent at identifying opportunities*" ($\alpha=.93$)

Supportive supervision: Supportive supervision was measured using a four-item scale based on Manz and Sims's (1987). Team members were asked whether the supervisor encourages employees to engage in self-goal setting, self-reinforcement, self-expectation, and self-observation/evaluation. Sample items include "*Encourages us to expect a lot from ourselves*" and "*Encourages us to set targets for our team performance*" ($\alpha = .89$). The 5-point scale ranged from 1 "strongly disagree" to 5 "strongly agree".

Team innovation: We operationalize team innovation as the combination of the quantity and quality of ideas that are developed and implemented (Eisenbeiss et al., 2008). Team innovation was measured using 22 items from Eisenbeiss, van Knippenberg and Boerner's (2008) measurement scale. Team leaders had to indicate quantity and quality of ideas developed within the team as well as of ideas implemented. Scales ranged from 1 to 7 but the anchors varied depending on the question. For example, the response for developing ideas, "*My team generates ideas about new targets or objectives*." ranged from 1 "no new ideas generated" to 7 "many new ideas generated". The response for idea implementation, "*How would you assess the quality of implemented ideas according to their novelty?*" ranged from 1 "not at all novel" to 7 "extremely novel" ($\alpha = .96$).

Controls: Before describing the methodology we used to test our hypotheses, we wish to emphasize that our intention is not to examine a complete model of team innovation, but rather to examine the role of few potentially important variables namely efficacy beliefs, proactive personality, and supportive supervision. In testing this hypothesis we acknowledge the role of other variables that may be correlated with innovation and therefore should be controlled for in this study. We controlled for team aggregated values of member's gender, age, country of residence, level of education, and tenure (years in the company).

We controlled for gender, as there is evidence (consistent with our sample) that there are fewer women than men in technology-oriented firms, which could potentially pose additional challenges for women in such firms (Eden, 1992). We controlled for age because as Kanfer and Ackerman (2004) showed that motivation vary across one's lifespan. We also controlled for country of residence as we were interested if there are any major differences between employees living in different countries. In addition, employees with higher education are more likely to be capable to generate and implement new innovative ideas. Furthermore, we controlled for team size, because larger teams usually deal with more complex tasks, which could challenge innovation processes (Chen et al., 2013). Finally, organizational tenure of team members is more likely to affect their attitudes toward innovation. More tenured employees may have more psychological commitment to the organizational status quo and values (Staw & Ross, 1980). Therefore, they may resist the changes (descriptive statistics are presented for all variables in Table 1 in Appendices).

3 RESULTS

We tested our hypothesis and it predicted significant relationships among the variables associated with innovation: efficacy beliefs, proactive personality, and supportive supervision. The correlations among these variables, presented in the Table 1 on the following page, indicate that the data were consistent with our hypothesis.

We analyzed the data using multivariate hierarchical regression analysis (Table 2 summarizes the multivariate hierarchical regression results). Because we assumed the demographic variables to be causally prior to all others, we entered them in the first step of multiple hierarchical regression as control variables: gender, age, country of residence, level of education, tenure, and team size; and they accounted for 2.5% of the total variance in team innovation, $F = .75$, $p = .61$. However, neither gender ($B = .06$, $SE = .21$, $\beta = .02$, $p = .78$), country of residence ($B = .15$, $SE = .22$, $\beta = .08$, $p = .51$), age ($B = -.20$, $SE = 0.15$, $\beta = -.13$, $p = .19$), level of education ($B = -.05$, $SE = .12$, $\beta = -.04$, $p = .69$), tenure ($B = -.03$, $SE = .09$, $\beta = -.04$, $p = .72$), or team size ($B = .06$, $SE = .07$, $\beta = .07$, $p = .39$) were significantly related with team innovation. The regression at the higher level of analysis required the use of aggregated scores, so we aggregated individuals' perception of collective efficacy to the team level and they yielded acceptable values (Mean $rwg = .93$, $SD rwg = .18$; $ICC[1] = .66$, $ICC[2] = .85$, $F = 6.64$, $p = .00$). We aggregated also results from individuals' proactive personality (Mean $rwg = .89$, $SD rwg = .20$; $ICC[1] = .76$, $ICC[2] = .90$, $F = 10.15$, $p = .00$) and individuals' perceptions of supportive supervision to the team level (Mean $rwg = .83$, $SD rwg = .21$; $ICC[1] = .65$, $ICC[2] = .84$, $F = 6.33$, $p = .00$) and they both yielded acceptable values.

Table 1: *Descriptive statistics and Inter-Item Correlation Matrix*

	Reliabilities												
	Mean	St. dev.	St. (Cronbach alpha)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Gender	1.85	0.35	n.a.	1									
2. Country	1.43	0.50	n.a.	.23**	1								
3. Age	2.01	0.63	n.a.	0.01	.42**	1							
4. Education	4.17	0.75	n.a.	0.14	.59**	.24**	1						
5. Tenure	3.15	1.06	n.a.	-0.01	.44**	.65**	.18*	1					
6. Team Size	3.28	1.20	n.a.	0.02	.44**	.25**	.15*	.26**	1				
7. Collective Efficacy	4.86	0.85	0.92	0.11	.21**	0.07	-0.03	0.08	0.11	1			
8. Team-level Proactive personality	2.47	0.79	0.93	0.04	-0.07	-0.07	-0.08	-.17*	0.02	.68**	1		
9. Supportive Supervision	3.69	0.75	0.89	0.04	0.10	.161*	-0.01	.17*	0.08	.62**	.72**	1	
10. Team Innovation	4.25	0.97	0.96	0.04	0.02	-0.11	-0.02	-0.08	0.06	.59**	.73**	.65**	1

Note: N = 185, * correlation is significant at the $p < 0.05$ level, **correlation is significant at the $p < 0.01$ level.

Table 2: *Results of multivariate hierarchical regression analysis*

	Model 1	Model 2	Model 3	Model 4
1. Gender	.059 (.21)	-.048 (.14)	-.114 (.13)	-.139 (.13)
2. Country	.147 (.22)	.027 (.15)	-.039 (.15)	.017 (.15)
3. Age	-.201 (.15)	-.293** (.10)	-.225* (.09)	-.226* (.09)
4. Education	-.049 (.12)	.069 (.08)	.127 (.08)	.111 (.08)
5. Tenure	-.033 (.09)	.035 (.06)	-.060 (.06)	-.076 (.06)
6. Team Size	.059 (.07)	.028 (.04)	.048 (.04)	.049 (.04)
7. Collective Efficacy		.134 (.07)	.042 (.07)	-.053 (.08)
8. Team Proactive personality		.417*** (.09)	.382*** (.08)	.392*** (.08)
9. Supportive Supervision		.269*** (.08)	.212** (.08)	.134 (.09)
10. Collective Efficacy x_ Proactive personality			-.025 (.08)	-.058 (.08)
11. Collective Efficacy x Supportive Supervision			-.256*** (.07)	-.147 (.09)
12. Proactive personality x Supportive Supervision			.143 (.08)	.128 (.08)
13. Collective Efficacy x Proactive personality x Supportive Supervision				.093* (.05)

Note: N = 185, values are standardized coefficients, with standard errors in parentheses. Team innovation is the dependent variable.

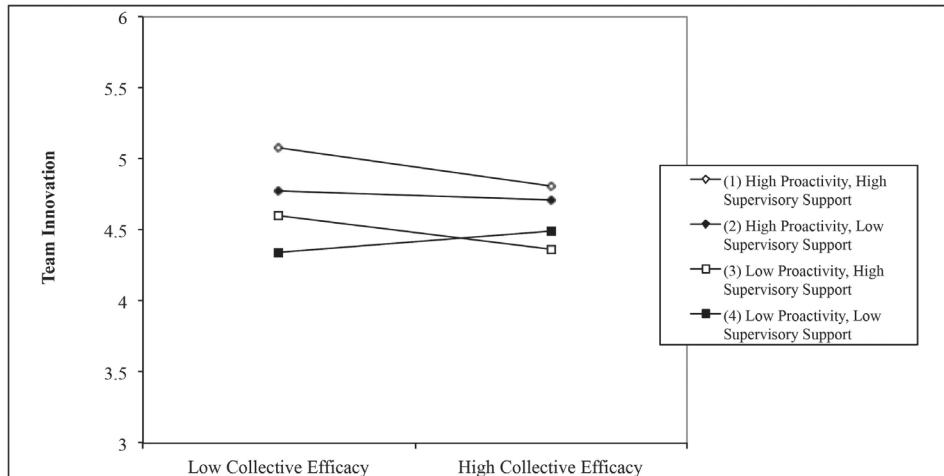
* correlation is significant at the p < 0.05 level, **correlation is significant at the p < 0.01 level and ***correlation is significant at the p < 0.001.

After entering control variables (gender, age, country of residence, level of education, tenure, and team size) in Step 1, we aggregated individuals' perception of collective efficacy, proactive personality and supportive supervision in Step 2. They accounted for additional 57.1 % of explained variance in team innovation, $F = 28.67$ $p = .00$. The inclusion of all three two-way interaction terms (Collective efficacy \times Proactive personality, Collective efficacy \times Supportive supervision, Proactive personality \times Supportive supervision) in a third step added significantly to the explained variance of team innovation, $\Delta R^2 = .06$, $F = 27.39$, $p = .00$. Finally, in step 4, the three-way interaction term (Collective efficacy \times Proactive personality \times Supportive supervision) was entered into regression. The three-way interaction term was statistically significant ($t = 2.01$, $p < .05$). Whereas the addition of the three-way interaction term explained an additional 1% of the variance in team innovation, leading to a total explained variance of $R^2 = .66$, none of the individual two-way interaction term were statistically significant. The effect of collective efficacy on team innovation was moderated by team-level proactive personality and supportive supervision.

To demonstrate the form of the three-way interaction, we created four combinations of individuals' perception of collective efficacy and team innovation (at one standard deviation above and below the mean) and plotted one collective efficacy – team innovation slope for each group. As illustrated in Figure 2, the relationship between collective efficacy and team innovation is moderated by perceived proactive personality and supportive supervision. Negative relationship between individuals' perceptions of collective efficacy and team innovation was found for team members reporting high levels of supportive supervision and high levels of proactive personality. In contrast, a positive relationship between individuals' perceptions of collective efficacy and team innovation was found for employees reporting low levels of supportive supervision and low levels of team-level proactive personality. These findings suggest that supervisors are of vital importance for facilitating team innovation in settings where levels of perceived collective efficacy are low.

The slopes for the two low proactive personality groups (Group 3-high supportive supervision, and Group 4-low supportive supervision) were significantly different from each other ($t = -3.577$, $p = .000$), suggesting that high levels of supportive supervision in combination with low levels of proactive personality result in higher levels of team innovation in the case of low collective efficacy, but produce lower levels of team innovation in the case of high levels of collective efficacy. The slope for high proactive personality and low proactive personality (Group 1-high supportive supervision, and Group 4-low supportive supervision) were significantly different from each other ($t = -2.649$, $p < .009$), suggesting that high levels of supportive supervision in combination with high levels of proactive personality result in highest levels of team innovation in both levels of collective efficacy, but (as opposed to Group 4) produce a negative line of the relationship, suggesting that low levels of collective efficacy are more suited for fostering team innovation in the case of high supportive supervision and high proactive personality.

Figure 2: *The moderating role of individuals' perception of team-level proactive personality and supportive supervision on relationship between collective efficacy and team innovation at -1 SD (low) and $+1\text{ SD}$ (high) of the centered means.*



4 DISCUSSION

By drawing upon the theoretical perspectives of personalities and beliefs (Bandura, 1997; Chen et al., 2013; Williams, Parker, & Nick Turner, 2010), team-level emergent states (Marks, Mathieu, & Zaccaro, 2001), and multilevel theory (Chen et al., 2005; Kozlowski & Klein, 2000), we investigated how individual-level elements (aggregated to team level), as well as their interplay, influence team innovation. Our findings largely validated our hypothesis that relationship between individuals' perceptions of collective efficacy and team innovation is moderated by proactive personality and supportive supervision.

In line with our hypothesis, we found support for a three-way interaction of individuals' perceptions of collective efficacy, team-level proactive personality and supportive supervision in relation to team innovation. The form of interaction demonstrates that in situations with high supportive supervision, proactive personality results in highest levels of team innovation in both levels of collective efficacy, but produce a negative line of the relationship, suggesting that low levels of collective efficacy are more suited for fostering team innovation in the case of high supportive supervision and high proactivity.

4. 1 Contributions and Theoretical Implications

This paper sets out the foundations and outlines a multilevel approach for studying team innovation process. We suggest that such an approach provides a more comprehensive interpretation of the interplay between the individual and the team in understanding

the innovation processes. The overarching advantage of multilevel approach over single-level approach includes the ability to study the interaction of individuals' perception of collective efficacy (motivation) over proactivity (ability) and supportive supervision (opportunity) to achieve higher levels of team innovation (outcome).

We contribute to the literature in three ways. First, most generally, by building upon the AMO framework and adopting a micro-meso perspective that integrates models of individual beliefs, personalities, support, and team innovation, we contribute to the intersection of the literature on organizational behavior and innovation management by elaborating the importance of the AMO framework at the team-level innovation management, which posits that a team's actions (and not just an individual's) are driven by all three elements. With AMO model we show that team innovation is the function of team members ability, motivation and opportunity. Members will perform well when they are able to do so (because they have the necessary knowledge and skills to the job), they have the motivation to do so (they will do the job because they want to) and finally, there will be enhance performance if their work environment provides the necessary support (for example through empowerment). Therefore, team innovation may be understood as a result of all three of them: motivation (efficacy beliefs), which captures the force that pushes people toward certain goals; ability (proactivity) represents team's ability to promote change and take action to influence the environment and opportunity (supportive supervision), which represents the environmental or contextual mechanisms that enable action by creating opportunities for performance, and enhancing employees' belief in their conjoint capabilities, which can lead to improved outcomes.

Our second contribution is to the AMO literature by using the AMO model on group level. The AMO model on team level helps to answer question like: What do teams experience being capable of?, What motivates them, and which tasks specifically do they find meaning in?, Which opportunities do they experience having? Even though AMO model proposes that all three variables are necessary for outcome achievement, our results indicate that when team is offered an opportunity (supportive supervision) and possesses abilities (proactive personality) the level of motivation (collective efficacy) is not as necessary as when the team lacks in abilities and opportunities. One explanation for this may be that when teams do not receive enough support and members are not proactive, the joint belief in their capabilities becomes a necessity for achieving higher levels of team innovation. After all, supervisor's support may be particularly important when combined with high proactive personality, which implies "a favourable" working environment, in which employees' motivation is not as necessary.

And finally, our third contribution is the use of emergent constructs at the individual level to achieve the outcome on team level. Morgeson and Hofmann (1999) suggested that emergent constructs (e.g. group personality) may originate from different sources but maintain similar meanings to their lower-level constructs. All three aggregate-level measures used in our study were aggregated to team level as the emergent constructs, and they all showed sufficient inter-member agreement, which justified the aggregation of ratings within units to the unit level (Chen et al., 2005). By detecting relatively high and

significant ICC(1) results for these measures further indicate that variability is smaller within teams than between teams.

4.2 Practical Implications

This study has also an important managerial implication. There is an agreement that a key organizational competitive advantage lies in its ability to adapt to challenges from business environment. Our study highlights the importance of addressing both individual and team contributions when managing team-level innovation. Specifically, our study suggests that team innovation is impacted by team characteristics and/or processes, individual personalities, and beliefs.

We argue that the AMO framework represents a further mechanism linking leadership practices and team innovation. For example, when levels of motivation are low, it is extremely important that teams are proactive and leaders provide support in order to achieve high levels of team innovation. Leaders can influence employees' motivation (efficacy beliefs) by communicating a high level of confidence in the team's ability to achieve ambitious collective goals and their confidence can have a contagious effect on members' own confidence (Podsakoff, MacKenzie, Moorman, & Fetter, 1990). Leaders also influence employees' abilities (proactive personality) by providing supportive environment for promotion of change and taking action to influence the environment and finally, leaders influence opportunities (supportive supervision), by showing concern for members' needs, which promotes a belief among team members that the leader will provide them with any support that they might need and strengthen team members' confidence in their conjoint capabilities (Schaubroeck, Lam, & Cha, 2007), which leads to improved outcomes.

The theoretical model we outline can help inform organizations and managers how to effectively recruit and train individual team members and teams as a whole in order to achieve higher levels of team innovation. According to our results, the level of collective efficacy had less effect on team innovation if teams perceived higher levels of supportive supervision and proactive personality. If teams had lower levels of motivation (individual perception of collective capabilities), ability (through proactive personality) and provided opportunity (supportive supervision) were more important for achieving higher levels of team innovation as they were when teams perceived lower levels of motivation. Therefore, increased attention needs to be paid to employees by recruiting innovative individuals and providing supportive environment where employees are motivated, able to seek continuous improvement, and search for innovative solutions to problems.

To achieve this, leaders should adopt transformational management style, the ability to get teams to want to change and increase the level of their proactive personality, which may function as the safety net for teams to think and behave innovatively. When teams achieve high levels of proactive personality, leaders give them more freedom to act on their terms and so they can create an environment with less regulations and policies from company's

side. Leaders can rely on “Deep Dive” process (Kelley, Littman, & Peters, 2001), which is a technique to rapidly engage a team into a situation for idea generation and is widely used for innovation in idea generation phase and product development or improvement.

4.3 Limitations and future research directions

Although the present study makes several noteworthy contributions, it is important to point out also some of the limitations and discuss how they might spur future research. One of the biggest limitation of our paper are the cross-sectional data as they were collected by studying individuals and teams at the same point of time without regard to differences in time and we have non-experimental data therefore we can not make causal claims (Antonakis, Bendahan, Jacquot, & Lalivé, 2010). Furthermore, although we have empirically tested and cited several studies that support hypotheses in our model throughout the paper, the results should be viewed with caution in light of the smaller sample size. Therefore, feasibility of the model and its ability to complement and extend existing theories should be tested in a large-scale study also in countries outside Europe. It is important to now go further; as such research would additionally extend our knowledge about the innovative process.

Whereas the case can be made that the team- and individual-focused inputs examined here (i.e., efficacy beliefs, proactive personality and supportive supervision) have an important impact on team innovation, we recognize that other antecedents, which we did not include in our study could also account for innovative performance at team level. For example, we did not assess other personal characteristics (e.g. intuition, need for cognition) and team-level factors that might affect this relationship (e.g. team-level leader-members exchange, influence tactics, psychological safety). Thus, more research is needed to build on our initial model of multilevel innovation processes in teams, and consider additional factors that promote innovativeness across levels of analysis.

5 CONCLUSION

Despite these limitations, there are important aspects in the present study for researchers as well as practitioners working in the field of innovation. In our study, we applied a multilevel approach in an attempt to take initial steps in advancing a more complete view of team innovation that encompassed emergent influences of individual members on their teams. Efficacy beliefs were associated with team innovative behavior by influencing employees’ motivation to engage in such behaviors, as they capture confidence to generate and implement new ideas. We took this analysis a step further by taking into account how this relationship might be moderated by proactive personality and supportive supervision as they encourage team members to take initiative and to focus on exploratory thinking and so it enables a working environment where risk-taking approaches are valued and innovation is given a high priority. Our findings are consistent with the idea that efficacy beliefs stimulate team innovation and the level of collective efficacy had less effect on

team innovation if teams perceived higher levels of supportive supervision and proactive personality. We hope this effort will encourage future multilevel research related to team innovation.

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