

Full Length Research Paper

# The effects of challenge and hindrance stressors on unlearning and NPD success: The moderating role of team conflict

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In order to develop successful products, an NPD team needs to engage in an unlearning process by re-orienting their existing beliefs and routines. Previous studies have mostly determined that unlearning is based on external organizational stressors, while internal ones are rarely discussed. Based on expectancy theory, this study examines the effects of challenge and hindrance stressors embedded in the organization on team unlearning. Moreover, this study also investigates the moderating effects of team conflict on the relationship between team unlearning and NPD success. To test the proposed hypotheses, 87 NPD team leaders and 336 members participated in the study. The results indicate that a challenge stressor positively influences team unlearning and NPD success, while a hindrance stressor has the opposite effect. Further, higher task conflict strengthens the positive effect of team unlearning on new product success when NPD teams engage less in the unlearning process, while less relationship conflict strengthens the effect when the teams are more engaged in the unlearning process.

**Key words:** Challenge stressor, hindrance stressor, team unlearning, team conflict, new product success.

## INTRODUCTION

The performance and survival of organizations rely on the development of innovative new products (Brown and Eisenhardt, 1995; Smith, Collins, and Clark, 2005). Innovative products, as the result of planned and effective introduction of change (Tjosvold, Tang, and West, 2004), require that NPD teams do not rely on existing beliefs and methods (Starbuck, 1996). In other words, when NPD teams stick to their existing beliefs and routines, the probability of developing and subsequently launching innovative products will be reduced due to an inability to effectively integrate the changing environment (e.g., market, technical, and regulatory) into newly developed products (Akgun, Lynn, and Byrne, 2006). The ability of NPD teams to change beliefs and routines to address rapidly changing environments – known as unlearning (Hedberg, 1981; Starbuck, 1996), has thus been posited to catalyze the change and adaptation process (Klein, 1989).

Prior studies have identified that team unlearning is influenced by the *stress* that is experienced by a team due

to dynamic changes in the environment (*stressors*), such as technology and market turbulence (Akgun et al., 2006). They assert that when the surrounding environment is rapidly changing, NPD teams need to initiate and engage in an unlearning process (Starbuck, 1996). However, these studies have tended to neglect the fact that work contexts might also either engender or inhibit team unlearning. As Brief and George (1995) argued, work contexts have a fairly consistent economic meaning for the individuals who experience them, and as a result, they tend to appraise and react to the particular work stressors in those contexts in fairly consistent ways. Therefore, this study raises the question of how work context can determine the unlearning process inside an NPD team and consequently the level of new product success.

According to Cavanaugh, Boswell, Roehling, and Boudreau (2000), there are two work stressors that exist in the workplace: challenge and hindrance stressors. *Challenge stressors* refer to job demands such as workload,

time urgency, job responsibility, and job complexity that are viewed by employees as rewarding work experiences that create opportunities for personal growth (Cavanaugh et al., 2000). *Hindrance stressors*, on the other hand, refer to job demands such as red tape, role ambiguity, role conflict, and hassles viewed as obstacles to personal growth or demands that interfere with or hinder one's ability to achieve valued goals (Cavanaugh et al., 2000). Based on expectancy theory (Vroom, 1964), this study argues that NPD team members appraise challenge stressors positively due to the opportunities they provide to promote personal or team growth (Lepine, Podsakoff, and Lepine, 2005), and as a result, they relate positively to NPD success. In contrast, NPD team members appraise hindrance stressors negatively due to that the feeling that these might harm their personal or team growth (Lepine et al., 2005), and thus they relate negatively to NPD success.

In addition, although prior studies have suggested that unlearning is a prerequisite for the success of NPD teams, the results tend to be inconsistent (e.g., Akgun et al., 2006; Starbuck, 1996), which indicates that some conditions might moderate the effect of unlearning. Therefore, this study address has a second research question, which is under what conditions team unlearning has a greater or lesser impact on NPD success. This study expects that changing beliefs and routines could cause agreement or disagreement within an NPD team, with the latter engendering conflict among team members. This study argues that different levels of conflict within an NPD team could explain the different effects of unlearning on its performance. According to Jehn (1994, 1995), task conflict often occurs when a team is working on non-routine tasks and positively relates to new product success. On the other hand, relationship conflict tends to be negatively related to team performance. Based on this, it is argued in this study that greater task conflict could strengthen the positive effect of the unlearning process on new product success. In contrast, the positive effect of the unlearning process on new product success tends to be weakened when relationship conflicts are more intense among members.

Based on the above, the aim of this paper is to investigate the effect of work contexts on the willingness of NPD teams to engage in the unlearning process. This study not only investigates the importance of the direct effects of team unlearning, but also under which conditions NPD teams can leverage the level of new product success, and thus it also examines the moderating role of team conflict.

## LITERATURE REVIEW

### Challenge/hindrance stressors

According to Brief and George (1995), work contexts often play roles as stressors that employees need to

appraise and react to in fairly consistent ways. There are two factors that can be considered from several common measures of stress originating from work contexts (Cavanaugh et al., 2000). One factor includes demands such as high workload, time pressure, job scope, and high responsibility. This factor has been labeled *challenge stressors*, because it includes stressful demands viewed by managers as obstacles to be overcome in order to learn and achieve. The other factor includes demands such as organizational politics, red tape, role ambiguity, and concerns about job security. This factor has been labeled *hindrance stressors* because it includes stressful demands viewed by managers as unnecessarily thwarting personal growth and goal attainment.

By extending the research of Lazarus and Folkman (1984) and using concepts from expectancy theory (Vroom, 1964), it becomes possible to account for the distinction between challenge and hindrance stressors and also to predict their differing relationships with performance (Lepine et al., 2005). Lazarus and Folkman (1984) posited that people appraise stressful situations as either potentially threatening or potentially promoting mastery, personal growth, or future gains. This distinction between stressors is similar to the distinction that Cavanaugh and his colleagues (2000) made, although Lazarus and Folkman (1984) used the labels "threats" and "challenges." The outcome of this initial appraisal process influences emotions, which in turn influence how a person copes with stressors. Challenge stressors, because they are appraised as having the potential to promote personal gain or growth, trigger positive emotions and an active or problem-solving style of coping (Lepine et al., 2005). Threatening or hindering stressors, because they are appraised as having the potential to harm personal growth or gain, trigger negative emotions and a passive or emotional style of coping (Lepine et al., 2005). In summary, this study asserts the view of Cavanaugh et al. (2000) that challenge stressors refer to job demands that are viewed by NPD team members as rewarding work experiences that create opportunities for personal growth, while hindrance stressors refer to job demands viewed as obstacles to personal growth that interfere with or hinder the ability to achieve valued goals.

While previous studies mostly discuss challenge and hindrance stressors at the individual level, this study follows the argument of Pearsall, Ellis, and Stein (2009) and claims that the concept can be extended to the team level since the team itself originates in individual cognitions and behavior. Team members, like individuals, perceive work contexts in terms of their potential harm or benefit. Team members appraise the contexts as an opportunity for growth or mastery (challenge) or a possible barrier to achieving their goals (hindrance). Researchers have suggested that because stress appraisals are embedded in the social context of the team, team members will process work contexts in a relatively similar manner (Drach-Zahavy and Freund, 2007;

Hobfoll, 2001). As team members interact and share their perceptions and concerns, their appraisals converge with other team members struggling to make sense of emergent, unfamiliar demands. Cognitive appraisals tend to converge due to analysis and discussion, while affective appraisals become more similar by emotional contagion (Gump and Kulik, 1997). Team members then engage in coping behavior based on the similar bases of primary appraisal toward stressors faced in the workplace, viewing them as either positive or threatening.

## **Unlearning**

Previous studies have indicated that organizational memory and unlearning are closely related concepts. Specifically, an organization practices unlearning when its memory does not fit with the current condition, and thus it needs to eliminate, disassemble, or change how it acts in certain situations (Akgun, Lynn, and Byrne, 2003; Moorman and Miner, 1997). Baker and Sinkula (1999) proposed that an organization practices unlearning when it actively reviews long-held routines, assumptions, and beliefs. Another definition, proposed by Nonaka, Toyoma, and Byosiere (2001, p. 509) is a “breakdown of routines, habits, or cognitive frameworks.”

Since the concept could be viewed as both a process and an attitude (outcome), it is necessary to distinguish between the two perspectives (Akgun et al., 2006). The process approach represents activities and procedures that NPD teams have when they are engaged in the unlearning process. An attitude approach refers to a change in beliefs or routines. This study adopts the former definition, since it is measurable (Akgun et al., 2006) and because teams' activities regarding the changes of their beliefs and routines are well-reflected in this concept. Consequently, this study asserts that unlearning is changes of beliefs and routines among new product development team members (Akgun et al., 2003, 2006; Nonaka et al., 2001; Sinkula, 2002).

## **New product success**

New product success constitutes the very end of the innovation process (Perez-Bustamante, 1999), and is defined by Marsh and Stock (2006) as an organization's innovative capabilities, product quality, and efficiency with regard to its new products. Song and Montoya-Weiss (1998) measured new product success as the degree to which a product meets a firm's profit objectives. The vast majority of studies have suggested that being market oriented is associated with a high level of new-product success (e.g., Harmancioglu, McNally, Calantone, and Durmusoglu, 2007; Narver, Slater, and MacLachlan, 2004). Consistent with this stream of literature, this study asserts that new product success can be assessed by

the market success of a new product. Following Millson and Wilemon (2006), market success is determined by four new product success measurements as follows: the degree to which a new product's profits exceed or fall short of what is expected; the degree to which sales exceed or fall short of what is expected; the degree to which a new product creates a product category new to a firm; and the degree to which a new product creates a market that is new to the industry.

## **Team conflict**

Team conflict refers to a process resulting from the tension between team members because of real or perceived differences (e.g., DeDreu, Harinck, and Van Vianen, 1999; DeDreu and Weingart, 2003). Because team members contribute to the team through social inputs and task inputs (e.g., Forsyth, 1983), conflict in teams is concerned with relationship and task issues (e.g., Amason and Schweiger, 1997; Jehn, 1997). Examples of relationship conflict are conflicts about personal taste, political preferences, values, or interpersonal style. Examples of task conflict are conflicts about the distribution of resources, about procedures and policies, and about judgments and interpretation of facts. Task conflict increases group members' tendency to scrutinize task issues and to engage in deep and deliberate processing of task-relevant information (Amason, 1996; Amason and Schweiger, 1997; Jehn, 1995, 1997), while relationship conflict tends to result in a focus of members on each other rather than on the assigned task (De Dreu and Weingart, 2003). This fosters learning and the development of new and sometimes highly creative insights leading the group to become more effective.

## **HYPOTHESES DEVELOPMENT**

According to expectancy theory (Vroom, 1964), the motivation of employees is a proximal antecedent of performance, and the motivation itself is the result of their appraisal and coping process toward work stressors (Lazarus and Folkman, 1984). According to Lepine et al. (2005), direct experience and social learning toward work stressors are associated with the cognition process of expectancy theory. They argued that the levels of effort with which NPD teams cope with their assigned tasks and the probability of their success with regard to accomplishing those tasks (expectancy) are based on beliefs that are associated with work stressors. Further, they noted that the success of NPD teams as far as accomplishing the assigned tasks is also associated with the degree of value (attractiveness) which is also based on their beliefs about work stressors. Based on this, it can be expected that challenge stressors provide high motivation for NPD teams to accomplish their assigned

tasks. The reason is that they believe that if they can finish the assigned tasks successfully, they will be rewarded handsomely. This belief turns into greater effort by the NPD team members to accomplish the assigned tasks, thus increasing the likelihood that they will meet the demands.

Under these circumstances, NPD team members have greater incentive to engage in the unlearning process to accomplish the mission assigned to them. As suggested by Smith et al. (2005), developing innovative products improves the performance of organizations and increases their chances of survival. The development of innovative products is catalyzed by introducing the change and adaptation process (Klein, 1989) by effectively integrating the changing environment into a newly developed product (Akgun et al., 2006). This process can be more successfully implemented when a team does not rely on existing beliefs and methods (Starbuck, 1996). In other words, NPD team members will devote greater effort to developing innovative products by engaging in the unlearning process because they believe that by doing so, the product will be successful and that they will receive social recognition from their colleagues as well as from the organization. In addition, since NPD teams' transactive memory increases while facing challenge stressors, they will be able to operate more efficiently and effectively (e.g., Lewis, 2004; Pearsall, Ellis, and Stein, 2009). Consequently, the chances of success for the newly developed products will increase. Based on this, the following hypotheses are proposed:

H<sub>1</sub>: Challenge stressors have a positive influence on the level of team unlearning

H<sub>2</sub>: Challenge stressors have a positive influence on new product success

Hindrance stressors should be associated with low motivation because people are unlikely to believe that there is a relationship between the effort expended on coping with these demands and the likelihood of meeting them (Lepine et al., 2005). Specifically, NPD team members are likely to believe that no reasonable level of effort will be adequate to meet the assigned tasks, and as a result, they will tend to have less motivation with regard to coping, regardless of any desire to cope based on the subjective value of potential outcomes. For example, when NPD team members feel that organizational decisions are more affected by politics than by their performance, they will be highly likely to reduce the amount of effort dedicated to the assigned tasks. Moreover, any effort expended to cope with such demands would likely be viewed as sapping resources that could otherwise be focused on demands associated with more valued outcomes that could be met. Under this situation, it can be expected that NPD team members are less likely to engage in the unlearning process. Moreover, since they believe that their performance is less appreciated, the likelihood of the success of new products also will be

lower. In addition, Pearsall et al. (2009) found that teams may have less transactive memory when they face hindrance stressors. Instead of engaging in learning something through an unlearning process, they tend to rely on their own existing knowledge structures and fall back on habitual routines (e.g., Gersick and Hackman, 1990). As a result, they are less willing to engage into the unlearning process. Moreover, since teams appraise such situations as negative and constraining, they respond by lowering their individual performance (Lepine et al., 2005). Consequently, the success of newly developed products will be lower. Therefore,

H<sub>3</sub>: Hindrance stressors have a negative influence on the level of team unlearning

H<sub>4</sub>: Hindrance stressors have a negative influence on new product success

This study asserts that changing beliefs and routines, regardless of the level of changes, is a prerequisite to developing innovative products (Starbuck, 1996), and thus, increasing new product success. When a team has experienced success in the past, it will usually adopt similar beliefs and routines to develop new products. However, this process will not generate new ideas because it is based on a platform of similar ideas. By practicing unlearning, teams 'make room' for more adequate frameworks and responses in team memory (Hedberg, 1981). Since this study regards unlearning as a process, any changes of beliefs and routines will also incorporate the implementation of those changes, which prior studies have indicated will increase the success of new products (Akgun et al., 2007b; Becker, 2008). Consequently, this study proposed the following hypothesis:

H<sub>5</sub>: Team unlearning has a positive influence on the level of new product success

The previous discussion does not indicate under what conditions an NPD team engages in unlearning. There is a high probability that unlearning processes heighten the level of disagreement among team members (e.g., De Dreu et al., 1999; Jehn, Greer, Levine, and Szulanski, 2008) about which beliefs or routines need to be changed or modified. Jehn (1994, 1995, 1997) noted that task conflict can be beneficial to task performance when working on non-routine tasks, which are typically complex tasks without standard solutions, therefore requiring some consideration by the NPD team. Task conflict increases team members' tendency to elaborate task issues and to engage in extensive knowledge exchange regarding task-relevant information (Amason, 1996; Amason and Schweiger, 1997; Jehn, 1995, 1997). This fosters learning and the development of new and sometimes highly creative insights, leading the group to become more effective and innovative (De Dreu and West, 2001; Jehn, 1995). By experiencing task conflict, NPD team members engage in an unlearning process by the

deep and deliberate processing of task-relevant information, during which the development of new and creative insights will be fostered leading the team to become more effective (De Dreu, 2006). Moreover, Simons and Peterson (2000) noted that groups who experience task conflict tend to make better decisions because such conflict encourages greater cognitive understanding of the issue being considered. As a result, it can be expected that when an NPD team engages in an unlearning process and at the same time experiences task conflict, their effectiveness will be heightened, and thus the success of a newly developed product will increase.

In contrast, relationship conflict has only a detrimental role on team performance (DeDreu, 2006). The previous results have indicated that relationship conflict generally decreases satisfaction and interferes with task performance (Jehn, 1995, 1997; Amason, 1996). According to De Dreu and Weingart (2003), relationship conflict limits the information processing ability of an NPD team because each member spends his/her time and energy focusing on others rather than the assigned task. Consequently, it is expected that the positive effect of team unlearning on new product success will be weakened when the team members engage in relationship conflict. Based on this, the following hypotheses are proposed:

H<sub>6</sub>: Team unlearning will interact with task conflicts such that the positive effect of team unlearning on new product success will strengthen when the members experience more rather than less task conflict.

H<sub>7</sub>: Team unlearning will interact with relationship conflicts such that the positive effect of team unlearning on new product success will weaken when the members experience more rather than less task conflict.

## METHODS

### Sampling plan

A mail survey was distributed to 200 NPD teams from three science parks in Taiwan. Although Taiwan as a context is rather restricted, the author believes that it is highly relevant to the study of NPD teams. According to the official figures (Government Information Office of Taiwan, 2009), nearly 90% of the world's laptops are manufactured by Taiwanese companies. Moreover, Taiwan is the world's second-largest producer of information-technology goods, such as semiconductors and optoelectronics products. Further, major global manufacturers—including Intel, HP, Dell, Sony, Microsoft, IBM and Ericsson—have set up around 40 R&D centers in Taiwan, while domestic enterprises operate an additional 100 such centers. In addition, Taiwan was ranked 6<sup>th</sup> for patents registered in the U.S. in 2008 (Ministry of Economic Affairs of Taiwan, 2009), and the proportion of R&D conducted by businesses accounted for 67.20% of the total R&D expenditure in 2006. These facts demonstrate that NPD activities in Taiwan are highly intensive and provide a perfect context for analyzing related phenomena.

The addresses of each team leader and team members were obtained from the human resources department of each company. The survey material included a university-headed cover letter from

the researcher. Forty-six EMBA students at a university in southern Taiwan were invited to do a pre-test of the study, and the results indicated that all the items were loaded as expected. Out of 200 NPD teams, 87 completed and returned questionnaires with follow-up e-mails during a three-month period in early 2010. A total of 336 team members and 87 leaders participated in the formal study, with a response rate of 43.50%.

### Research design and construct measurements

The measurement items of challenge stressors were adopted from Cavanaugh et al. (2000) and Boswell et al. (2004), while hindrance stressors were adopted from Cavanaugh et al. (2000) and LePine et al. (2004). These research constructs were tested using a 7-point Likert scale, in which "one" refers to strongly disagree, and "seven" to strongly agree. The measurement items for team unlearning were adopted from Weber and Crocker (1983) and Moorman and Miner (1997), and from those used by Akgun et al. (2006) - four items for team beliefs and five items for team routines. The measurement items of new product success (five items) were adopted from Cooper and Kleinshmidt (1987) and from those used by Akgun et al. (2006). The measurement of team conflict was adopted from Jehn (1995) for relationship conflict (four items) and Shah and Jehn (1993) for relationship conflict (four items). The last three research constructs were tested by using a 5-point Likert scale, in which one refers to strongly disagree, and five to strongly agree. This study required team leaders to give responses on new product success, while items on challenge/hindrance stressors, team unlearning, and team conflict were responded to by team members. In order to maximize functional and conceptual equivalence during the translation process, the questionnaire was translated using a double translation method and was presented in both English and Chinese. All the research items are presented in Table 1.

As discussed by Feldman and Lynch (1988), respondents may use retrieved answers to earlier survey questions as inputs to respond to later questions. Thus, in order to reduce the effect of self-generated validity, this study followed the procedure of Podsakoff, MacKenzie, Lee, and Podsakoff (2003) by utilizing *counterbalancing question order*, with the survey questions not arranged sequentially. Moreover, this study *proximally separated the measures* by having respondents complete the measurement of the predictor and criterion variables in different response formats (i.e., 5-point and 7-point Likert scales).

### Respondents' descriptions

The following are the basic attributes of the firms, teams, and members. Seventy-seven teams participated from 15 companies, and each company consisted of one to 17 teams. Most of the teams worked within companies operating in high tech industries (55.300%), followed by low-tech industries (31.800%), and the rest were in the service industry. Almost seventy-percent of the companies had been established for more than 16 years, and most had yearly sales of more than US\$250 million (79.7%). Approximately 70% of the firms had less than 2,000 employees, and the rest had more than 2,000. All the leaders who participated in this study had long tenure in their companies (more than six years, with 80% having more than 10 years), and had been engaged in more than five NPD projects. In order to clarify the complexity of the NPD project, this study also asked team leaders and members to focus on a project that they had been working on in the last six months. Half of them indicated that the project was totally new, and half of them were developed based on existing platforms. In terms of team members, the majority had engaged in NPD projects less than five times (70%), and more than 60% had been working in their companies for less than 10 years.

**Table 1.** Research Items, factor loadings, and Cronbach's  $\alpha$ .

<b>Research variable</b>	<b>Factor loadings</b>	<b>Composite reliability</b>
<b>Challenge stressors –Cavanaugh et al. (2000) and tested by Boswell et al. (2004)</b>		0.864
During the NPD process, my team ....		
i) has several new product projects.	0.777	
ii) spends a large amount of time on the project.	0.610	
iii) has a large volume of work that must be accomplished in an allotted time.	0.772	
iv) experiences time pressure whenever assigned to new product projects.	0.777	
v) has a lot of responsibility in the new product projects assigned.	0.764	
vi) has a scope of responsibility related to the team.	0.625	
<b>Hindrance stressors - Cavanaugh et al. (2000) and LePine et al. (2004)</b>		0.732
During the NPD process, my team ....		
i) is simply unable to clearly understand what is expected from the project.	0.357	
ii) needs to go through many procedures before the project is done.	0.556	
iii) experiences stalls in progress related to the project.	0.794	
iv) Has a lack of job security.	0.527	
v) feels that organizational decision are more affected by politics than our performance.	0.714	
<b>Team unlearning - Weber and Crocker (1983) and Moorman and Miner (1997) which are tested by Akgun et al., 2006)</b>		0.854
1) Team beliefs	0.781	
During the New Development Product (NPD) project, the team's beliefs changed regarding:	0.846	
i) The features were technically possible.	0.843	
ii) The rate of technological improvements.	0.852	
iii) The rate of market acceptance.		
iv) The features customer demanded.	0.753	
2) Team routines	0.814	0.861
During the new development product (NPD) project, the team's routines changed regarding:	0.813	
i) Product development procedures.	0.836	
ii) Information-sharing mechanisms (memos, e-mail, teleconferencing).	0.817	
iii) Project plans.		
iv) Product development tools (e.g., CAD/CAM, QFD, software programs).		
v) Team decision-making processes.		
<b>New product success - Cooper and Kleinschmidt (1987) and Akgun et al. (2006)</b>		0.926
Overall, the NPD performances meet or exceed the sales expectations	0.898	
i) The NPD performances meet or exceed sales dollar expectations	0.863	

**Table 1.** Contd.

ii) The NPD performances meet or exceed the schedule to be produced and commercialized	0.903	
iii) The NPD performances meet or exceed profit expectations	0.846	
iv) The NPD performances meet or exceed return on investment (ROI) expectations	0.882	
<b>Team conflict – Shah and Jehn (1993)</b>		0.911
1. Task conflict		
i) Members of this team often have different opinions regarding the work being done.	0.914	
ii) Members of this team have frequent conflict about ideas regarding the newly developed product.	0.894	
iii) There are many conflicts about the work in this team.	0.918	
v) There are many opinions differences in this team.	0.831	
2. Relational conflict	0.885	0.902
i) There are many frictions among members in this team	0.875	
ii) Personal conflicts often happened in this team.	0.828	
iii) There are many tensions in this team.	0.934	
iv) Emotional conflict often happened in this team.		

Note: Italicized research items were deleted due to low factor loadings.  $\chi^2(df) = 749.014 (443); p = 0.08; CFI (RMSEA) = 0.899 (0.090)$ .

### Data aggregation

In order to determine the appropriate level of analysis, this study followed the suggestion of Schriesheim, Cogliser, and Neider (1995) by performing a within-group similarity or agreement index ( $R_{WG}$ : James, Demaree, and Wolf, 1993).  $R_{WG}$  assessed inter-rater reliability in judgments with a single group of 'judges' (respondents) on a single variable (challenge/hindrance stressors, team unlearning, and team conflict) about a single referent, i.e., a team. If the expected agreement was not present ( $R_{WG} > .70$  was the suggested value to represent a 'good' amount of within-group inter-rater agreement; James et al., 1993), then the variable was considered to be an individual unit-level one (e.g., George, 1990).

The  $R_{WG}$  estimates of within-group inter-rater reliability were derived for the challenge stressor, the hindrance stressor, team unlearning, and team conflict. The mean value of the  $R_{WG}$  coefficients for the challenge stressor was 0.721 (ranging from 0.271 to 0.827), and sixteen groups

of the 87  $R_{WG}$  coefficients did not meet the agreement criterion. The mean value of the  $R_{WG}$  coefficients for the hindrance stressor was 0.764 (ranging from 0.312 to 0.893), and only nine groups of the 87  $R_{WG}$  coefficients did not meet the agreement criterion.

Moreover, the mean value of the  $R_{WG}$  coefficients for team unlearning was 0.742 (ranging from 0.272 to 0.895), and only twelve groups of the 77  $R_{WG}$  coefficients did not meet the agreement criterion. In the case of team conflict, the mean value of the  $R_{WG}$  coefficients for conflict was 0.832 (ranging from 0.355 to 0.931), and fifteen groups of the 87  $R_{WG}$  coefficients did not meet the agreement criterion.

In addition,  $R_{WG}$  was employed for new product success to test the within-group inter-rater reliability of each team from the leaders. The results indicate that the mean value of the  $R_{WG}$  coefficients for new product success was 0.563 (ranging from 0.245 to 0.691), and only nineteen groups of

the 87  $R_{WG}$  coefficients met the agreement criterion. Based on these results, this study employed the team as the level for analysis.

## RESULTS

### Reliability and validity of measurement constructs

The construct validity was assessed using the guidelines in Anderson and Gerbing (1988). First, the exploratory factor analysis for all the items resulted in factor solutions, as expected theoretically.

Cronbach's  $\alpha$  for each coefficient was greater than 0.700. Second, we used Confirmatory Factor Analyses (CFA) to assess the convergent validity of the measures. Most of the item loadings exceeded 0.600; and each indicator t-value exceeded

**Table 2.** Means, standard deviations, and correlations.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
Type of Industry	1.812	0.645	n.a.	0.011	0.100	0.002	0.037	0.010	0.047	0.000	0.020	0.009
Sales	3.750	0.557	-0.105	n.a.	0.001	0.000	0.003	0.007	0.000	0.013	0.035	0.042
Project complexity	1.581	0.545	0.316	-0.037	n.a.	0.157	0.058	0.049	0.004	0.059	0.020	0.013
Challenge stressors	5.691	1.361	0.049	-0.012	0.396	0.720	0.098	0.086	0.042	0.064	0.073	0.006
Hindrance stressors	4.746	1.428	-0.192	0.057	-0.241	0.313	0.648	0.004	0.004	0.031	0.223	0.053
Team beliefs	3.835	1.375	0.098	0.082	-0.221	0.294	-0.265	0.751	0.331	0.021	0.005	0.064
Team routines	3.690	1.380	0.217	-0.017	-0.061	0.204	-0.161	0.575	0.718	0.005	0.031	0.005
New product success	3.176	1.775	0.014	-0.114	-0.244	0.254	-0.177	0.213	0.194	0.846	0.013	0.002
Task conflict	2.787	1.694	-0.141	-0.188	-0.143	0.270	0.472	0.170	0.177	0.123	0.850	0.040
Relationship conflict	3.393	1.556	0.093	0.206	0.113	-0.077	-0.230	0.254	0.071	-0.164	-0.200	0.838

Note: Correlation values greater than 0.150 is significant at  $p < .05$ , correlation values greater than 0.280 is significant at  $p < .01$ . Values at diagonal are AVE. Values below diagonal are inter-factor correlation, and values above diagonal are squared inter-factor correlation. n.a. refers to not available.

10 ( $p < .001$ ) and thus satisfied the CFA criteria (Hair, Black, Babin, and Anderson, 2010). One item was discarded (item 1 of the hindrance stressor) due to low factor loading and item-to-total correlation. The overall fit supported the measurement model, and the  $\chi^2$  fit statistic was 749.014 with 443 degrees of freedom, and the  $p$ -value was 0.080. The root mean squared error (RMSEA) was 0.090, and the comparative fit index (CFI) was 0.899. All these figures supported the overall measurement quality given a particular sample and number of indicators (Gerbing and Anderson, 1992), and the measures thus demonstrated adequate construct validity and reliability. The results are presented in Table 1.

To assess the potential impact of common method bias in the present study, the discriminant validity was tested in three steps. First, a Harman one-factor test was conducted (Podsakoff and Organ, 1986) which loaded all the variables into a principal component factor analysis. The results revealed that no single factor dominated (seven factors were generated with 75.4725% of the total

variance, and factor 1 was only 19.263% of the variance). Second, the variance-extracted percentages for any two factors were compared with the square of the correlation estimate between them (Fornell and Larcker, 1981). Table 2 reports the interfactor correlations and their squared values. It shows that each of the variance-extracted estimates was greater than the corresponding interfactor squared correlation estimates (that is, had values above the diagonal). Finally, the  $\chi^2$ -difference test was performed for each pair of factors that had correlation values above 0.500 (one case) by using the common method factor. All cases resulted in a significant difference, which further indicated that the pairs were not collinear (Anderson and Gerbing, 1988). Therefore, discriminant validity among the research constructs was further confirmed.

To test the hypotheses, this study used structural equation modeling with the maximum likelihood estimation method. Because of the complexity of the model, second-order factors were used. Given the measurement validity of the

overall research variables, this technique could reduce model complexity and could be used for structural model analysis and hypotheses testing (e.g., Anderson and Gerbing 1988). The model had  $\chi^2 = 83.520$  with 114 degrees of freedom, the CFI = 0.921, the RMSEA = 0.084, and the  $p$ -value = 0.100; which suggested that the model fit the data. To assess whether the proposed model was better than a rival one, a comparison of the fit index was undertaken (Bagozzi and Yi, 1988). The rival model was developed by asserting that challenge and hindrance stressors mainly influence team unlearning, while team unlearning is the only variable that influences the new product success. The model generated  $\chi^2$  (df) = 187.359 (116), and the CFI (RMSEA) = 0.896 (0.088). The second rival model assumed that all the research variables are directly related to new product success. The model generated  $\chi^2$  (df) = 210.543 (116), and the CFI (RMSEA) = 0.881 (0.097), which suggested that the proposed model performed better than did the rival ones.

The first hypothesis predicted that a challenge

**Table 3.** The moderating effects of task and relational conflicts.

Predictor	Dependent variable: New product success		
	M1	M2	M3
<b>Control variable</b>			
Type of industry	0.041	0.069	0.081
Sales	0.120	0.130	0.109
Type of project	-0.108	-0.098	-0.107
<b>Main effect</b>			
Team beliefs (TB)	0.306*	0.302*	0.291*
Team routines (TR)	0.470**	0.453**	0.437**
Task conflict (TCn)		0.120	
Relational conflict (RCn)			-0.161*
<b>Interaction effect</b>			
TB × TCn		-0.190*	
TR × TCn		-0.241*	
TB × RCn			-0.250*
TR × RCn			-0.281**
R <sup>2</sup>	0.175	0.314	0.314
ΔR <sup>2</sup>	0.136	0.124	0.151
ΔF	3.270	5.283	6.374
Sig	0.050	0.022	0.008

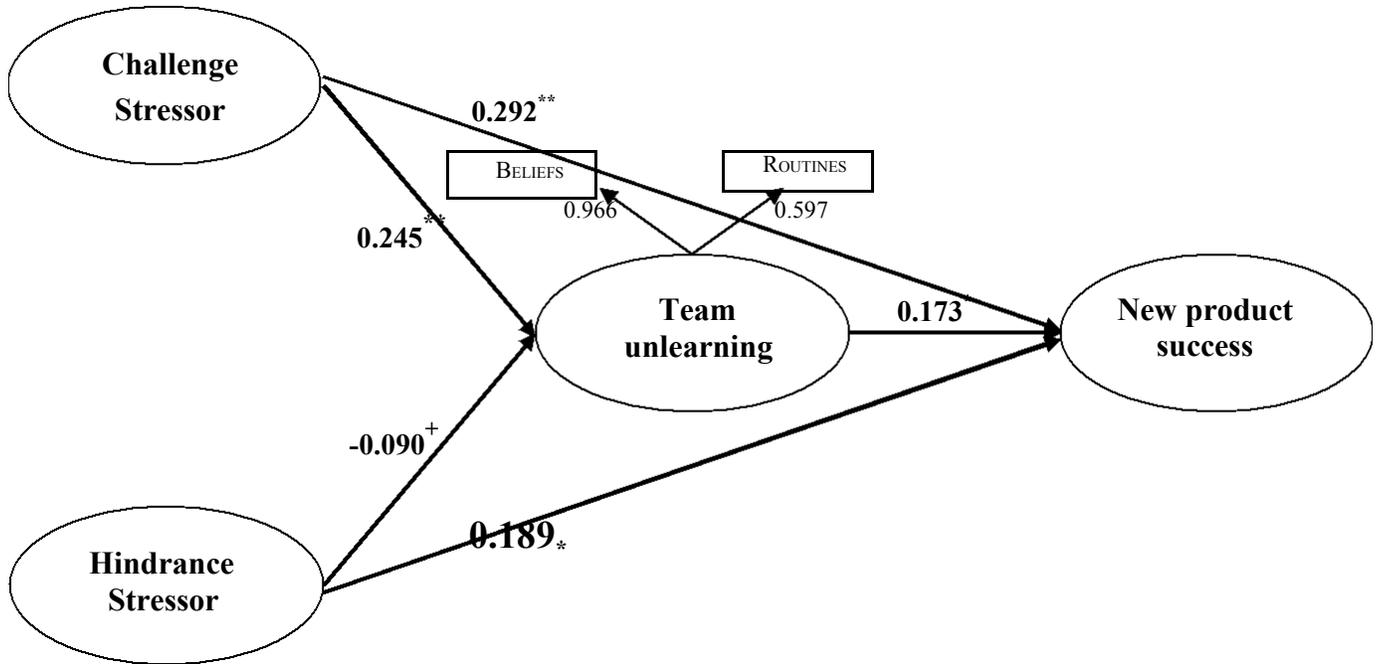
Note: † represents  $p < 0.10$ ; \* represents  $p < 0.05$ ; \*\* represents  $p < 0.01$ .

stressor has a positive influence on team unlearning. The results indicated that a challenge stressor positively influences team unlearning ( $\beta = 0.245$ ,  $p = .009$ ), which supporting H<sub>1</sub>. The second hypothesis posited that a challenge stressor has a positive influence on new product success. The results indicated that a challenge stressor has a positive influence on new product success ( $\beta = 0.292$ ,  $p = 0.01$ ), and thus H<sub>2</sub> was also supported. Hypothesis 3 predicted that a hindrance stressor has a negative influence on team unlearning, and the results were consistent with this ( $\beta = -0.090$ ,  $p = 0.074$ ), although not significant. Hypothesis 4 posited that a hindrance stressor negatively influences new product success, and the result was also consistent with this ( $\beta = -0.189$ ,  $p = 0.045$ ). Thus, only H<sub>4</sub> was supported. The fifth hypothesis predicted that team unlearning positively influences product success, which was also indicated by the result ( $\beta = 0.173$ ,  $p = 0.037$ ); thus, H<sub>5</sub> was also supported.

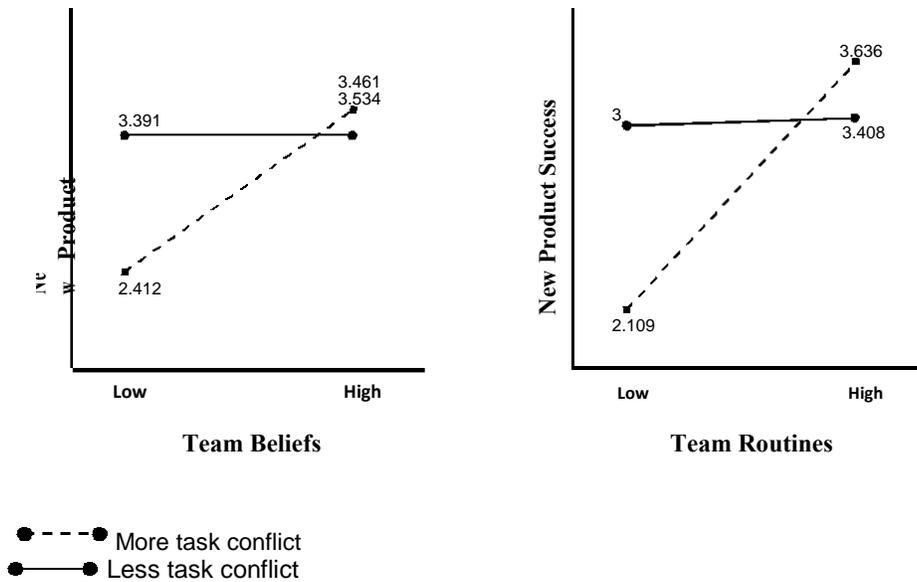
In order to test the moderating effects proposed in H<sub>6</sub> and H<sub>7</sub>, this study used a hierarchical regression, since the predictor (team unlearning) and moderators (team conflict – task and affective conflict) were measured using continuous variables. The use of a regression can retain the continuous nature of the variables without losing information or reducing the power to detect the interaction effects (e.g., Aiken and West, 1991). However, there is a possibility that variables might correlate with each other (high multi-collinearity), and thus this study applied the centering method to reduce

these effects (Frazier, Tix, and Barron, 2004). In addition, based on suggestions from previous studies (e.g., Akgun et al., 2006; Hoegl and Parboteeah, 2005), this study employed three control variables inside the regression equations: type of industry, sales, and project complexity. The results presented in Table 3 show that task conflict had no direct significant effect on new product success ( $\beta = 0.120$ ,  $p=0.125$ ; M2). However, task conflict significantly moderated the effects of team beliefs ( $\beta = -0.190$ ,  $p<.05$ ; M2) and team routines ( $\beta = -0.241$ ,  $p<.05$ ; M2) in a significant manner ( $R^2 = 0.124$ ,  $F = 5.283$ ,  $p=0.022$ ). There was a significant negative influence of relational conflict on new product success ( $\beta = -0.161$ ,  $p<.05$ ; M3). Further results indicated that the effects of team beliefs ( $\beta = -0.250$ ,  $p<.05$ ; M3) and team routines ( $\beta = -0.281$ ,  $p<0.001$ ; M2) were also negatively moderated by relational conflict in a significant manner ( $R^2 = 0.151$ ,  $F = 6.374$ ,  $p=0.008$ ). Therefore, H<sub>6</sub> was not supported but H<sub>7</sub> was.

Following the procedure of Aiken and West (1991) and Cohen et al. (2003), Figures 2 and 3 depict the moderating effects of task and relational conflict. The first figure indicates that low task conflict generated the lowest new product success ( $\bar{Y} = 2.412$ ) when the team changed their beliefs less, but it increased dramatically when the team engaged in high levels of task conflict ( $\bar{Y} = 3.361$ ). Interestingly, when the team changed their beliefs significantly, high task conflict generated slightly lower ( $\bar{Y} = 3.461$ ) new product success than did low task conflict



**Figure 1.** Result of Path Model. Note:  $X^2$  (df) = 183.520 (114), CFI (RMSEA) = 0.921 (0.084),  $p = .10$ ; <sup>+</sup> refers to  $p < .10$ , \* refers to  $p < .05$ , \*\* refers to  $p < 0.01$ .



**Figure 2.** The moderating effect of task conflict.

( $\bar{Y} = 3.534$ ). A similar pattern also occurred on team routines, which are shown in the second figure. New product success reached the highest level when the teams changed their routines significantly and at the same time experienced less task conflict ( $\bar{Y} = 3.836$ ) and slightly decreased when the teams engaged in a high level of

task conflict ( $\bar{Y} = 3.408$ ). In the case of less changes in team routines, less task conflict produced the lowest level of new product success ( $\bar{Y} = 2.109$ ), and it increased substantially when the team engaged in more task conflict ( $\bar{Y} = 3.351$ ).

Figure 3 presents the moderating effect of relational

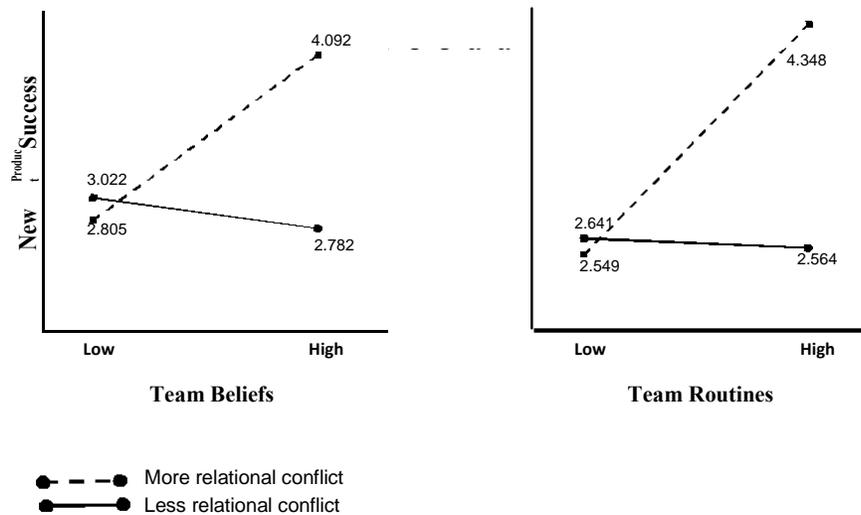


Figure 3. The moderating effect of relationship conflict.

conflict. The first figure indicates that changing beliefs significantly lead to the lowest score of new product success when the team experienced more relational conflict ( $Y = 2.782$ ). In contrast, when the team changed beliefs significantly, but at the same time there was less relational conflict, the score of new product success reached the highest level ( $Y = 4.092$ ). In the case of less changes of team beliefs, there was a slight difference between high ( $Y = 3.022$ ) and low relational conflict ( $Y = 2.805$ ). The second figure also depicts a similar pattern. Specifically, there was a slight difference between high ( $Y = 2.641$ ) and low relational conflict ( $Y = 2.549$ ) when the team only slightly changed their routines. However, the difference became significant when the team changed their routines to a greater degree. New product success reached the highest score when there was less relational conflict ( $Y = 4.348$ ), and decreased dramatically when the team had more relational conflict ( $Y = 2.564$ ).

## DISCUSSION

The results indicated that a challenge stressor positively influences the level of team unlearning and new product success. The findings were consistent with the notion of Lepine et al. (2005) that a challenge stressor engenders positive motivation in employees. Developing the argument from expectancy theory (Vroom, 1964) and adopting the argument of Lazarus and Folkman (1984) that employees' motivation is influenced by work stressors, this study indicated that challenge stressors create positive expectations of NPD team members toward their assigned tasks. Social and economic recognition will be earned when a newly developed product is successfully developed, and engaging in an unlearning process (Starbuck, 1996; Akgun et al., 2006) has been shown as one way of achieving this. The findings of this

study were also consistent with Lepine, Lepine, and Jackson (2004), who suggested that challenge stressors positively influence the level of motivation to learn. Further, the findings were also in line with Wallace, Edwards, Arnold, Frazier, and Finch (2009), who indicated that a challenge stressor among employees across 61 offices of a state agency in the USA positively influenced the level of role-based performance.

The second finding indicated that a hindrance stressor negatively influences the levels of team unlearning and new product success. Consistent with the previous argument, a hindrance stressor caused NPD team members to reduce their learning effort level due to some threats in the work place (Lazarus and Folkman, 1984). The reason for this was that they had negative expectations regarding the outcomes, which might have had discrepancies with their expectations. As a result, they tended to engage less in the unlearning process and developed less successful products. This finding is in accordance with the results of Lepine et al. (2004), which showed that a hindrance stressor negatively relates to motivation to learn something new, such as is required when reframing existing beliefs and routines. In addition, the finding was also consistent with Wallace et al. (2009) in which it was shown that a hindrance stressor negatively influenced state employees' role-based performance. These two findings can answer the first research question, and show that the work context as stressors can determine the unlearning process inside an NPD team and the level of new product success.

The third finding indicated that the unlearning process positively influences the level of new product success. As suggested by Starbuck (1996), unlearning is a prerequisite to developing innovative products, which then increases the success developed product. He further argued that teams relying of newly on current beliefs and routines will be less likely to develop innovative products

because then there are no new ideas to be applied to such products. Moreover, Becker (2008) also found that changing beliefs and routines and applying them to make new products can achieve more innovative results compared to developing products based on existing platforms. As a result, the newly developed product will perform better in the market.

In addition, the results indicated that task conflict positively moderates the positive influence of team unlearning on new product success. Specifically, when a team is engaged to a significant degree in team unlearning, less task conflict generates higher levels of success than more task conflict. In contrast, more task conflict is even more important when the NPD team engages less in the unlearning process. This finding was somewhat consistent with previous results, which indicated that there is a curvilinear relationship between task conflict and team performance (De Dreu, 2006; De Dreu and Weingart, 2003). Specifically, this study extended the idea that greater task conflict is beneficial when the teams are reluctant to change their existing beliefs and routines, but it might prove ineffective when the teams are more deeply engaged in the unlearning process. The reason for this is that too much conflict regarding the task when a team has decided to change its beliefs and routines will reduce its capability to implement a newly developed product (Akgun et al., 2006) and thus, slightly reduce new product success.

Finally, the results indicated that relationship conflict negatively moderated the positive effect of team unlearning on new product success. When the team engaged deeply in the unlearning process, more relationship conflict was detrimental to its performance, while less relationship conflict increased the effect of unlearning on new product success. The reason for this is that team members had limited information processing abilities due to a high level of concern about their peers' tastes or preferences (De Dreu and Weingart, 2003).

Consequently, they had limited time and energy to elaborate and process the related information regarding the assigned task (Amason, 1996; Amason and Schweiger, 1997; Jehn, 1995, 1997). Therefore, it can be expected that the unlearning process will be less optimal, and as a result, the success of the newly developed product will be marginal. The last two findings also answer the second research question that the existence of conflict, either task or relationship conflict, could moderate the positive effect of team unlearning on new product success.

## IMPLICATIONS

This study has implications for practitioners as well as academics. For practitioners, the findings imply that developing work contexts that positively challenge NPD team members could be beneficial to overall team performance (Pearsall et al., 2009; Wallace et al., 2009). By doing so, managers can potentially maintain the positive expectancy

of NPD team members toward the outcomes of the assigned tasks and thus heighten their motivation (Lepine et al., 2005) to accomplish the task successfully by increasing transactive memory (Lepine et al., 2004; Pearsall et al., 2009), such as engaging in the unlearning process. At the same time, managers need to suppress any work contexts that might engender hindrance stressors, since the existence of this stressor inhibits the potential learning that NPD team members might have (Lepine et al., 2004), and thus reduces the success of newly developed products. Moreover, the simultaneous existence of hindrance and challenge stressors could be detrimental to overall team performance (Pearsall et al., 2009). Furthermore, managers should carefully handle any conflicts among NPD team members, particularly during the unlearning process. By maintaining conflicts that are task related rather than relational in nature (e.g., De Dreu, 2006; Jehn, 1995), the positive effect of unlearning with regard to new product success will be strengthened. The existence of task conflict is even more important when the team engages less in the unlearning process. The reason for this is that task conflict stimulates team members to focus more on task related issues and to exchange their valuable knowledge and information on the assigned task. Consequently, the success of a newly developed product will be greater.

In addition to these managerial implications, this study has several theoretical ones. First, this study contributes to the unlearning literature (e.g., Akgun et al., 2006; Starbuck, 1996) that indicates that work contexts could determine the level of team unlearning. By employing the concept of challenge/hindrance stressors (Cavanaugh et al., 2000; Lazarus and Folkman, 1984), in addition to the external environment, the results of this study suggested that the willingness of an NPD team to engage in the unlearning process is also determined by internal organizational factors. Second, this study further contributed to the literature on this topic by examining under what conditions and to what extent that team unlearning contributes to new product success. By asserting the idea that the process of changing beliefs and routines induces disagreement or conflict among team members (e.g., Jehn, 1995; De Dreu, 2006), this study carefully argued and empirically tested the idea that task conflict positively moderates the positive effect of team unlearning, while the opposite is true for relationship conflict.

## LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Although these research results are compelling, several limitations exist in this study. First, as the respondents only consisted of NPD teams at science parks in Taiwan, and the generalizability of the results should be limited to these groups. Future studies could use the same questionnaire or the questionnaire in an abbreviated form, to conduct surveys in different parts of the world to confirm the validity and generalizability of these findings.

Second, this study did not examine whether individuals factors such as personality could have direct effects on team unlearning or indirect effects by moderating the proposed relationships. Third, this study asserted that challenge/hindrane stressors could be present in any industry, regardless of the type industry that an NPD team belongs to.

Consequently, this study refers to general rather than specific new product success. In order to increase the generalizability of the findings, future studies could specifically discuss new product success in specific industries, such as the software (Hoegl and Parboteeah, 2006) or high-tech industries (Akgun et al., 2006) to improve the validity of the findings. Finally, this study agreed with Akgun et al. (2006) that unlearning is also engendered by external dynamism, such as exists in the rapid changes of technology and the market. However, since this study focused only on the stress engendered by an internal organization, it did not specifically discuss the stress rooted in the external environment. Future studies could thus elaborate on the issue of stress originating from both external and internal organizations to provide more comprehensive views of how it will affect the effectiveness of NPD teams.

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