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Procedia - Social and Behavioral Sciences 57 (2012) 404 – 411

Procedia
Social and Behavioral SciencesInternational Conference on Asia Pacific Business Innovation and
Technology Management

The relationships among leader social support, team social support, team stressors and team performance

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Abstract

While workplace stress often leads to poor employee performance, this predicament can be improved through the use of social support and reward mechanisms. This study tests two models to investigate the relationships among support, reward, team stressors and team performance. In model 1, leader social support, team social support, and team reward plays an antecedent role in the relationship of team stressors and performance. In model 2, the tree variables have the moderating effect on the relationship between team stressors and performance. Data are collected from NPD team members of Taiwanese semi-conductor industry. The regression analyses are used for the tests of alignment hypotheses. The Model 1 provides the better explanation of relationships between the above-mentioned variables. This study contributes new evidence to disputed views in previous studies and offers important implications for both research and practice

Keywords: Leader social support, team social support, team reward, team stressors

1. Introduction

Stress has physical and psychological effects on both individuals and teams, especially in highly competitive environments. Because stress cannot easily be controlled using simple management techniques, but may influence the behavior and performance of relevant parties, many articles in the literature have investigated the sources of stress, the pathways by which it exerts its effects, and means of relieving stress. Stress may have even greater influence in specific fields of work. For instance, the difficulties that sales personnel encounter when face-to-face with customers and with performance requirements imposed by the organization may cause such personnel to experience considerable stress [1]. In addition, because innovative work is highly technology-oriented and emphasizes competition and speed, the demands of this type of work may constitute a source of stress, which may affect workers' physical and mental state. Because of this, stress may have a great influence on individuals and teams, and their performance, in new product development environments [2]. But while team members engaging in various organizational activities may be subject to stress in the course of their work, management mechanisms and interpersonal factors may interfere with or change the effect of stress on such employees. Past research has suggested that management and controls can root out the many factors having a negative influence on the success of new products [3]. If an executive can provide appropriate support to employees, this will invariably encourage employers' intrinsic motivation [4]. Mumford [5] consequently proposed that, if the enhancement of innovation

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performance is desired, sufficient support must be given to creators, cooperation and communication between team members should be encouraged, and an appropriate goal and reward system established. Effective management along these lines can be the key to the success of innovations. In addition, an effort-reward imbalance has consistently been considered to be a source of stress [6]. If an organization can enhance support for members and establish appropriate rewards, this will relieve employee stress, and foster a greater degree of identification and contribution in the workplace.

This study performs analysis on two aspects: the study focuses on "leader social support" and "team social support" on the mental level, and on "team reward" on the material level. This study also establishes two models: Model 1 regards the three foregoing variables as antecedents, while model 2 regards the variables as moderating variables. Both models investigate the effect of these variables on team stress and team performance, taking high-tech industry as an example.

In summary, the goals of the study are to analyze the role of leader social support, team social support, and team reward as antecedents of team stress and team performance; to investigate the role of the three variables in moderating team stress and team performance; and proposing research implications and recommendations.

2. Literature review

2.1 Stressors

The complex meanings expressed by stress are reflected in the word's varied definitions and multiple effects. In research on specific industries, stress is typically used to express the particular forms of pressure faced by persons in that field, such as time management stress [7], manufacturing capability stress [8], and performance attainment stress [9]. As new product development activities have taken on greater strategic significance, the issue of stress among organizational members has come to attract growing attention from managers and researchers.

In particular, since a lot of new product development work is performed by teams, this special type of this work format suggests that individual stress research may not apply to teams. Furthermore, is stress only confined within the individual? As working in teams becomes increasingly prevalent, persistent stress may influence team members or diffuse throughout teams. As a consequence, raising the quantification of stress from the individual to the team level will facilitate understanding of the effects of stress within teams and in highly interactive environments. This study therefore employs the definition and assessment of team stress proposed by Akgun, Byrne, Lynn and Heskin [10], and thus seeks to elevate the stress assessment unit from the individual level to the level of the team. Doing this will better meet the needs of new product development teams, while simultaneously facilitating the delineation of sources and forms of stress.

2.2 Leader social support and team social support

The literature contains much research on supporting-level factors, and empirical research suggests that managers' support for members' creativity has a positive influence [11]. Support is connected with employee commitment, and employee commitment can be used to enhance employee performance [12]. Management support is an important precondition for high performance by a team. These findings from the literature indicate that, apart from letting employees understand management expectations, the various forms of support also provide employees with necessary psychological and utilitarian support during the work process, form an important social interaction process, and promote a harmonious atmosphere and sentiments.

This study emphasizes sociomotional support, and adopts and revises the definitions proposed by Currivan [13]: leader social support refers to the degree of concern expressed by a manager to his or her subordinates, and team social support refers to the degree of concern expressed by team members to each other. This study hopes to understand whether effective interaction from different sources and interpersonal interaction, concern, and mutual assistance have the same effects, and whether the former can effectively ease team members' feelings of stress, enhance employees' positive mood, and increase employees' commitment to their work.

2.3 Team reward

The influence of rewards on employees is often explained from the perspective of motivation. Because human motivation is often reward-driven, rewards can induce and encourage individuals to engage in specific behaviors. In the case of an organization, the goal of rewarding employees is to affirm and endorse behavior, while encouraging employees to continue to engage in that behavior [5]. In the practical sphere, rewarding employees is an important part of human resource management. Apart from being frequently mentioned in performance research, rewards also play an important role in establishing and maintaining good attitudes among employees.

Some scholars believe that providing employees with appropriate compensation can reduce effort-reward imbalances, and the granting of rewards is consequently an important management task [6]. Appropriate rewards can help ease employee dissatisfaction, and rewards are inherently a form of affirmation for diligent workers. As a result, rewards may be an effective means of reducing stress. If we examine rewards from the perspective of expectation theory and utility theory, the former suggests that beneficial results facilitate enhancement of performance, while the latter implies that rewards facilitate the strengthening of intrinsic motivation, and encourage increased creativity through greater freedom from social restraints [14]. These findings suggest that reasonable and appropriate rewards can boost employees' intrinsic motivation and reduce their dissatisfaction, encouraging employees to align themselves with the organization's goals.

2.4 Relationships of leader and team social support, team reward, team stressors and performance

Earlier studies on the impact of support and reward mainly focus on two types of models for explaining their relationships with team stressors, and performance. In this study, we shall refer to these models as (1) Antecedent Model and (2) Moderating Effect Model. These models will be described in the following sections.

2.4.1 Antecedent model

The environment in which a team is situated will influence its members' perceived stress [10]. The research of Wang and Takeuchi [15] has verified that a negative correlation exists between perceived support and on-the-job stress, and implies that, when receiving strong support from management, employees can exercise their creativity in an environment containing material and psychological support. Management support can create a culture and climate facilitating the development of new products, and also conveys management's emphasis on innovation [16]. Medical and occupational research has revealed that effort-reward imbalances are commonly a major source of on-the-job stress. As a consequence, as soon as employees find that their compensation is not commensurate with their effort, they will naturally experience psychological stress [6]. In addition, literature on employee satisfaction also suggests that satisfaction with rewards is typically one of the major factors affecting employees' on-the-job mood [17]. Because of this, rewards are not only material compensation, but also constitute management tools for assessing employees' contribution and affirming their hard work. Rewards can therefore serve as a method for relieving stress.

Employee performance may be affected when their perceived stress changes. In practicality, an appropriate level of on-the-job stress can facilitate and enhanced sense of responsibility, strengthen efforts to maintain work progress, and spur team members to complete existing tasks. However, excessive stress commonly has an unfavorable impact on work. The findings of Smink [8] indicate that, in new product development projects, a high degree of product complexity can create intangible stress, which will have a negative effect on new product manufacturing capabilities. But regardless of whether stress is good or bad, it will directly influence performance in most cases. In summary, support and rewards may influence employees' perceived stress and thereby alter their performance. Thus, in this study, we propose the following hypothesis.

H1: Leader social support, team social support and team reward play an antecedent role in the relationship of team stressors and team performance.

2.4.2 Moderating effect model

Organizations typically rely on managers to promote the production of creative output by employees. Managers can play the role of promoters in teams, providing team members with support and encouragement, and ensuring that team members contribute their full effort within their respective roles. As a consequence, the greater the perceived support received by employees, the lower their perceived

stress. Apart from revealing the effect of support on employee attitude and behavior, the foregoing research also suggests that different levels of support from management and the team can change the relationship between stress and performance.

The literature contains conflicting conclusions concerning the effect of rewards on creativity [4]. Some scholars believe that rewards provide affirmation to diligent workers, and consequently have a positive influence on creativity. Expectations theory suggests that beneficial results will promote enhanced performance, while utility theory indicates that rewards should increase creativity by facilitating enhanced intrinsic motivation [14]. However, other scholars believe that because rewards imply control, they may even inhibit creative behavior. According to Toubia [18], while rewards have a positive effect on repetitive, reflexive behavior, they tend to inhibit new responses. Furthermore, other scholars suggest that rewards may have different effects under different circumstances [19]. [21]

The foregoing contradictory conclusions may indicate that different levels of reward may have different effects on employees, and may also suggest that rewards have a moderating effect on the relationship between stress and performance. Thus, in this study, we propose the following hypothesis.

H2: Leader social support, team social support and team reward moderate the relationship between team stressors and team performance.

3. Methodology

3.1 Samples and sampling procedures

In this study, our focus will be Taiwan's semiconductor industry, including design tools, IC design, IC manufacturing, IC packaging, IC testing, wafer, mask, separate component and opto-electronic semiconductors. The convenience sampling method has been adopted in this study, in which respondents answer questions based on their NPD experiences over the recent month. Testing was conducted for a total duration of two months. Of the 1,000 questionnaires sent out, 241 valid questionnaires were collected, which is represented as 24.1% return rate. To test for any difference among samples collected at different times, a t-test ($p < 0.001$) was conducted on the first 75% and last 25% of the samples. No significant differences were observed.

3.2 Variable measurement

The authors employed questionnaires developed by previous studies with proper modifications to suit the environment of new product development team in Taiwan. All multi-item variables in this study were measured using a five-point Likert scale: 1 for total disagreement and 5 for complete agreement.

This study focuses on NPD teams as research targets and uses two types of performance measurement indicators. Product quality is used to measure new products' degree of superiority in terms of five functions and qualities [7]. Speed to market is also used to measure NPD team's performance. NPD team members rate their performance by comparing the team's actual speed to market against other new products and competitors' similar products [7]. Team stressors, defined according to Akgün, Byrne, Lynn and Heskin [10], consists of two separate aspects: team crisis and team anxiety, which are used to measure feeling of crisis and anxiety experienced by team members in carrying out NPD plans. Leader social support is used to measure the extent to which leaders concern and care about their subordinates [13]. Team social support is used to measure the extent to which team members concern and care about each other [13]. Team reward is used to measure the extent to which reward is related to team's performance [20].

3.3 Analysis methods

This study uses descriptive statistics for understanding the characteristics of the collected sample. This is later followed by reliability analysis. This study further verifies distinct roles of team pressure using regression analyses to see if there are significant relationships between variables, and variables are in the hypothesized directions and to provide the initial evidence for the models.

4. Results of this study

4.1 Descriptive statistics

There were more male respondents than females (male, 65%; and female, 35%). The majority of the respondents were university graduates (53.4%) who have been working in R&D for 1-5 years (67.2%). They were mostly engineers, project engineers and assistant engineers (86.9%). Most of the sample companies have been established for over 10 years (87.5%) and have more than 120 employees (91.9%).

The correlation matrix is shown in Table 1.

Table 1 Correlation matrix	1	2	3	4	5	6	7	8	9
1 Leader social support	1								
2 Team social support	.428***	1							
3 Team reward	.447***	.446***	1						
4 Team stressors	.363***	.365***	.342***	1					
5 Leader social support*Team stressor	.753***	.376***	.434***	.788***	1				
6 Team social support*Team stressor	.475***	.441***	.861***	.687***	.711***	1			
7 Team reward*Team stressor	.462***	.797***	.492***	.836***	.741***	.708***	1		
8 Speed to market	.308***	.306***	.378***	.450***	.449***	.466***	.477***	1	
9 Product quality	.367***	.510***	.433***	.403***	.358***	.555***	.445***	.347***	1

*** p<0.001 (two-tailed test)

4.2 Adequacy of measures

In this study, relevant research constructs are directly derived from existing studies. As their construct validities have been previously proven by scholars, they are dependable. This study evaluates the fitness with the data by comparing the first order CFA with the second order CFA, T value. If the T value is closer to 1, then we can use the results of the second order CFA to replace those of the first order CFA to make the model more precise. The T value of team pressure (54.06/55.24) is closer to 1. And in the second order CFA, the coefficients of team crisis and team anxiety are 0.92 and 0.94 respectively (significant at an alpha of 0.05). This study takes the results of the second order CFA to implement the following analyses. In terms of reliability testing, the Cronbach α for leader social support, team social support, team reward, team stressors, speed to market, and product quality are 0.846, 0.798, 0.807, 0.825, 0.783, and 0.876 respectively, indicating excellent reliability.

4.3 Model specification and estimations

In this study, we perform separated regression analyses for each model to analyze their hypotheses. Model 1 consists of four regression analyses and Model 2 uses one. They are presented as follows.

Model 1:

- Team stressors = $\beta_0 + \beta_1$ (leader social support) + β_2 (team social support) + β_3 (team reward) + ϵ
- Team performance = $\beta_0 + \beta_1$ (team stressors) + ϵ
- Team performance = $\beta_0 + \beta_1$ (leader social support) + β_2 (team social support) + β_3 (team reward) + ϵ
- Team performance = $\beta_0 + \beta_1$ (leader social support) + β_2 (team social support) + β_3 (team reward) + β_4 (team stressors) + ϵ

Model 2:

Team performance = $\beta_0 + \beta_0 + \beta_1$ (leader social support) + β_2 (team social support) + β_3 (team reward) + β_4 (team stressors) + β_5 (leader social support*team stressor) + β_6 (team social support*Team stressor) + β_7 (team reward*team stressor) + ϵ

4.4 Results of regression analyses

Regression analysis for this study is tabulated in Table 2 and Table 3. In Table 2, “speed to market” is treated as a performance measurement indicator; and in Table 3 the indicator is replaced to “product

quality". All of the F-statistics are significant at the $p < 0.001$ level, thus showing good fit of the models to the data, whereas the constructs account for a sizable proportion of the variance in dependent variables. The variance inflation factors in the regression models are all less than 2, indicating that multicollinearity is not serious.

Independent variable	Dependent variable				
	(1)	Model1			Model2
	Team stressors	Speed to market	Speed to market	Speed to market	Speed to market
Leader social support	0.204*** (3.022)		0.136*** (1.977)	0.068 (1.025)	-0.303 (-1.116)
Team social support	0.207*** (3.067)		0.132*** (1.932)	0.064 (0.962)	0.054 (0.197)
Team reward	0.158*** (2.315)		0.259*** (3.732)	0.206*** (3.106)	0.402 (1.425)
Team stressors		0.450*** (7.795)		0.332*** (5.316)	0.048 (0.169)
Leader social support*Team stressor					0.647 (1.461)
Team social support*Team stressor					0.054 (0.118)
Team reward*Team stressor					-0.315 (-0.8220)
Adjusted R ²	0.194***	0.199	0.170	0.255	0.277
F Statistic	20.233***	60.759***	17.347***	27.835***	12.748***
ΔR^2				0.076	
ΔF Statistic				21.571***	

In Table 2, the authors use speed to market as a dependent variable. The results of testing Model 1 (H1) involved four regression analyses are as follows: (1) leader social support ($\beta = 0.204$, $p < 0.001$), team social support ($\beta = 0.207$, $p < 0.001$) and team reward ($\beta = 0.158$, $p < 0.001$) are positively related to team stressor. (2) Team stressors is positively related to speed to market ($\beta = 0.450$, $p < 0.001$). (3) Leader social support ($\beta_1 = 0.136$, $p < 0.001$), team social support ($\beta_2 = 0.132$, $p < 0.001$) and teamreward ($\beta_3 = 0.259$, $p < 0.001$) are positively related to speed to market. (4) The relationship between leader social support, team social support, team reward and speed to market was weakened by theinclusion of team stressors (β_1 dropped from 0.136 to 0.068; β_2 dropped from 0.132 to 0.064; β_3 dropped from 0.259 to 0.206). Since conditions (1)-(4) were supported, it follows that H1 hypothesis—"leader social support, team social support and team reward play an antecedent role in the relationship of team stressors and team performance" was supported.

In Model 2, we see that the coefficients for leader social support, team social support, team reward, team pressure, and interaction between these two are all insignificant. Thus, H2—Leader social support, team social support and team reward moderate the relationship between team stressors and team performance.—is not supported.

In Table 3, the authors use product quality as an independent variable. The results of testing Model 1 (H1) involved four regression analyses are as follows: (1) leader social support ($\beta = 0.204$, $p < 0.001$), team social support ($\beta = 0.207$, $p < 0.001$) and team reward ($\beta = 0.158$, $p < 0.001$) are positively related to team stressor. (2) Team stressors is positively related to product quality ($\beta = 0.403$, $p < 0.001$). (3) Leader social support ($\beta_1 = 0.113$, $p < 0.001$), team social support ($\beta_2 = 0.363$, $p < 0.001$) and team reward ($\beta_3 = 0.221$, $p < 0.001$) are positively related to product quality. (4) The relationship between leader social support, team social support, team reward and product quality was weakened by the inclusion of team stressors (β_1 dropped from 0.113 to 0.074; β_2 dropped from 0.363 to 0.323; β_3 dropped from 0.221 to 0.190). Since conditions (1)-(4) were supported, it follows that H1 hypothesis—

“leader social support, team social support and team reward play an antecedent role in the relationship of team stressors and team performance” was supported.

In Model 2, we see that the coefficients for leader social support, team social support, team reward, team pressure, and interaction between these two are all insignificant. Thus, H2—Leader social support, team social support and team reward moderate the relationship between team stressors and team performance.—is not supported.

Independent variable	Dependent variable				
	(1) Team stressors	Model1			Model2 Model 2
		(2) Product quality	(3) Product quality	(4) Product quality	Product quality
Leader social support	0.204^{***} (3.022)		0.113^{***} (1.817)	0.074^{***} (1.188)	0.318 (1.244)
Team social support	0.207^{***} (3.067)		0.363^{***} (5.822)	0.323^{***} (.5.185)	-0.053 (-0/207)
Team reward	0.158^{***} (2.315)		0.221^{***} (3.508)	0.190^{***} (3.052)	0.335 (1.262)
Team stressors		0.403^{***} (6.799)		0.193^{***} (3.281)	0.112 (0.416)
Leader social support*Team stressor					-0.385 (-0/922)
Team social support*Team stressor					0.645 (1.501)
Team reward*Team stressor					-0.204 (-0.566)
Adjusted R ²	0.194^{***}	0.159	0.314	0.341	0.339
F Statistic	20.233^{***}	46.223^{***}	37.595^{***}	32.048^{***}	18.607^{***}
ΔR ²				0.030	
ΔF Statistic				10.763^{***}	

5. Discussions and conclusions

In this study, the antecedent model and moderating effect model were used to probe into the relationships among leader social support, team social support, team reward, team stressors and team performance. We have obtained the following results: H1 hypothesis—“leader social support, team social support and team reward play an antecedent role in the relationship of team stressors and team performance” was supported.

This implies that stress has an important and very significant effect on performance. An appropriate amount of stress may indeed motivate employees to align themselves with the organization's goals, but while interpersonal methods and management mechanisms (reward systems) may have a positive effect on performance, this effect may be weakened by employees' perceived stress. Apart from confirming the role of stress as a precondition to performance, the study also found that social emotional support or material rewards, even if they are exogenous, will have an effect on behavior only if they are internalized by the employee as a mood, feeling, or perception. This should alert managers to the fact that leading people requires winning their inner allegiance, and managers must therefore employ emotional and material aspects to find employees' inner drivers (stress, needs, or motivations, etc.) if they seek to induce employees to contribute their full efforts to the organization's goals.

Besides, H2—Leader social support, team social support and team reward moderate the relationship between team stressors and team performance—is not supported.

This is a surprising! finding, and is at odds with past literature. This result may come about because the interactions between emotional support, interpersonal interaction, and rewards on one hand, and employee stress on the other, and the new product development process does not drive changes in behavior. In other words, employees' attitudes or moods or the decision to take action does not change much under the influence of the foregoing factors, which are not transformed into actions. Because of this, these factors do little to induce improved performance.

This study proposed an alternative model of the relationship between social emotional support, rewards, stress, and performance in order to advance discussion and remedy deficiencies of the

literature. Subsequent research should add more management or intervention mechanisms, such as upper management support, performance assessment evaluations, in-service continuing education, and employment benefits, in order to investigate the linkage between these factors and stress. In addition, with regard to the antecedents to improve performance, future research should also consider other mood-related variables such as work satisfaction and working atmosphere in order to gain a better understanding of the antecedents of employee goal attainment.

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