Industrial Marketing Management xxx (2012) xxx–xxx

Contents lists available at SciVerse ScienceDirect

Industrial Marketing Management

Management control, role expectations and job satisfaction of new product development teams: The moderating effect of participative decision-making

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ARTICLE INFO

Article history:
Received 6 May 2010
Received in revised form 3 April 2012
Accepted 20 August 2012
Available online xxxx

Keywords:
Management control
Role ambiguity
Role conflict
Job satisfaction
New product development

ABSTRACT

This work examines the relationships between formal and informal management controls (i.e. output, process and professional) and job satisfaction of new product development (NPD) teams. In particular, the study investigates the direct and indirect effects of management controls on job satisfaction through role expectations (i.e. role conflict and role ambiguity) and the moderating effect of participative-decision making. Results are based on a sample of 197 NPD projects. Our findings indicate that management controls have differential effects on role ambiguity, role conflict and job satisfaction of NPD team. In particular, NPD teams respond more favorable to professional and output controls than to process controls. Relatedly, participative decision making was found to moderate the relationships between output, process, professional controls and role expectations.

1. Introduction

Management control in a new product development (NPD) context involves the efforts of managers to influence the behaviors and activities of NPD team members to achieve successful results (Ayers, Dahlstrom, & Skinner, 1997; Bonner, Ruekert, & Walker, 2002; Poskela & Martinsuo, 2009). Previous research on control of NPD projects has mainly focused on the impact of managerial controls on specific new product performance outcomes such as product quality, project's schedule and budget, and overall project performance (e.g., Bonner et al., 2002; Rijsdijk & van den Enden, 2011; Tatikonda & Rosenthal, 2000). However, an issue that has received very little research attention so far is how management controls affect job satisfaction of NPD teams. This is an important gap as job satisfaction has been widely recognized as a strong determinant of NPD team effectiveness and performance (Barczak & Wilemon, 2003; Rodriguez-Escudero, Carbonell, & Munuera-Aleman, 2010).

Job satisfaction refers to the team members' satisfaction with regard to the recognition, responsibilities, supervision and opportunities offered during the NPD project (Sarin & Majahan, 2001). Marketing studies have shown ambiguous findings concerning the effect of management control on job satisfaction (see e.g. Jaworski, Stathakopoulos, & Krishnan, 1993; Oliver & Anderson, 1994; Challagalla & Shervani, 1996). Such inconsistent findings have prompted several researchers to examine mediating and moderating variables that influence the relationship between managerial control and job satisfaction (e.g., Challagalla & Shervani, 1996; Evans, Landry, Li, & Zou, 2007). This study proposes further examination of the linkage between management controls and job satisfaction by investigating the mediating effects of role conflict and role ambiguity and the moderating effect of participative-decision making. The study focuses on two types of formal controls (output control and process control) and one type of informal control, mainly professional control.

According to previous research, project team members in NPD are often confronted with unclear and conflicting role expectations as they encounter new and changing customer demands, technical uncertainties, organizational ambiguities and various types of conflicts (Akgün, Lynn, & Byrne, 2006; Barczak & Wilemon, 2003; Kim & Wilemon, 2001). Findings from recent research indicate that role ambiguity and role conflict have, in turn, a negative impact on job satisfaction and performance of NPD teams (Rodriguez-Escudero et al., 2010).

In the current literature, empirical evidence on the mediating effect of role expectations on the management controls-job satisfaction relationship is limited and piecemeal. First, only three studies were found in which these effects were investigated (i.e., Challagalla & Shervani, 1996; Jaworski & Kohli, 1991; Rigopoulou, Theodosiou, Katsikea, & Perdikis, 2012). Second, these studies posit role ambiguity as the key sole mediator of the effects of management control on job satisfaction. Notwithstanding the role of management controls in decreasing role ambiguity, we argue that equally importantly, management controls can ensure that there is a greater agreement between management and team members on role expectations, thereby

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http://dx.doi.org/10.1016/j.indmarman.2012.08.007

potentially contributing to lowering role conflict. Finally, with a few exceptions (see Ayers et al., 1997; Cravens et al., 2004; Jaworski et al., 1993), researchers have devoted very little attention to the effect of informal control on role expectations and job satisfaction. This is an important gap since as several studies note managers use formal and informal controls to manage NPD teams (Poskela & Martinsuo, 2009; Rijsdijk & van den Enden, 2011). The presence of informal controls and the potential for managers to influence them underscore the need for managers to be more aware of their effects on role expectations and job satisfaction (Jaworski et al., 1993). The current research addresses the existing knowledge gaps by exploring the direct and indirect effects of output, process and professional controls on job satisfaction via role ambiguity and role conflict.

In recent years, the notion of employee's participation in decision making has gained strength among NPD managers (Cooney, 2004). Existing studies have shown that employees who participate in decision-making have a clearer picture of what is involved in executing the project and exhibit higher level of job satisfaction (Fang, Evans, & Zou, 2005). Against this background, an interesting question becomes how participative decision making interacts with management controls to affect NPD team role expectations and job satisfaction.

Research findings concerning the moderating impact of participative decision-making on the effects of management controls have been mixed. In Ramaswami (1996), employees' perceptions of the influence they have on their supervisors regarding their work do not moderate the relationship between output and process controls and employees' dysfunctional behaviors (e.g., concealing and manipulating data). Fang et al. (2005), which examine the moderating effect of goal participation on the relationship between process control and behavior performance using data from both China and United States, indicate that the moderating effect holds in the China sample but not in the US sample. Finally, Atuahene-Gima and Li (2006) show that whereas participative supervision moderates the relationship between process control and employee's trust, it does not moderate the link between output control and employee's trust. The current study adds to the existing literature by examining the moderating impact of participative decision-making on the effects of formal and informal controls on role ambiguity, role conflict and job satisfaction. To the best of our knowledge, this is the first study to examine the proposed relationships.

From a theoretical perspective, the potential contribution of this research lies in identifying multiple ways and contexts in which formal and informal controls can affect job satisfaction of NPD teams, thereby increasing our understanding of the complexity of the relationship between management controls and team job satisfaction. Our research is of potential value for new product managers since it identifies intermediate markers that they should monitor once formal and informal controls are installed in order to ensure that job satisfaction does in fact result. Results also offer useful insights into how participative decision making moderates the effect of management control on role expectations and job satisfaction and thus, provide useful guidance for managers seeking to enhance NPD team design.

2. Definitions and conceptual framework

2.1. Management control

Management control systems refer to the aggregate of policies, procedures and rules organizations use to monitor, direct, evaluate and reward employees (Anderson & Oliver, 1987). Jaworski (1988) identified two broad types of control systems: formal and informal. Formal controls are written, management-initiated control mechanisms, and informal controls are unwritten, worker-initiated control mechanisms (Jaworski, 1988). The current study examines two types of formal controls, namely process and output controls, and one type of informal control.

Output control refers to the extent to which management emphasizes the achievement of end results when monitoring, evaluating and rewarding NPD team members (Jaworski, 1988). Output controls direct team members by specifying output goals and standards. They leave the choice of methods and procedures to the NPD team members themselves (Ramaswami, 1996). Output controls would include the specification of standards such as technical performance, quality, profitability and market share for the product developed (Bonner, 2005).

Process control refers to the extent to which management places an emphasis on procedures and behavioral activities when monitoring, evaluating and rewarding NPD teams (Bonner et al., 2002; Jaworski, 1988). Through process control, management tries to ensure that activities considered necessary and critical for the success of innovation are thoroughly accomplished (Poskela & Martinsuo, 2009). Under this control system, management holds team members responsible for following the prescribed process but does not hold them responsible for the outcome (Jaworski, 1988).

Informal controls are typically classified according to their level of aggregation as follows: self, professional and cultural controls. Self control is exercised when an individual establishes personal objectives, monitors their attainment and adjusts behavior if off course. With professional control, a work unit or small group establishes certain standards, monitors conformity and takes actions when social deviations occur. Cultural control involves an entire division or firm (Jaworski et al., 1993). Because of the focus of the current study is on NPD teams, we only examine professional control.

Professional control represents control by neither outcome nor behavior, but by socialization (Anderson & Oliver, 1987). Professional control is implemented by promulgating common values, beliefs and philosophy within the team. Rather than requiring employees to follow a written set of procedures, the socialization process, as well as rituals and ceremonies, serve to identify and reinforce acceptable behaviors (Kirsch, 1997). This control is also termed “social control” or “clan control”.

2.2. Role ambiguity and role conflict

Individuals in organizations are often faced with stress resulting from conflicting, incompatible or unclear expectations regarding their roles in the organization. Two main types of role stress have been defined: role ambiguity and role conflict (Rizzo, House, & Lirtzman, 1970). For this study, role ambiguity is defined as the degree to which NPD team members are unclear about their role, responsibilities, expectations and authority during the development process (Rizzo et al., 1970). Role conflict is the degree of incompatibility or incongruency among role expectations held by NPD team members (Rizzo et al., 1970). For NPD teams, role conflict may occur as a result of working on unnecessary things, working under conflicting directives, receiving tasks that are outside the team's training and capabilities, doing things that should have been done differently, bucking rules or established procedures to carry out their jobs, and receiving tasks without adequate resources to execute them.

2.3. Conceptual framework

Our conceptual framework is illustrated in Fig. 1. As noted earlier, we expect output, process and professional controls to have a direct effect on role ambiguity and role conflict and an indirect effect on job satisfaction via the former variables. Output, process and professional controls are also expected to directly influence job satisfaction. This is based on extant research suggesting that in addition to their effect on employee's job-related cognitions, management control has also critical implications for employee's job-related affects and behaviors (Anderson & Oliver, 1987; Atuahene-Gima & Li, 2006; Sarin & Majahan, 2001).

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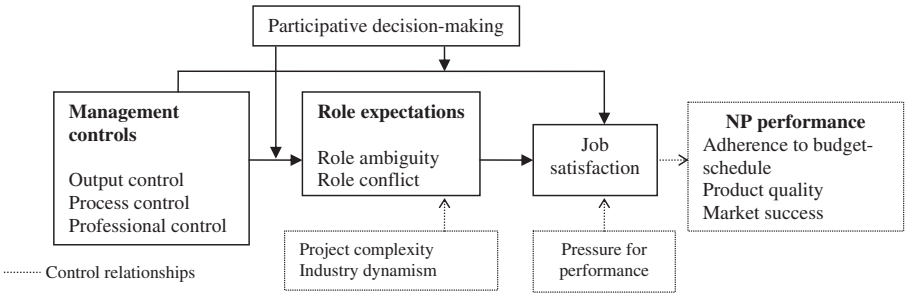

Fig. 1. Conceptual framework.

As depicted in Fig. 1, participative decision-making is expected to moderate the relationships between management controls and role expectations and management controls and job satisfaction. The proposed moderating effects are consistent with the contingency view of control articulated by Ouchi (1979) and Jaworski (1988). Participative decision-making represents the extent to which NPD team members participate in and have influence on decisions regarding the NPD project (Tatikonda & Rosenthal, 2000).

Finally, in order to confirm the value of job satisfaction in explaining new product performance, Fig. 1 includes the effect of job satisfaction on three measures of new product performance, mainly adherence to budget and schedule, product quality and market success. Formal hypotheses for these relationships are not, however, advanced since the relationships are not central to the article's main focus.

3. Research hypotheses

3.1. Management controls and role ambiguity

Output control involves setting output goals, monitoring, and providing feedback on output performance. When management sets output goals, path-goal theory suggests that team members are motivated to expend effort to understand their managers' expectations (Locke & Latham, 2002). Specific and clear output goals motivate team members to direct attention to the goal-relevant activities and seek feedback from management. Feedback seeking, in turn, reduces role ambiguity by bolstering team members' understanding of the expectations of their job (Whitaker, 2010). In keeping with the preceding discussion, Challagalla and Shervani (1996) and Jaworski et al. (1993) reported a negative relationship between output control and role ambiguity. Thus, we propose that:

H1a. Output control is negatively related to role ambiguity.

Process control regulates the activities and behaviors of NPD team members. To exercise process control, managers specify the behaviors and processes in which the project team members must engage, and monitor the implementation of such activities (Bonner, 2005). Process control encompasses formalized rules and routines, frequent monitoring and ongoing adjustments to behaviors (Cardinal, 2001). Previous studies in NPD have suggested a negative association between process control and role ambiguity (Cooper, 2011). Thus, Tatikonda and Rosenthal (2000) noted that process formality may aid in reducing role ambiguity because a work process with controls and reviews provides a sense of structure and sequence to the work. Similarly, Goodale, Kuratko, Hornsby, and Covin (2011) claimed that a structured work environment and a focus on following prescribed behaviors and activities eliminate uncertainty in the performance of tasks. Finally, because process controls tend to be proximal in nature, supervisors are likely to monitor and communicate with employees more frequently (Challagalla & Shervani, 1996), thereby reducing the likelihood of role ambiguity (Walker, Churchill, & Ford, 1975). Following this research we propose a negative association between process control and role ambiguity:

H2a. Process control is negatively related to role ambiguity.

Professional control provides both the implicit rules (i.e. common values, beliefs and philosophy) and the supportive structures (i.e. group cohesion, reinforcement) to facilitate role understanding (Flamholz, Das, & Tsui, 1985). The collegial interaction and informal communication among team members enables them to gain a better understanding of the tasks and role responsibilities associated with their job, leading to lower role ambiguity (Flamholz et al., 1985). Therefore, we argue that:

H3a. Professional control is negatively related to role ambiguity.

3.2. Management controls and role conflict

NPD teams need some flexibility during project execution to adjust to emerging needs of the project (Bonner et al., 2002; Tatikonda & Rosenthal, 2000). Under an output control strategy, once output goals are agreed upon, the development team is given substantial flexibility to determine how they would like to achieve the desired results (Atuahene-Gima & Li, 2006). The great amount of autonomy and flexibility afforded by output control provides NPD team members with an opportunity to deal more freely with emerging project problems, reducing the likelihood of role conflict. In keeping with this argument, Jaworski et al. (1993) found a negative relationship between output control and role conflict. Thus, we propose:

H1b. Output control is negatively related to role conflict.

Unlike output control, process control is likely to increase role conflict of NPD teams. Previous research has found that when the behavior of an employee is constrained by company rules and closely supervised, that employee is more likely to experience role conflict (Jaworski et al., 1993; Ramaswami, Agarwal, & Bhargava, 1993; Walker et al., 1975). As noted earlier, NPD teams require flexibility and creativity to react to emerging project needs and unanticipated demands and opportunities for action. A highly formalized environment (i.e., process control) curtails the flexibility and creativity expected and/or required for their job, thus increasing the likelihood that the NPD team members experience role conflict. Thus, we propose:

H2b. Process control is positively related to role conflict.

Professional control can reduce role conflict by increasing the likelihood that NPD team members see their interests as convergent. Through collegial interaction and informal communication, conflicting

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role expectations are clarified (Flamholz et al., 1985). Informal interactions among team members enable them to gain a better understanding of each other's roles in the development process and become aware of potential points of contention. When team members know what others within the team are doing, they develop mechanisms to remain flexible to their colleagues' needs alleviating the possibility of conflict (Ayers et al., 1997; Kirsch, 1997). Moreover, shared values, traditions and beliefs foster trust and dedication to common goals among team members, which increases the likelihood that team members will not behave opportunistically (Floyd & Lane, 2000). Finally, professional control provides some assurance that arguments and disputes over competencies or resources will be settled based on the NPD project's interest, rather than the interest of particular individuals or groups (Floyd & Lane, 2000). Based on these arguments, we propose:

H3b. Professional control is negatively related to role conflict.

3.3. Managerial controls and job satisfaction

The relationship between output control and job satisfaction is expected to be negative. Under an output control system, project's team members are rewarded based on achieving the project goals. Thus, output control shifts substantial performance risk to the project team because performance outcome is affected by environmental and company factors beyond their control (Atuahene-Gima & Li, 2002; Hernard & Szymanski, 2001). As Sarin and Majahan (2001) noted, to the extent that project team members are compensated on the basis of outcomes beyond their control, performance risk to them is greater. Drawing upon this argument, Li, Chu, and Lin (2010) argued that by increasing the team's performance risk, output control sends a negative signal of the management's lack of concern or support for the NPD team. Relatedly, Hopewood (1972) found that when managers rely heavily on financial and quantitative measures employees tend to show increased tension and perceive poorer relations with them. Following the previous discussion, we posit that the use of output control will lead to lower job satisfaction:

H4. Output control is negatively related to job satisfaction.

The use of process control is likely to result in higher job satisfaction. Process control ensures that NPD team members receive rewards as long as process requirements are met, irrespective of the performance output achieved. From this point of view, process control frees employees from short-term pressure because the organization rather than the employee assumes much of the performance risk (Cravens, Ingram, LaForge, & Young, 1993). Anderson and Oliver (1987) argued that when the supervisor relies on process control, employees feel committed and grateful; because the supervisor assumes risk for them and provides them a more nurturing climate. Hence, we expect process control to increase team's job satisfaction.

H5. Process control is positively related to job satisfaction.

Professional control is likely to increase job satisfaction. Studies have suggested that as managers shift from hierarchical controls to more decentralized controls (i.e. professional control) job satisfaction increases (Jaworski et al., 1993). One reason is that control achieved through interaction with group members alleviates bureaucratic pressure. Also, the feelings of belonging to a group brought about by professional controls may lead to higher job satisfaction (Agarwal & Ramaswami, 1993). Thus, O'Reilly and Chatman (1996) asserted that social controls can engage individuals emotionally and provide them with a sense of purpose. Consequently, professional control may be accompanied by more positive attitudes. Following these arguments we expect that professional control will increase job satisfaction.

H6. Professional control is positively related to job satisfaction.

3.4. Moderating role of participative decision-making

It has been argued that participation in the goal-setting process gives employees explicit knowledge of where to direct their efforts (Fang et al., 2005). Moreover, the high level of supervisor-employee communication associated with participation enables employees to discuss concerns about their job, reducing the opportunity for role conflict (Ramaswami et al., 1993, Teas, 1983). Therefore, we argue that team's participation in decision-making will enhance output control's effectiveness in decreasing role ambiguity and role conflict. Moreover, output control is less likely to decrease job satisfaction when NPD team members have greater participation in decision-making. The logic is that having participated in setting decisions regarding the NPD project's goals and objectives, deadlines and budget, team members are more likely to accept and to commit to the performance risks involved in output control (Das & Teng, 1998). Therefore, the impact of the perceived negatives regarding managerial lack of support and care inherent in output control on job satisfaction will be buffered when the team has a strong participation in decision-making. Therefore,

H7a. The negative relationship between output control and role ambiguity will be stronger when the degree of participative decision-making is high rather than low.

H7b. The negative relationship between output control and role conflict will be stronger when the degree of participative decision-making is high rather than low.

H7c. The negative relationship between output control and job satisfaction will be weaker when the degree of participative decision-making is high rather than low.

In contrast, we argue that process control is less likely to decrease role ambiguity and more likely to increase role conflict when NPD team members play an important role in decision making. When NPD team members participate in specifying the performance goals, methods and procedures for the NPD project, they gain better knowledge about why the goals are set and what is involved in reaching those goals (Ramaswami, 1996). In this situation, the managers' high levels of direction of and intervention in the NPD activities via process control cannot help but make the NPD team feel uncertain and unclear about what is expected of them, thereby increasing the opportunity for role ambiguity and conflict. Also, since the team is involved in decision making, the use of process control sends a negative signal of lack of belief and trust in the competence of the NPD team to performance their duties without close control of their behaviors (Atuahene-Gima & Li, 2006), weakening the positive impact of process control on job satisfaction.

H8a. The negative relationship between process control and role ambiguity will be weaker when the degree of participative decision-making is high rather than low.

H8b. The positive relationship between process control and role conflict will be stronger when the degree of participative decision-making is high rather than low.

H8c. The positive relationship between process control and job satisfaction will be weaker when the degree of participative decision-making is high rather than low.

Professional control provides an informal and collegial way for the team members to reduce incongruity and uncertainty with regard to

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their roles and duties during the NPD process by discussing their concerns with their peers rather than with their manager. In this respect, we argue that professional control is less likely to decrease role ambiguity and role conflict as well as less likely to increase job satisfaction when team members have a strong participation in decision-making. The argument is that having participated in setting decisions regarding the NPD project's goals, methods and procedures, team members are likely to be more knowledgeable about their tasks during the NPD process and therefore professional control becomes less relevant in order to reduce team's role ambiguity and role conflict. Moreover, since job satisfaction is also strengthened with high participative decision making (Atuahene-Gima & Li, 2006; Korgaard, Schweiger, & Sapienza, 1995), professional control will play a smaller role in developing job satisfaction when NPD team member's participation in decision-making is high.

H9a. The negative relationship between professional control and role ambiguity will be weaker when the degree of participative decision-making is high rather than low.

H9b. The negative relationship between professional control and role ambiguity will be weaker when the degree of participative decision-making is high rather than low.

H9c. The positive relationship between professional control and job satisfaction will be weaker when the degree of participative decision-making is high rather than low.

3.5. Role expectations and job satisfaction

Rodriguez-Escudero et al. (2010) found that role ambiguity and role conflict have a significant negative effect on job satisfaction of NPD teams. When team members experience ambiguity and conflict, they are likely to become disillusioned and, therefore, unsatisfied. Feelings of ambiguity have a negative impact on team's satisfaction because it is difficult for team's members to like their job and achieve feelings of personal accomplishment and growth when they are uncertain about what they are expected to do and how (Walker, Churchill, & Ford, 1979). Research in NPD teams has shown that role conflict can result in negative feelings about the project, frustration, and stress. These feelings, in turn, often negatively affect job satisfaction (Barczak & Wilemon, 2003). Therefore, we propose that:

H10. Team role ambiguity is negatively related to job satisfaction.

H11. Team role conflict is negatively related to job satisfaction.

4. Methodology

4.1. Sample and data collection

The initial sampling frame included 1403 innovative Spanish firms operating in various manufacturing industries. Data were collected through a web-based questionnaire sent to the senior executive in charge of the NPD activities at each company. Before collecting the data, the questionnaire was pre-tested with six managers and six academics. Reminder e-mails and phone calls were sent to all non-respondents two weeks after the initial contact. A total of 197 complete questionnaires were received, yielding an effective response rate of 14%. Even if this response rate is not as high as one might wish, it is comparable with those of other studies on NPD. Also of note, although extensive evidence details lower costs and faster response times for online surveys than for mail surveys (e.g. Dillman, 2000; Illieva, Baron, & Healy, 2002), web-based surveys offer no clear advantages over mail surveys in terms of response rate (Olsen, 2009). The vast majority of the NPD projects resulted in products sold to industrial markets: 66% industrial; 33% consumers.

To test for nonresponse bias, early and late respondents were compared as suggested by Armstrong and Overton (1977). No significant differences were found in terms of firm size (number of employees and sales volume) and in the constructs examined in this study at $p<0.05$. Sample representativeness was also checked. The analyses revealed no significant differences between our sample and the population it was drawn from in terms of industry distribution, employee number and company sales. Table 1 shows the sample characteristics.

The respondents included R&D managers (42.5%), marketing managers (23.4%), general managers (9.4%), production managers (6.7%) and others. Respondents were asked to base their answers on a new product project representative of the firm which had been fully completed within the past three years. To assess quality of the responses, respondents were asked to indicate their degree of knowledge about the new product and the NPD process using a seven point Likert scale (1 = very limited, 7 = very substantial). The mean responses were 5.98 and 5.31, respectively, thus showing a high knowledge level on the NPD project selected.

4.2. Measures

A pool of items was generated for measuring each of the constructs using literature and interviews with practitioners. Output control was measured with four items that captured the extent to which upper management specified, monitored, provided feedback and based rewards on the extent the NPD team achieved project objectives (Jaworski & MacInnis, 1989). The process control scale included four items that referred to the extent to which upper management set procedures and methods, and supervised, modified, and provided feedback on the extent the NPD team followed the established procedures (Bonner et al., 2002, Jaworski & MacInnis, 1989). Professional control measured the degree of interaction, feedback and evaluation among members in the NPD team (Jaworski & MacInnis, 1989).

Decision-making participation was measured with five items that reflected the extent to which the NPD team participated in defining the project's goals and objectives, specifying the project's deadlines, selecting the team's members, determining the team's budget and the format of progress review (Bonner et al., 2002; Tatikonda & Rosenthal, 2000). Team-role ambiguity and team-role conflict were measured with four and six items, respectively, adapted from Rizzo et al. (1970).

Table 1
Sample characteristics.

SIC code and sectors	% of sampled firms	Number of employees	% of sampled firms	Sales volume (mill. €)	% of sampled firms
28. Chemical products	27.9%	<50	20.3%	<6	13.7%
35, 37. Machinery and transportation equipment	28.9%	51–150	25.4%	6–18	20.8%
36. Electrical and electronic machinery	28.9%	151–250	18.8%	18–30	11.2%
20 to 27. Others	14.2%	251–500	19.8%	30–60	21.8%
		>500	13.7%	>60	21.3%
		Non-response	2.0%	Non-response	11.2%
Total	197		197		197

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Table 2
Construct definition and measures.

Construct name	Construct measurement	Mean (S.D.)
Output control	During the NPD process, upper management:	
(α=.84, CR=.91, AVE=.71)	• Established specific performance objectives for the NPD project.	5.34 (1.47)
	• Supervised the extent to which project performance goals were attained.	5.26 (1.35)
	• Provided feedback concerning the extent to which NP objectives were attained.	5.17 (1.42)
	• Rewarded team based on goal attainment.	3.92 (1.75)
Process control	During the NPD process, upper management:	
(α=.91, CR=.91, AVE=.64)	• Specified the processes and procedures to be used by the team.	4.43 (1.53)
	• Supervised the extent to which team followed established procedures.	4.67 (1.50)
	• Modified procedures when desired results were not obtained.	4.19 (1.69)
	• Provided feedback regarding the extent to which team followed established procedures.	4.55 (1.47)
Professional control	• The work-environment during the NPD process encouraged cooperation among team members.	5.33 (1.34)
(α=.94, CR=.94, AVE=.77)	• The work-environment stimulated work-related discussions among team members.	5.29 (1.33)
	• Team members showed respect for each other's work.	5.33 (1.34)
	• Most of the team members were familiar with each other's work.	5.26 (1.25)
	• Most of the team members were familiar with each other's productivity.	5.06 (1.35)
Participation in decision-making	During the NPD process, the team participated in (played an important role in):	
(α=86, CR=.86, AVE=.55)	• Defining the project's goals and objectives	5.05 (1.45)
	• Specifying project's deadlines	5.07 (1.51)
	• Selecting team members	4.73 (1.60)
	• Determining the team's budget	4.37 (1.60)
	• Determining the format of progress review	5.40 (1.25)
Role ambiguity	Team members were uncertain about how much authority they had (R).	2.49 (1.31)
(α=.93, CR=.98, AVE=.75)	Team members were unclear of what had to be done (R).	2.35 (1.25)
	Team members did not know what their responsibilities were (R).	2.38 (1.22)
	Team members did not know exactly what was expected of them (R).	2.47 (1.30)
Role conflict	During the development process, conflict arose because team members:	
(α=.92, CR=.91, AVE=.67)	• Bucked rules or policies in order to carry out their job/tasks.	2.81 (1.60)
	• Had to work on unnecessary things.	3.34 (1.77)
	• Worked under conflicting directives or orders.	3.08 (1.82)
	• Received tasks that were outside their training and capabilities.	2.85 (1.76)
	• Received tasks without adequate resources to execute them.	3.40 (1.83)
	• Had to do things that should have been done differently.	3.30 (1.82)
Job satisfaction	Team members were satisfied with:	
(α=.91, CR=.91, AVE=.73)	• The recognition they got for their work on the project.	4.59 (1.53)
	• The amount of responsibility given during the project.	5.02 (1.33)
	• The way the team was managed.	4.94 (1.29)
	• The opportunities given to use their knowledge and capabilities	5.19 (1.29)
Project complexity	It was technically complex to develop the new product.	4.50 (1.48)
(α=.89, CR=.89, AVE=.66)	Our team had to use non routine technology to develop the product.	3.96 (1.54)
	The development process associated with the product was difficult and complex.	4.45 (1.41)
	The product developed by our team was complex.	4.27 (1.53)
Industry dynamism	At the time the new product was launched, the environment was characterized by:	
(α=.84, CR=71, AVE=.51)	• Very frequent changes in the mix of products/brands available.	3.68 (1.81)
	• Very frequent changes in the sales strategies.	3.78 (1.66)
	• Very frequent changes in product/technology standards	3.97 (1.80)
	• Very frequent changes in customer preferences.	4.09 (1.73)
	• Very frequent changes in the structure of competition.	3.98 (1.74)
Pressure for performance	The team felt great pressure from company's executives to succeed on this project.	5.04 (1.63)
(α=.80, CR=.81, AVE=.55)	The team felt great pressure to launch this product successfully.	5.27 (1.49)
	The team felt great pressure from the environment to develop this product quickly.	4.74 (1.72)
	The team felt their jobs could be in jeopardy if this project failed.	5.04 (1.52)
Adherence to budget and schedule	The team made efficient use of its time.	4.74 (1.42)
(α=.89, CR=.86, AVE=.54)	The team did a good job meeting all of its schedule deadlines.	4.31 (1.63)
	The new product was launched on time.	4.39 (1.76)
	The team operated in a cost-efficient manner.	4.73 (1.46)
	The team did a good job adhering to its budget.	4.58 (1.53)
	The team's project was within budget.	4.84 (1.42)
Product quality	The product was more reliable than competing products available to the customer.	5.39 (1.25)
(α=.88, CR=.87, AVE=.48)	The product's performance met our expectations.	5.90 (0.96)
	The product's quality exceeded our expectations.	5.55 (1.36)
	This product delivered benefits to the customers that were not currently available	5.26 (1.32)
	The product had an excellent post-purchase service.	4.98 (1.37)
	This product was superior to competing products available to the customer.	5.52 (1.25)
	Our clients were very satisfied with this product.	5.74 (1.10)
	This product offered an important competitive advantage.	5.46 (1.24)
Market success	The new product met sales expectations.	4.75 (1.48)
(α=.94, CR=.91, AVE=.72)	The new product met sales growth expectations.	4.76 (1.53)
	The new product met market share expectations.	4.62 (1.54)
	The new product met profit expectations.	4.71 (1.40)
	The new product met return on investments expectations.	4.70 (1.45)

Seven point Likert-type scales (1=strongly disagree to 7=strongly agree), *R*=reverse-scored item.

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The job satisfaction scale measured satisfaction with regard to recognition, responsibilities, supervision and opportunities (Hartline & Ferrell, 1996, Sarin & Majahan, 2001). Adherence to budget and schedule, and market success were measured with six and five items, respectively from Sarin and Majahan (2001). Finally, product quality was operationalized using eight items adapted from Garvin (1987).

Project complexity, industry dynamism and pressure for performance were included as control variables. Project complexity referred to the degree to which the development process was complicated and difficult (Sarin & Majahan, 2001). To the extent that project complexity entails difficulty in task accomplishment, it may be expected to bear a positive relationship with role ambiguity and role conflict (Parasuraman & Alutto, 1981). Industry dynamism was related to the perceived frequency of change in marketing forces in the industry environment (Sarin & Majahan, 2001). Akgün et al. (2006) noted that the wide variety of stimuli and frequent changes in information due to turbulence can cause communication delays, intragroup conflict, role ambiguity and decision-making deficiencies. Pressure for performance indicated the emphasis that the organization placed on goal accomplishment and effectiveness-related activities (Selladurai, 1991). When performance pressure is high, team members are less likely to be happy with their jobs (Strutton, Pelton, & Lumpkin, 1993). Pressure for performance was operationalized with four items from Akgün et al. (2006). Measures and descriptive statistics of all variables are shown in Table 2.

4.3. Unidimensionality, reliability and validity

Psychometrics properties of the scales were analyzed based on widely accepted procedures. The internal consistency, reliability and convergent validity were investigated by performing a confirmatory factor analysis using AMOS v.19. Composite reliability estimates exceeded the 0.70 standard recommended by Bagozzi, Yi, and Phillips (1991). Values of average variance extracted (AVE) provided satisfactory results, with the exception of the variable product quality for which the AVE was slightly below 0.50. Standardized item loadings for all constructs were greater than 0.50 and significant ($p<0.05$), evidencing good convergent validity (Bagozzi et al., 1991). An inspection of alpha coefficients revealed that all values were equal or greater than 0.80 which indicates good reliability. The discriminant validity was assessed across the scales by respecifying the initial *measurement* model in a series of constrained models in which each intertrait correlation was constrained to 1. In every instance the constrained models showed a worse fit and the difference in χ^2 value between each of the constrained models and the baseline measurement model was found to be significant, thus providing evidence of discriminant validity. Together the results of the tests suggest that the reflective scales used in this study possess sufficient unidimensionality, reliability and validity (Table 2). Before testing the model, scale items were averaged to create a single measure of each construct. Table 3 exhibits means, standards deviations and zero-order correlations for the model constructs.

4.4. Common method bias

Most researchers agree that common method variance (CMV) is a potentially serious biasing threat in behavioral research, especially with single informant surveys. According to Podsakoff, Mackenzie, Lee, and Podsakoff (2003), the two primary ways to control for method biases are through procedural and/or statistical remedies. Procedural remedies were addressed by protecting respondent anonymity, reducing evaluation apprehension, improving item wording, and separating the measurement of the predictor and criterion variables. Further, the following statistical remedies were applied. First, the Harman's one-factor test was conducted (Podsakoff et al., 2003). In this test, evidence for CMV exists when a single factor emerges from the analysis or when one general factor accounts for the majority of the covariance in the independent and dependent variables. This analysis produced ten factors, with the first factor accounting for only 27.9% of the total variance explained (74.5%). Second, the Lindell and Whitney's (2001) marker variable technique was employed. The extent to which the new product was commercialized jointly with other companies was designated as the marker variable. Using the formulas suggested by Lindell and Whitney (2001), we computed the CMV-adjusted correlations among the research constructs using the second-smallest positive correlation as a proxy for CMV. Results indicated that the correlations reported in Table 3 remained significant after the CMV adjustment. In summary, results from the above-mentioned tests suggest that CMV is unlikely to affect the findings of this study.

5. Results

5.1. Model estimation

Covariance-based path analysis with maximum likelihood estimation (AMOS v.19) was used to estimate the theoretical model. All reported significance levels are based on bias-corrected bootstrap confidence intervals.

Interaction terms were included in the model to test for the moderating hypotheses. Multicolinearity is an endemic problem in models that simultaneously contain linear and interaction terms of the same variables. To minimize this problem, output control, process control, professional control and participation in decision-making were mean-centered prior to the creation of the interaction terms. We checked whether parameter estimates were sensitive to the addition or deletion of the interaction terms by estimating a main-effect-only model. The coefficients' signs and magnitudes did not change.

A series of post-hoc power analyses were completed using the G*POWER 3 computer software (Faul, Erdfelder, Lang, & Buchner,

Table 3
Means, standard deviations and zero-order correlations.

	Mean (S.D.)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Output control	4.92 (1.24)												
2. Process control	4.46 (1.33)	.64**											
3. Professional control	5.25 (1.17)	.47**	.39**										
4. Participative decision making	4.92 (1.18)	.44**	.28**	.51**									
5. Role ambiguity	2.42 (1.15)	−.49**	−.38**	−.69**	−.43**								
6. Role conflict	3.09 (1.45)	−.17*	−.10	−.27**	−.04	.33**							
7. Job satisfaction	4.94 (1.21)	.52**	.32**	.69**	.50**	−.69**	−.36**						
8. Project complexity	4.30 (1.28)	.37**	.21**	.18**	.35**	−.17*	.20**	.15*					
9. Industry dynamism	3.91 (1.36)	.14*	.09	.15*	.22**	−.12	.10	.19**	.18**				
10. Pressure for perform.	5.05 (1.24)	.21**	.17*	.18**	.30**	−.18**	.33**	.08	.33**	.12			
11. Adherence to budget-schedule	4.57 (1.19)	.41**	.19**	.52**	.37**	−.49**	−.32**	.53**	.07	.14*	.05		
12. Product quality	5.50 (0.89)	.35**	.29**	.46**	.32**	−.41**	−.14*	.44**	.26**	.14*	.20**	.27**	
13. Market success	4.74 (1.32)	.41**	.26**	.44**	.32**	−.41**	−.13	.44**	.28**	.17*	.22**	.46**	.47**

Significance levels: **$p<.01$, *$p<.05$ (two-tailed test).

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Table 4
Path analysis: standardized parameter estimates.

Hypothesized relationships		
Output control → Role ambiguity	−0.24**	H1a — supported
Output control → Role conflict	−0.25**	H1b — supported
Process control → Role ambiguity	−0.03	H2a — rejected
Process control → Role conflict	0.03	H2b — rejected
Professional control → Role ambiguity	−0.50**	H3a — supported
Professional control → Role conflict	−0.22**	H3b — supported
Output control → Job satisfaction	0.19**	H4 — rejected
Process control → Job satisfaction	−0.09+	H5 — rejected
Professional control → Job satisfaction	0.30**	H6 — supported
Team ambiguity → Job satisfaction	−0.33**	H10 — supported
Team conflict → Job satisfaction	−0.12*	H11 — supported
Output control * participative decision-making → Role ambiguity	−0.35**	H7a — supported
Output control * participative decision-making → Role conflict	−0.35**	H7b — supported
Output control * participative decision-making → Job satisfaction	−0.07	H7c — rejected
Process control * participative decision-making → Role ambiguity	0.18**	H8a — supported
Process control * participative decision-making → Role conflict	0.26**	H8b — supported
Process control * participative decision-making → Job satisfaction	−0.01	H8c — rejected
Professional control * participative decision-making → Role ambiguity	0.20**	H9a — supported
Professional control * participative decision-making → Role conflict	0.17*	H9b — supported
Professional control * participative decision-making → Job satisfaction	0.02	H9c — rejected
Control relationships		
Participative decision-making → Role ambiguity	−0.09	
Participative decision-making → Role conflict	0.05	
Participative decision-making → Job satisfaction	0.15**	
Project complexity → Team ambiguity	0.07	
Project complexity → Team conflict	0.30**	
Industry dynamism → Team ambiguity	−0.01	
Industry dynamism → Team conflict	0.09	
Pressure for performance → Job satisfaction	−0.07	
Job satisfaction → Adherence to budget and schedule	0.53**	
Job satisfaction → Product quality	0.44**	
Job satisfaction → Market success	0.14*	
Adherence to budget-schedule → Market success	0.30**	
Product quality → Market success	0.32**	
R^2 role ambiguity	0.60	
R^2 role conflict	0.24	
R^2 Job satisfaction	0.62	
R^2 Adherence budget-schedule	0.29	
R^2 Product quality	0.19	
R^2 Market success	0.34	

**$p<.01$, *$p<.05$ (one-tailed test). Significance levels are based on bootstrapped, bias-corrected confidence intervals.

2007) to determine the p-values for the statistical analyses included in the study. Power values were calculated for each dependent variable in the path model. In all instances, power values for a medium effect size and Type I error (α) of 0.05 exceeded recommended criterion of 0.80. Hence, an alpha-value of 0.05 seems to be appropriate to judge the statistical significance of the analysis.

Overall, the hypothesized model shows good fit to the data ($\chi^2/df = 86.44/40$, GFI = 0.95, NFI = 0.931, CFI = 0.959, RMSEA = 0.077). The model explained 60%, 24% and 62% of the variance in role ambiguity, role conflict and job satisfaction.

5.2. Direct effects

Data in Table 4 support H1a and H1b which, respectively predicted a negative association between output control and role ambiguity ($\beta = -0.24$, $p<.01$) and between output control and role conflict ($\beta = -0.25$, $p<.01$). Results, however, show non-significant effects of process control on role ambiguity and role conflict. H2a and H2b are thus rejected. The coefficients of professional control on role ambiguity and role conflict are negative and significant ($\beta = -0.50$, $p<.01$ and $\beta = -0.22$, $p<.01$, respectively), which provides support for H3a and H3b.

Contrary to expectations (H4), results point out a positive association between output control and job satisfaction ($\beta = 0.19$, $p<0.01$). Results reveal a negative, although only marginally significant, effect of process control on job satisfaction ($\beta = -0.09$, $p = 0.08$), rejecting H5. The effect of professional control on job satisfaction is found to be positive and significant ($\beta = 0.30$, $p<0.01$). H6 is thus supported.

In keeping with H10 and H11, there is a negative relationship between role ambiguity and job satisfaction ($\beta = -0.33$, $p<0.01$) and between role conflict and job satisfaction ($\beta = -0.12$, $p<0.05$). Regarding the relationship between job satisfaction and new product performance, results show a positive relationship between job satisfaction and adherence to budget and schedule ($\beta = 0.53$, $p<0.01$), between job satisfaction and product quality ($\beta = 0.44$, $p<0.01$), and between job satisfaction and market success ($\beta = 0.14$, $p<0.05$).

5.3. Indirect effects

As shown in Fig. 1, output, process and professional control may affect job satisfaction directly as well as indirectly through role ambiguity and role conflict. Estimates of the indirect effects were computed using AMOS v19. To test for the significance of the indirect effects we followed the bootstrapping method advocated by Preacher and Hayes (2004) rather than the traditional Baron and Kenny's (1986) four-step mediation approach. Shrout and Bolger (2002) and Cheung and Lau (2008) recommend bootstrapping over the Baron and Kenny's (1986) test, because the former has a higher level of

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Table 5
Standardized direct, indirect and total effects of management controls on job satisfaction.

Type of control	Direct effect	Indirect effect	Total effect
Output control	.19**	.11**	.30**
Process control	−.09	.01	−.08
Professional control	.30**	.19**	.49**

**$p<.01$, *$p<.05$ (one-tailed test). Significance levels are based on bootstrapped, bias-corrected confidence intervals.

power and reasonable control over the Type 1 error rate. Reported significance levels of the indirect effects are based on bias-corrected bootstrap confidence intervals (AMOS v.19).

Table 5 displays the direct, indirect and total effects of output, process and professional controls on job satisfaction via role conflict and role ambiguity. As we can see in the third column in Table 5, the indirect effects of output control and professional control on job satisfaction are positive and significant ($\beta=0.11$, $p<0.01$; $\beta=0.19$, $p<0.01$, respectively), whereas the indirect effect of process control is not significant. The data in the last column of Table 5 show that professional control has the strongest total effect on job satisfaction (total effect = 0.49, $p<0.01$), followed by output control (total effect = 0.30, $p<0.01$). Process control appears to have a non-significant total effect on job satisfaction. These results suggest that professional and output controls are superior to process control in terms of their impact on job satisfaction.

5.4. Moderating effects of participative decision-making

Results in Table 4 show a negative and significant interaction effect between output control and participative decision-making on role ambiguity ($\beta=-0.35$, $p<0.01$) which provides support for H7a. The predicted values of role ambiguity for high and low participative decision-making (given a medium level of output control) were analyzed following the simple slope procedure suggested by Aiken and West (1991). For NPD projects with high participative decision-making (one standard deviation above the mean), statistical testing reveals that the simple slope is negative and significant ($\beta=-0.52$, $p<0.01$). Thus, role ambiguity declines with increasing output control. In contrast, for NPD projects with low participative decision making (one standard deviation below the mean), there is no statistically significant change in role ambiguity with changing levels of output control. Results also support H7b which predicted a negative interaction effect between output control and participative decision-making on role conflict ($\beta=-0.35$, $p<0.01$). Results from the Aiken and West's (1991) simple slope procedure reveal that output control has a strong negative relationship with role conflict when participative decision-making is high (on standard deviation above the mean) ($\beta=-0.56$ $p<.01$). For low levels of participative decision-making (one standard deviation below the mean), the relationship between output control and role conflict is not significant.

Results support H8a. The interaction effect between process control and participative decision-making on role ambiguity ($\beta=0.18$, $p<0.01$) is positive and significant. The Aiken and West's (1991) procedure reveals that process control has opposite effects on role ambiguity under different conditions of participative decision-making: a positive effect when participative decision-making is high ($\beta=0.16$, $p<0.05$) and a negative effect when participative decision-making is low ($\beta=-0.22$ $p<.01$). In support of H8b, the interaction effect between process control and participative decision-making on role conflict is positive and significant ($\beta=0.26$, $p<0.01$). Findings from the Aiken and West's (1991) procedure reveal that the effect of process control on role conflict is positive and significant when participative decision making is high ($\beta=0.30$, $p<0.01$). A negative and significant effect ($\beta=-0.24$, $p<0.01$) is found when participative decision-making is low.

Table 6
Summary of Aiken and West's results.

	Participative decision-making	Role ambiguity	Role conflict
Output control	Medium	−.24**	−.25**
	High	−.52**	−.56**
	Low	.06	.06
Process control	Medium	−.03	.03
	High	.16*	.30**
	Low	−.22**	−.24**
Professional control	Medium	−.50**	−.22**
	High	−.35**	−.09
	Low	−.65**	−.36**

**$p<.01$, *$p<.05$ (one-tailed test). Significance levels are based on bootstrapped, bias-corrected confidence intervals.

H9a and H9b are supported. The interaction effects between professional control and participative decision-making on role ambiguity and role conflict are positive and significant ($\beta=0.20$, $p<0.01$; $\beta=0.17$, $p<0.05$ respectively). Regarding role ambiguity, under conditions of high participative decision-making, the impact of professional control on role ambiguity is lower than under conditions of low participative decision-making ($\beta=-0.35$, $p<0.01$ versus $\beta=-0.65$, $p<0.01$). Regarding role conflict, results from the Aiken and West (1991) procedure reveal that professional control has a negative relationship with role conflict when participative decision-making is low ($\beta=-0.36$ $p<0.01$). For high levels of participative decision-making, the relationship between professional control and role conflict is not significant.

Finally, hypotheses H7c, H8c and H9c positing a moderating effect of participative decision-making on the relationship between output, process and professional controls and job satisfaction are rejected. None of the proposed interaction effects were significant. A summary of the control, process and professional control effects on role ambiguity and role conflict at different levels of participative decision-making is shown in Table 6.

5.5. Additional analysis

An important question is whether the hypothesized direct effects differed based on the type of market served by the new product (industrial versus consumer). An additional path analysis was run which included the potential moderating effect of the variable 'type of market served' on the relationships among output control, process control, professional control, role ambiguity, role conflict and job satisfaction. Only one of the nine proposed interaction effects was significant at the 0.05 level. Particularly, a positive interaction effect was found between professional control and type of market served on role ambiguity ($b=0.11$, $p<0.05$) indicating that the negative impact of professional control on role ambiguity is slight greater for consumer products ($b=-0.58$, $p<0.01$) than for industrial products ($b=-0.42$, $p<0.01$). Importantly, the direction of the coefficients estimates for the focal variables of the study and their corresponding significance levels did not change from those reported in Table 4.

6. Discussion

Control is an important aspect of the management of the NPD process (Bonner et al., 2002; Sethi & Iqbal, 2008). Although the need for control is rarely disputed, the effect of control systems on NPD team's outcomes remains unsettled. This study offers interesting insights into the effects of output, process and professional controls on role ambiguity, role conflict and job satisfaction of NPD teams, and into the moderating effect of participative decision-making.

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6.1. Output control

Findings from our study indicate that output control has an important impact on decreasing role ambiguity and role conflict. Output control appears to motivate team members to direct attention to the goal-relevant activities and seek feedback from management, which leads to a more effective transfer of role-related information, and thus to lower role ambiguity (Challagalla & Shervani, 1996). Also, under such a system, team members are given flexibility to achieve results in their own way using their own strategies (Atuahene-Gima & Li, 2006), which reduces the likelihood of role conflict. Lower role ambiguity and role conflict lead to greater satisfaction with their job.

Interestingly, contrary to the hypothesis, the use of output control seems to have a positive direct effect on job satisfaction. A plausible explanation for our result could be that whereas output control may potentially increase the level of performance risk and job tension for project team members (Atuahene-Gima & Li, 2006); it also has the benefits of providing team members with a substantial degree of autonomy and independence in how they execute their tasks (Rijsdijk & van den Enden, 2011); which has been positively linked to job satisfaction. For example, Jassawalla and Sashittal (2000) report that NPD teams which enjoy high levels of autonomy are more satisfied with their jobs. It therefore appears that the use of output control can enhance job satisfaction by giving NPD team members a great amount of autonomy and independence to perform their duties.

In keeping with our hypotheses, findings from the study suggest that output control is more likely to decrease role ambiguity and role conflict when NPD team members have a strong participation in decision making.

6.2. Process control

Although the main effects of process control on role ambiguity and role conflict are not significant, the current study results suggest that the use of process control with active participation by project team members in decision-making can lead to higher role ambiguity and role conflict. Feelings of role conflict and ambiguity are likely to arise insofar as NPD team members perceive that they have to struggle to reconcile the high levels of monitoring and direction associated with process controls with their presumed higher influence over the various aspects of their job.

Contrary to expectations, we found a marginal negative relationship between process control and team job satisfaction. It should be noted that the negative effect of process control on job satisfaction of NPD teams is at odds with stipulations made by several researchers (Cravens et al., 1993; Oliver & Anderson, 1994) that the more a control is behavior based, the more satisfied employees will be. Based on our results, it appears that process control can foster team members' dissatisfaction. Unlike output control, the use of process control imposes strict guidelines on which activities and procedures are to be performed during the development of new products and how they should be performed, limiting team member autonomy. Moreover, under a process-control setting reward decisions are likely to be subject to the personal biases of supervisors, because supervisory evaluations of how team members perform tasks are typically subjective (Anderson & Oliver, 1987). Such perceptions of subjectivity/unfairness in the reward and evaluation process may be difficult to dispel and can have a negative influence on job satisfaction (Sarin & Majahan, 2001).

6.3. Professional control

Our results show that professional control has a positive impact in fostering NPD team's job satisfaction directly and indirectly via role ambiguity and role conflict. It is worth noting that the results obtained here indicate that of the three types of control examined, professional control has the strongest total effect on increasing job satisfaction. Moreover, results indicate that professional control is more likely to reduce role ambiguity and role conflict when team's participation in decision-making is low. To the extent that team members participate or have influence on defining the project's goals and objectives, project's deadlines, team's budget, and the format of progress review, team members will feel they have the information necessary to perform their role adequately, and therefore, will rely less on peers for job-related discussions or appraisals of their job.

Finally, the findings indicate that participative decision-making does not moderate the relationship between output, process and professional controls and NPD team's job satisfaction. None of the three interaction effects hypothesized for participative decision-making were significant. This may be in keeping with literature suggesting that the key benefit of employee's participation in decision-making is the cognition effect (e.g. participation in decision making gives employees explicit knowledge of where to direct their efforts) not the motivational effect (Latham & Locke, 1991). Rather than serving a socio-emotional role, participation in decision-making appears to serve a task role (Jackson & Schuler, 1985).

7. Managerial implications

From a managerial perspective, findings from this study suggest that management controls can exert an important influence on role expectations and job satisfaction. The findings are of great significance to new product managers in view of the positive relationship between job satisfaction and new product performance (adherence to budget and schedule, product quality and market success). There are two important implications for NPD managers:

First output, process and professional controls have differential implications in role conflict, role ambiguity and job satisfaction. Our results inform new product managers that the use of output control (i.e., establishment, monitoring and evaluation of performance goals for the NPD project) leads to lower levels of role conflict and role ambiguity and higher levels of job satisfaction. The clear goals and team member autonomy that result from outcome controls help reduce role ambiguity and role conflict and increase job satisfaction.

Professional control has an even greater effect on decreasing role stress, and increasing job satisfaction than output control. This positive effect suggests that NPD managers should promote opportunities for team members to engage in collegial interaction, discussion, and evaluation of each other's work.

Unlike output and professional control, the use of process control (i.e., specifying the appropriate behaviors and processes in which project team members must engage) does not appear to have an impact on role ambiguity and conflict; however it can potentially harm team's job satisfaction. Therefore, managers should reduce the reliance on process controls and use them only when deemed necessary.

Second, managers should consider the potential implications of participative decision-making on the efficacy of management controls. The study's results suggest that team's involvement in decision-making (by participating in the determination of the project's goals, budget and schedule and progress review format) can have a different effect on the efficacy of output, process and professional controls to reduce role ambiguity and role conflict. Thus, managers are advised to adjust team's participation in decision-making to match the type of control system in place.

In particular, our study indicates that output control becomes more effective at reducing role ambiguity and role conflict when NPD team members are actively involved in decision-making about the NPD project. Therefore, under an output control system, managers are well advised to solicit and pay attention to team members' opinions and inputs about what process requirements and outcome

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objectives would be most appropriate for a given NPD project. Professional control, however, becomes less effective at decreasing role conflict and role ambiguity when NPD team members are engaged in decision-making. Therefore, in order to obtain favorable outcomes under a professional control system, managers should not promote team members' participation in decision-making.

The effect of participative decision-making seems most drastic on process control, where the participation or lack of participation in decision-making by team members can make drastic changes on the effect of process control on role ambiguity and role conflict. More specifically, our study reveals that when NPD team members are little involved in decision-making, using process control can help decrease role ambiguity and role conflict. However, the opposite effects arise when team members are actively involved in project-related decisions.

8. Limitations and future research lines

The present study has several limitations. First, caution must be exercised in drawing cause–effect inferences because of the cross-sectional research design employed. Second, the study relied on retrospective accounts of NPD projects, which can result in some distortion of the facts. Third, a single key informant provided the data in each company, thus introducing the possibility of common method bias. Although results from the tests realized in the methodology section suggest that this bias is not a major problem in our sample, we cannot entirely rule out this possibility. Different key informants should provide the data for independent and dependent variables in future studies to avoid this problem. Fourth, the response rate is relatively low. Still, there are some reasons to believe that the response rate did not jeopardize the representativeness of our sample. Thus, Armstrong and Overton's (1977) test provided some indication of the absence of non-response error and the sample was representative of the population in terms of industry sectors and company size. Finally, the fact that the senior executives responsible for new product development activities at each company served as key informants for the study raises some concerns about the accuracy of the information obtained for role conflict, role ambiguity and job satisfaction of NPD team members. In this respect, it is possible that our data reflect managers' perceptions of NPD team's role conflict, role ambiguity and job satisfaction rather than the perceptions of the NPD teams themselves.

Several lines of future research can be suggested. First, future research conceptual definitions of control suggest that control has two major dimensions - information (i.e., goal setting, monitoring and feedback) and reinforcements (i.e., rewards and punishments) (Anderson & Oliver, 1987; Challagalla & Shervani, 1996). Future research might investigate the independent effects of the information and reinforcement dimensions on role expectations, job satisfaction and NPD performance. Second, future research could advance the study of the relationship between control and job satisfaction by evaluating the role of other intermediate variables. For example, in the case of process controls, relevant intermediate variables include loss of flexibility and discretion, and negative perception of fairness and trust. The intermediate variables relevant for output control include felt pressure, transfer of risks to the employee, and perceived lack of supervisory direction (Ramaswami, 1996). Third, individual differences (e.g. team members' experience) and context variables (e.g. environmental turbulence) might offer additional refinement and clarity regarding the control-job satisfaction relationship. Finally, although this study assumed that output, process and professional controls constitute distinct control forms, they may not be mutually exclusive and hence may be implemented together (Agarwal & Ramaswami, 1993). Future research should investigate how different combinations of control may influence employee responses and NP performance (Kirsch, 1997).

Acknowledgments

The authors gratefully acknowledge the financial support from the Spanish Ministry of Education and Science (SEJ2006-08854/ECON) and of the Regional Agency of Science and Technology of the Murcia Region-Foundation Seneca (08663/PHCS/08).

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Please cite this article as: Carbonell, P., & Rodriguez-Escudero, A.I., Management control, role expectations and job satisfaction of new product development teams: The moderating effect..., *Industrial Marketing Management* (2012), http://dx.doi.org/10.1016/j.indmarman.2012.08.007

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