Senior Management Support in the New Product Development Process

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This paper studies the relationship between senior management support to new product development activities by means of a quantitative and qualitative analysis of questionnaire and interview data collected in the United Kingdom and the Netherlands. The quantitative analysis showed that there is a small to medium association between senior management support to new product development and project performance in the dimensions of time, cost, and end product quality. The qualitative analysis suggests that these weak links could be explained by separating the influence of senior management support on new product development activities into direct and indirect effects. Direct effects include issues such as the use of multifunctional senior teams and process champions, whereas indirect effects include issues such as organization mission and goals, and learning and knowledge management systems.

Introduction

One factor contributing to successful new product development activities is believed to be the support provided by senior managers to new product development teams (Brown & Eisenhardt, 1995; Maidique & Zirger, 1985). Despite the unanimous recognition that a supportive senior management team positively influences performance, there is a surprisingly lack of knowledge about *what* are its effects on different performance variables and *how* it takes place. The current paper addresses two related questions. Firstly it uses questionnaire data in order to examine the relationship between senior management support and various performance measures, namely time, cost, and end product quality. Secondly, the paper explores how senior management support to product development projects is felt by team members, further describing the ways through which such support occurs in innovative organizations. This question is investigated by means of a qualitative analysis to interview data collected with team members and project managers.

Senior Management Support in a product development context

It is generally accepted by the current innovation literature that the organization and management of new product development is a key strategic issue in an increasingly global and fast-changing business environment (Griffin, 1997). Companies in almost all industrial sectors face the challenge of coping with rapid technological change, shorter product life cycles, and higher complexity in the business system, characterized by a move from products developed in isolation by research and development or marketing, towards projects carried out in a seamless global firm, with multifunctional teams involving internal and external (e.g. suppliers, customers and contracted out research and development or manufacturing) parties from several countries.

Within this context of kaleidoscopic dynamics (Rogers, 1996), the drive is for truly innovative companies to develop unique- and customized-products delivered at low prices, with quality and before its competitors. This strategic reorientation with emphasis put on

uniqueness and innovativeness (Kumpe and Bolwijn, 1994) requires individuals and organizations to constantly create not only new and improved products and services, but also to recreate themselves through learning and knowledge. One of the factors with a strong impact on this process of continuous innovation (Bartezzaghi et al. 2001) is a company commitment to, and involvement with, innovation, which starts at the very highest level in the hierarchy.

The key role of senior management in innovation success has been highlighted since the 1970s. In fact, both the SAPPHO (Rothwell *et al.*, 1974) and the NewProd studies (Cooper, 1979; 1980) found that successful innovative firms have a top leadership committed to innovation and product development. Such commitment is defined by Brown and Eisenhardt (1995) as the provision of financial and political resources to the project team. McDonough (2000) suggests that top managers help cross-functional teamwork by a variety of means, such as demonstrating commitment, helping the team to surmount obstacles, making things happen, and providing encouragement to the team. Similarly, Emmanuelides (1993) proposes that development teams depend heavily on top management for acquisition of necessary resources, approval of design proposals, securing of required legitimacy, and delegation of necessary decision-making authority. Further, the author proposes that a product development strategy should state, implicitly or explicitly, the objectives of the development programme and the importance of performance dimensions for any given project. Song *et al.* (1997) found a positive impact of senior management support (measured as the promotion of team loyalty over functional loyalty) on interfunctional cooperation. Jassawalla and Sashittal (1998) say that the sense of urgency about product innovation and the priority conveyed by the organization to new product development are strong contributors to the financial success of the company. The authors define this high priority in terms of initiation and allocation of resources to product innovation activities. According to Dvir et al. (1998) and Hobday (1998), such support is important for all types of projects or products.

The emphasis placed by the company on the pre-stages of the development process also reflects the supportive role of senior management. Gupta and Wilemon (1996) report the results of a survey to 120 technical directors from technology-based companies; they found that one key factor in successful innovation is senior management support to various technical activities. Cooper and Kleinschmidt (1995) speak of a unified, clear and well-communicated new product strategy for the company and particularly for those involved in new product development. Similarly, in a comparison of four companies, Donnellon (1993) found that the most successful one had a conscious intent to develop a more entrepreneurial, collaborative culture, whereas the others focused solely on speed and efficiency goals.

Research Objectives

The majority of the studies referred to above assume a positive impact of senior management support to new product development activities on performance. However, there is neither strong empirical evidence for this relationship nor does the existing literature specify how senior managers, which are committed to innovation, affect different performance measures. Also from the above discussion, it can be concluded that knowledge on the means used by senior managers to support product development activities is still very fragmented and disorganized. In fact, studies often seem to forget how the main actors feel and think about the issue; this leads to an incomplete and context-independent picture of the phenomena under discussion.

With the growing importance of innovation in the organization survival and development, a greater involvement of senior managers in the new product development process is likely to occur; as a result, the aforementioned problems suggest some important questions for research. The current study addresses two research objectives. The first objective is to investigate the relationship between senior management support to new product development and different performance measures. At the project level of analysis, the measures considered in this research were time, cost, and end product quality (Brown and Eisenhardt, 1995; Emmanuelides, 1993; Griffin and Hauser, 1996). It is expected that:

H: Senior management support to new product development activities is associated to a) product development time; b) product development cost; and c) end product quality

The second research objective is to investigate the means used by senior managers to encourage and promote successful new product development activities, as perceived by those involved in the innovation process, namely project managers and project team members. As this research question has

an exploratory and descriptive nature, no research hypotheses are formulated.

Method

The study was carried out in two steps. The first phase aimed at answering the first research question, and involved a survey of 55 project managers working in 40 companies operating in the UK and the Netherlands in the following industries: chemicals, pharmaceuticals, electronics, telecommunications, toiletries and detergents, cosmetics, and domestic appliances. A structured questionnaire was used to collect information regarding the two variables of interest: senior management support and new product development performance. Respondents were asked to select a project that had been recently terminated and involved a multifunctional team (a team constituted by commercial and technical functions) and then respond to a number of sentences in relation to that project.

The first variable was created based on four sentences taken from Cooper and Kleinschmidt (1995), to measure the degree of support to the project under analysis; with regards to performance, six items were adapted from works by Song and Parry (1992), and Song et al. (1997), to measure the degree to which the goals of time, cost, and end product quality were attained in the particular project (Appendix 1). All the variables were measured on a 5-point Likert scale, and reviewed by two academic peers for clarity and simplicity. Despite the small sample, both scales were submitted to exploratory factor analysis, which revealed two distinct factors for the senior management support variable and three factors for the performance variable. The performance factors correspond to the three expected dimensions of time, cost, and product quality; the two support factors were labeled Resources and Commitment. The first factor reflects the degree to which senior management makes available enough resources to product development; the second is concerned with the degree of commitment that senior managers have towards product development. A value of 1 in these two scales indicates that senior management did not dedicate enough resources or was not sufficiently committed to the particular project; a value of 1 in the performance scales indicates that the product: a) was launched before time; b) cost less than budgeted; and c) was of lower quality than expected. Appendix 1 shows the results of reliability, factor analysis, and sample comparison.

The second phase of this study aimed to answer the second research question and was based on 70 interviews conducted in the UK with project team members and project managers from the same type of industries used in the first stage. 25 companies are represented in this second sample. The collection of data was done through interviews focusing on the personal experiences of managers and team members involved in product development. Interviews were structured around the relevant topics for research, but unstructured as regards what interviewees chose to emphasise. The design of the interview protocol and corresponding topics for collecting information was the result of both literature review and two pilot case studies.

Interviewees were asked to report their experiences in relation to recently finished or close to the end projects. The main informants were project leaders and team members, but there was also information collected via interviews with people responsible for the product development process, documents, and external sources (e.g. companies databases). The interview data was analysed through content analysis; the goal of the analysis was to explore and describe the actors' views and feelings with regards to senior management support, and not to develop theory or confirm existing models.

Results

The results are reported in two sub-sections, corresponding to the two research objectives.

Relationship between senior management support and new product development performance

Multiple regression was the main technique used to analyse the relationship between the two variables. Several regression analyses were performed in search for the models with the best fit. The particular performance variable was the dependent variable, whereas Resources (Reso) and Commitment (Comm) were the two independent variables. Table 1 shows the main results.

The table shows some interesting results. Firstly, the percentage of variance of the dependent variable explained by senior management support varies between 25% for product development time and only 1.3% for end product quality. In other words, the support given by senior management to the product development process is responsible for only a small part of the final outcome, with an impact on the time needed

Table 1. Influence of Senior Management Support on New Product Development Performance: Final Estimated Regression Models

	Fit	Equation	Partial correl.	Simple correl.
PD Time	$R^2 = 0.251$ $F_{(2,48)} = 8.023$**	Time = 5.69 − 0.33(Reso) − 0.26(Comm) (t = −2.41*) (t = −1.86NS)	Reso: −0.33 Comm: −0.26	Reso: −0.32* Comm: −0.40*
PD Cost	$R^2 = 0.159$ $F_{(2, 48)} = 4.489$*	Cost = 5.32 − 0.17(Reso) − 0.30(Comm) (t = −1.13NS) (t = −2.02*)	Reso: −0.16 Comm: −0.28	Reso: −0.28* Comm: −0.35*
End product quality	$R^2 = 0.013$ $F_{(2, 48)} = 0.321$NS	Qual = 3.15 + 0.09(Reso) + 0.04(Comm) (t = 0.59NS) (t = 0.24NS)	Reso: 0.03 Comm: 0.12	Reso: 0.09 Comm: 0.08

* $p < 0.05$
** $p < 0.001$
NS= no statistical differences found

to take a product from idea to commercialisation and on the costs of carrying out the project, and no significant influence with regards to the final quality of the product. These results suggest two implications. Firstly, the relatively small R^2 values indicate that other variables not included in the study also account for developing a product within predicted time and cost. Second, the support given by senior management seems to have a stronger effect on those performance measures that are directly related to the new product development process itself, such as time and cost, than to one of its outcomes, such as end product quality. In fact, the analysis did not reveal any significant impact of the variable senior management support on the quality of the final product. Overall, these results support hypotheses a) and b), but fail to support hypothesis c). The simple correlations shown in the table confirm these conclusions: all the correlations between performance and the two dimensions of senior management support are medium and significant for time and cost, but weak and non significant for end product quality.

On the other hand, the impact is more important on time ($R^2 = 0.251$) than on cost ($R^2 = 0.159$). When senior management gives the necessary support to a project, it is more likely that the particular project is developed within the predicted time than within the predicted costs.

With regards to the differential effects of the two support factors on performance, the stronger impact of Resources ($\beta = -0.33$) than Commitment ($\beta = -0.26$) on product development time, means that when the goal is to develop a product within predicted time, senior managers give their support mainly through making available enough resources to a particular project; less important to developing a product within predicted time seems to be the degree of senior management involvement on the project. This means that more resources pulled into a project in terms of available people is an important condition to deliver a project that meets the original goal of time to market. Conversely, when the goal is to develop a product within the predicted cost, the most important dimension is the level of senior management commitment to new projects and involvement in the Go/Kill and spending decisions for new projects ($\beta = -0.30$).

Forms used by senior management to support product development projects

Figure 1 summarizes the means used by senior management to support new product development projects as perceived by project team members. The figure shows the specific practices identified in the case material. These practices are briefly presented in the main text below with a few examples from the interviews.

The specific practices identified in the data can be grouped into direct and indirect influences of senior management on projects. The first category defines those actions directly exerted by senior managers on the project. The second category specifies those actions, which have an impact on the context. The indirect influences can further be divided into organisation and process actions.

Direct influence of senior management on new product development projects

The data shows that direct practices can take many forms:

- Multifunctional senior teams that act as gatekeepers and get involved in the project reviews and go/kill decisions at the vari-

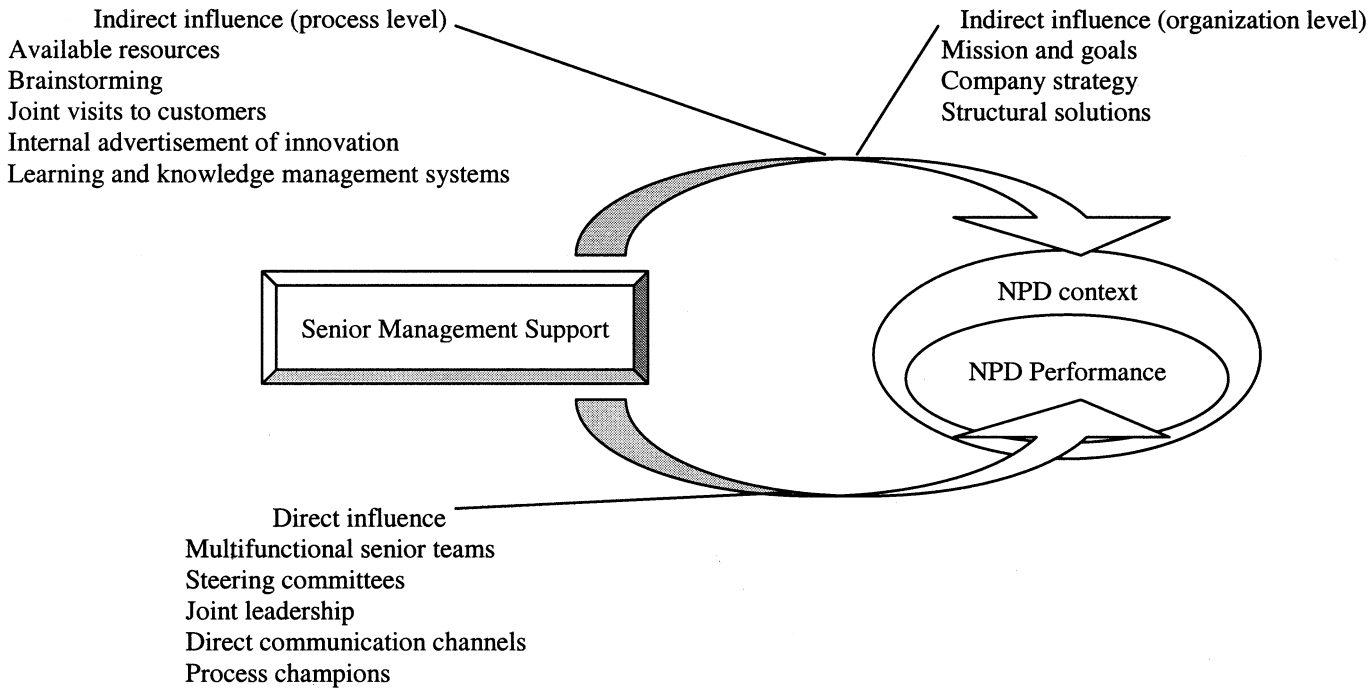

Figure 1. Senior Management Support to New Product Development: Perceived Practices

ous milestones of the new product development process;
- Steering committees to decide on idea prioritization, resource allocation, and other strategic decisions directly related to new product development;
- Joint leadership between senior managers and project managers;
- Direct communication channels promoted by flat structures which allow quicker and easier communication channels between team members and senior management;
- Process champions – these are different from project champions insofar that these are senior individuals that are responsible for implementing and maintaining a structured new product development process in place.

Indirect influence of senior management on new product development projects: organization level

At an organization level, interviewees feel more support to new product development from senior management through a number of ways:

- Mission and organization goals: one of the strongest ways to emphasize a company's commitment to innovation is through its mission and goals. Excerpts of the new mission statement of one company involved in the electronics industry reads: 'To exceed our customers' expectations through innovation, quality and total service (...) through high quality people and superior teamwork (...); to foster teamwork and individual achievement within a culture of empowerment and accountability'. Similarly, in one company manufacturing control systems, one of the goals is to develop products that were not in production two years ago, thus showing the firm's strong commitment to innovation.
- Strategy: increasingly companies are focusing on what the market needs and wants instead of developing technically perfect products for which little market application may exist or responding to sales people without first assessing the potential of a particular request. For example, after spending millions in a project, a company operating in the electronics sector decided to kill the project because a small competitor had arrived first in the market with a similar product. A decision was also taken to buy the company that actually arrived first in the market, therefore bringing in-house the rights for exploring commercially the new product.
- Structural solutions: in some other cases, the strategic emphasis on innovation is translated into the company structure which, by its turn, sends a strong message in terms of the need to innovate. For example, the purpose of the newly created

Strategic Planning and Corporate Learning Department of a firm making components for the automotive industry is to boost innovation and bring unity to the way the company generates new ideas and develops projects. Similarly, one of the goals for the creation of one of the companies in the sample (just one year previous to the interviews taking place) was to explore the market applications of a particular technical innovation.

Indirect influence of senior management on new product development projects: process level

There are several examples of potential indirect actions carried out by senior managers to influence the way the new product development process itself operates:

- Available resources: in virtually all cases, the availability of resources was said to be an important condition to successful new product development. The more resources – people, money, production facilities, etc. – are pulled into a project, the likely it is to be developed within the initial goals of time and cost. Also in all cases interviewees suggested that this was one of the most difficult issues to tackle, as projects are not developed in isolation in the company; other business systems (e.g. hierarchical organization) and product portfolio management (e.g. existing product platforms) are just two of the constraints to take into consideration during resources allocation.
- Brainstorming/idea generation sessions: in an interview published in a trade journal, the international technical director of a domestic appliances manufacturer said 'What distinguishes [the company's product development process] from other cross-functional design efforts is that it involves marketing, design, and engineering before there is a firm product concept, never mind a timetable for the product's development'. During the interviews conducted in this firm, it became clear that this quote was referring to the brainstorming sessions regularly held by the company. These special meetings are regularly held by people from the abovementioned functions and sometimes customers and senior management; the goal of these meetings is not only to generate ideas for new projects, but also to define the fit of a new project into the company's new product development and innovation strategy.
- Joint visits to customers: in a tandem interview with the Scientific Consultant and a Senior Analyst in a chemicals manufacturer, it was recognized that, although technology-driven, the company – through its senior management team – is increasingly promoting joint visits to customers held by technical and commercial people. This was said to be important to getting technical people closer to the market and to making them more aware of commercial and sales issues. This is also important because, as said by a project manager, it allows technical people to challenge sales and marketing people's assumptions and hence generate ideas for new projects.
- Internal advertising of team achievements: an internal document provided by a gas producer is entitled European Innovation Awards. The document shows pictures of the teams that successfully developed a new idea in one of three areas: technical innovation, innovation in business, and innovation in operations technology. The Director of Innovation explained that this 8-page leaflet is sent to everybody in the company in order to publish the internal scheme of promotion of innovation. A hidden message for encouragement of teamwork can however be seen throughout the whole document, for example in the photographs and identification of the winning teams.
- Learning and knowledge management systems: these are usually computer-based systems through which any employee in the company can submit an idea for a new project. At the firm making components for the automotive industry, a new intranet system had just been introduced, with the aim of boosting not only the number of ideas for new projects, but also the level of knowledge sharing in the company. The system architecture had been conceived by an employee who then had all the support of senior managers to develop the project into an Idea-Generation and Learning system.

Discussion and Conclusions

Overall, this research has shown that senior management support to new product development projects is an important aspect for project performance, thus confirming the propositions of authors such as Cooper and Kleinschmidt (1995), Dvir *et al.*, (1998), and Emmanuelides (1993). However, this work has also revealed that the magnitude of this relationship varies with the particular goal of the project. For instance, a strong senior leadership contributes more to developing a product within time than within predicted

costs. Furthermore, the quantitative data indicates that senior management support is not the only predictor of project performance, and is not relevant at all when the quality of the end product is the goal to attain. Other variables not included in this study help explain project performance, such as the use of multifunctional teams and the matrix structure (e.g. Brown and Eisenhardt, 1995; Griffin, 1997). These factors are well described in the literature, however less information exists with regards to how they affect the relationship between senior management support to new product development activities and project performance. The moderate and mediator effects of such factors can be addressed by future research.

Notwithstanding these weak to medium-size links between the two central constructs of this study, the qualitative phase of this research shows that senior management has a much wider influence on projects than the direct actions undertaken during project reviews or Go/Kill decision gates. In fact, the analysis suggests that senior management has an indirect influence on successful innovation and product development by operating upon the context – organization and process elements – on which project and team activities unfold. Some of the mechanisms shown in the previous section have already been addressed by the literature – e.g. available resources –, but others emerged in the analysis – e.g. learning and knowledge management systems – that recommend a further exploration of the relationship between these mechanisms and the concepts used in this study.

If on one hand the findings of this work call attention to future research lines with regards to new product development and support from senior management, on the other, they are also revealing for what they do not show. For example, the results show the absence of direct or indirect actions undertaken by senior management with regards to the development of joint reward systems. This contradicts authors such as Griffin and Hauser (1996), who have proposed that joint reward schemes are an important determinant of project success through its effect on team motivation and other individual and group variables. The majority of the organizations observed in the current research do not use group reward systems; instead they recognize and promote individual- and functional-related performance. This finding needs further research to clarify why senior management does not foster the use of group reward systems within new product development projects.

To conclude, this paper has shown that the role and intervention of senior managers on the product development process is more complex than previous research has suggested. The increasingly strategic importance of innovation in the organization growth and renewal call for a deeper and wider understanding of the topics studied in this work. If the findings here reported have provided some answers, they have also raised some questions that need future attention from managers and academics.

Appendix

Table A1. Reliability and Factor Analysis of the Senior Management Support Scale

Original item in the scale (based on Cooper and Kleinschmidt, 1995)		Empirical structure	
	α	F1	F2
1. In this organisation, senior management devotes the necessary resources to achieve the firm's new project objectives		.76	
2. New product development is being carried out with the necessary people in place, and they have their time freed up for new projects		.94	
3. Senior management is committed to new projects			.73
4. Senior management is involved in the key Go/Kill and spending decisions for new projects			.94
	Eigenvalue:	2.3	1.1
	% total variance:	56.7	27.3
	% cumulate variance:	56.7	84.1

Table A2. Reliability and Factor Analysis of the New Product Development Performance Scale

Original item in the scale (based on Song and Parry, 1992, and Song et al., 1997)	Theoretic structure	α	Empirical structure F1	F2	F3
1. Compared to the initial goals, this project took a long time to develop	Time				.95
2. Compared to other projects, this project took a long time to go to market			.62		
3. Compared to the initial goals, this project had higher costs to develop	Cost		.86		
4. Compared to other projects, this project had higher costs			.88		
5. Compared to the initial goals, this project ended up by being of better quality	Quality			.88	
6. Compared to other products, this product is of better quality				.90	
		Eigenvalue:	2.1	1.6	0.8
		% total variance:	35.6	27.4	13.9
		% cumulate variance:	35.6	62.9	76.8

Note: item 2 does not load on factor 3, as expected. For this reason, the variable Time is composed of item 1 only, whereas Cost and Quality were calculated as the average of the two correspondent items.

Table A3. Sample Comparison

Sample mean and (standard deviation)	**UK (N=35)**	**Netherlands (N=20)**	**t-test**	**Mann-Whitney Z**
Support to new product development activities				
Adequate Resources	3.2 (0.88)	3.1 (0.96)	0.76	0.73
Senior Management Commitment	4.1 (0.74)	3.7 (0.85)	1.63	1.44
Performance				
Time	2.7 (0.63)	3.0 (0.90)	−1.41	1.38
Cost	3.1 (0.89)	3.1 (1.25)	0.20	−0.21
Quality	3.7 (0.53)	3.2 (0.71)	2.96*	2.82*

*$p < 0.05$

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