International Food and Agribusiness Management Review
Volume 18 Issue 4, 2015

Senior Management's Influence on New Product Development Projects and Firm Performance in Small and Medium-Sized Food Companies

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Abstract

This paper analyses direct and indirect effects of senior management behavior on the success of new product development projects and firm performance. To examine these behaviors, a PLS-structural equation model is applied to survey data collected from R&D-managers of small and medium-sized food and drink companies in Germany. Results found that project planning and process performance are able to mediate about 50% of the total impact of senior management support on project performance, with project planning being the more important mediator. Effects on firm performance are also largely mediated through its antecedents in the proposed model.

Keywords: new product development; innovation management; top management activities; resource allocation; SMEs

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Introduction

Continuous development and continual new product-launches are considered two important elements in a firm's formula to achieve sustainable success (e.g. Cooper 1994, Hauser et al. 2006). Over the last decades a vast amount of literature has identified the factors influencing successful new product development (NPD) projects (for an overview, see Evanschitzky et al. 2012, Henard and Szymanski 2001, Montoya-Weiss and Calantone 1994). One factor critical to the success of major innovation outcomes, is senior management support. In general, senior management support is defined as the "degree of senior management support [provided] for a new product initiative" (Evanschitzky et al. 2012, S. 37) . Based on this definition, most of the previous studies have focused on direct effects of senior management support on NPD success or on other factors that were hypothesized to influence NPD success. For example, Akgün et al. (2007) demonstrated that stress and crises with project teams increase NPD-success, but only when senior management support is high. Another study showed that a high degree of senior management support has strong positive impacts on financial success, design quality and achievement of time sensitive goals of NPD projects (Swink 2000). However, the positive effects on financial success were moderated by the degree of technological innovation. Thus, in this example senior management support was moderated by a third factor. Effects of senior management support on NPD success were also investigated with a special focus on the food industry. For example, Hoban (1998) as well as Kristensten et al. (1998) detected positive direct effects of senior management support while Stewart-Knox et al. (2003) did not find such a positive effect on the success of new low-fat products.

These and other studies on senior management support undoubtedly provide valuable insights for managers inside and outside the food industry, especially because management practices and principles do not differ significantly between the food sector and other industries (Anderson 2008). On the other hand, previous studies have two important limitations that we seek to address with the present study. First, as described above, only direct and moderating effects of senior management support were addressed in the past. As a consequence, the potential presence of indirect effects of senior management support on NPD and firm performance was ignored, which could lead to an underestimation of senior management's total impact on various success factors. In other words, as NPD and firm performance are just the final outcome variables, it seems likely that senior management support is not only directly relevant for NPD success, but is essential to the outcome and success of different stages preceding NPD and firm performance, such as project planning and the realization of an NPD project. Secondly, although we acknowledge the argument that management practices do not differ significantly between industries (Anderson 2008), there are important specialities with food manufacturing companies that are relevant to the outcome of innovation studies. For example, within the food industry, primarily new products with a relatively low level of newness are developed (Menrad 2004, van Trijp and van Kleef 2008). Additionally, product newness itself was found to have a significant direct and moderating effect on new product performance (Gielens and Steenkamp 2007). Therefore, when not controlling for the different levels of innovativeness in different industries, the results are likely to be biased or misinterpreted.

Based on the described limitations, the present study analyses how senior management support influences the different phases of NPD projects as well as both project performance and the

overall performance of the company. Compared to previous studies, we focus on the direct and indirect effects of senior management support. Therefore, this study demonstrates that the decisions and behaviours of senior management have *direct and indirect* effects on the various stages followed by all NPD projects. So, the study may help senior managers within the food and drink sector better understand the overall importance of their role in contributing to NPD success.

To test the proposed hypotheses and assumptions of this paper, data from SMEs in the German food and drink industry are analysed. SMEs were chosen for two reasons. First, about 99% of companies in Europe's food and drink industry fall within the definition of SMEs (FoodDrinkEurope 2013) which means that our study is able to address the majority of the food (and drink) companies. Secondly, SMEs are thought to have flatter hierarchies with CEOs and senior management teams participating to a greater degree in the operational implementation of strategies (Lubatkin 2006).

This paper is structured as follows. First, we present an overview of the proposed model and draw attention to the operationalization constructs of the model used in the study. We then describe the constructs in more detail and formulate hypotheses concerning both direct and indirect construct relationships. The methodology section is followed by the presentation of the model results. Finally, the results are discussed, followed by the conclusions and implications for management.

The Model

In order to achieve the overall goal of this paper, i.e., to demonstrate the direct and indirect effects of senior management support on NPD and firm performance, we formulate a structural equation model that includes five substantive constructs (see Figure 1). As this paper focuses on operational senior management support rather than on strategic guidance, we call our main construct operational managerial responsibility (OMR). OMR is conceptualized as a higher-order construct consisting of two lower-order constructs which are referred to as team resource allocation (TRA) and cooperation (COOP). The reasons for this conceptualization follow. Innovation is considered a complex process in which existing knowledge is used to generate innovation outcomes, such as new products, services, procedures or new knowledge (Brown and Duguid 1991, Lee et al. 2003, Mors 2010). However, existing knowledge is spread across the firm and not accessible in every situation. Therefore, teams have to be assembled by the senior management in order to receive the necessary knowledge which is fundamental for successful innovation projects (Bonner et al. 2002, Koch 2012, Sears and Baba 2011). However, such cross-functional integration in the form of team foundation is not sufficient to describe the sub-construct of TRA. Teams must be given different levels of competence (Koch 2012). The organizational structure which defines the rules for the allocation of these competences is under managerial control (Droge et al. 2008). Since upper management is responsible for the allocation of autonomy, time and money, these sub dimensions are also included in the TRA construct (see Table 2).

The second lower-order construct of OMR is cooperation (COOP), which includes functional cooperation as well as managerial involvement. Although teams are formed to incorporate

necessary knowledge into the innovation project, communication and cooperation between functions seem to be stumbling blocks (Koch 2012). Managerial involvement is important because communication and knowledge transfer are not accompanied by the formation of cross-functional teams alone. As the governing authority, it's upper management's role to model cross-functional communication and cooperation in order to create an atmosphere where communication networks can flourish.(Henard and Szymanski 2001).

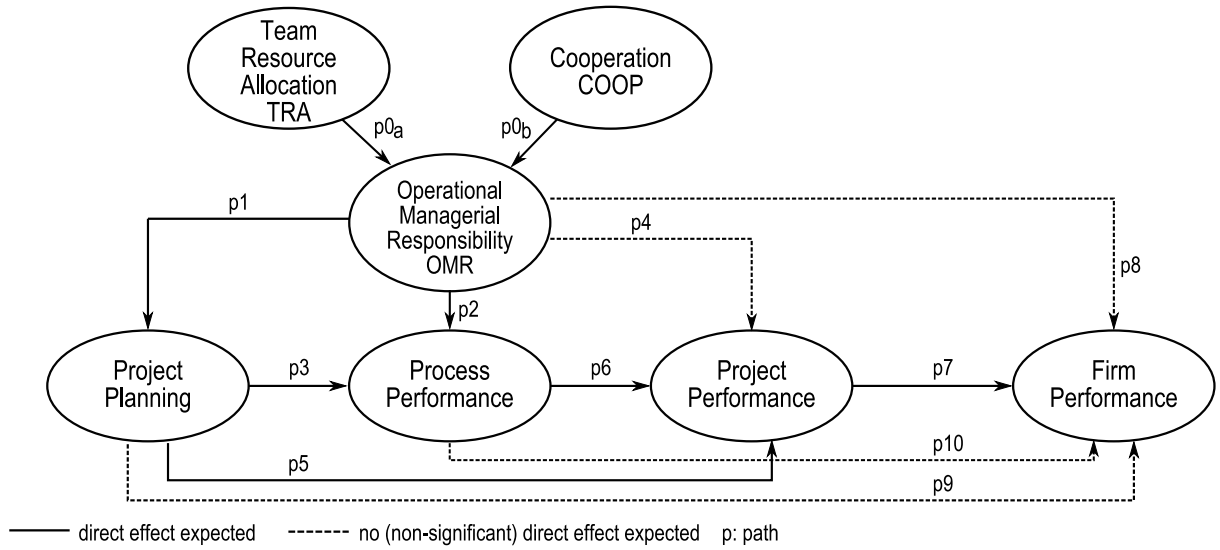

Figure 1. Proposed Relationships between Model Constructs.

Direct Model Relationships

The major objective of this paper is to illustrate the direct and especially the indirect ways in which the actions of senior management affect project and firm performance. To detect indirect effects, the direct effects of outcome variables on antecedents need to be demonstrated. Therefore, project planning and process performance are included as antecedents of project performance and firm performance. We expected OMR and its sub-dimensions to have positive direct effects on project planning and process performance as well as indirect effects on both project performance and firm performance (see Figure 1).

Project planning can be defined as the intensity of planning activities prior to the realization of a NPD project. We argue that project teams which are given adequate time, money and decision-making autonomy are more likely to create and use comprehensive project plans to underpin their NPD projects. For instance, cross-functional knowledge (which is covered in the TRA construct) is already a requirement at this stage and should support planning outcomes (Thieme et al. 2003, Verworn 2009). Cross-functional communication further facilitates effective planning by overcoming conflicts that may arise due to differences in cultural origin, personality or ways of thinking (Thieme et al. 2003). Thus OMR and its sub-dimensions should have a positive impact on project planning.

Project planning is directly followed by the realization of the NPD-project (Khurana and Rosenthal 1997). In our study we call this stage process performance. The overall goal in this phase is to convert new ideas into new products. However, teams should (a) stay within defined budgets and deadlines (Sáenz et al. 2009); and (b) make constructive use of external contacts and suggestions (Cooper and Kleinschmidt 2011, Menrad 2004). Both, team motivation and good communication play a major role in this phase of the NPD project. The use of cross-functional teams should facilitate the use of external contacts and suggestions because such team members bring diverse external experiences from their day-to-day operations. For example, marketing and sales personnel cultivate contacts with potential customers and should therefore be able to contribute information on present and future customer requirements. Purchasing agents, on the other hand, could have information on the latest production techniques or packing materials that could potentially be incorporated into the project-realization phase. As in project planning, communication and cooperation also support good process performance. The participation of senior management and the reinforcement of good communication should contribute positively to team performance in the project-realization phase. Furthermore, senior management plays a supervisory role that helps to keep innovation projects on course and in line with strategic goals (Cooper and Kleinschmidt 1995). Thus, both dimensions of OMR should have positive effects on process performance.

We further expect process performance to be positively affected by project planning. The association between these two constructs is addressed in several studies, with most of them reporting positive relationships (Dvir et al. 2003, Shenhar et al. 2002, Verworn et al. 2008). On the other hand, Poskela and Martinsuo (2009) found that project planning had no effect on process performance. They argued that the positive effects of project planning could be offset by the decreased flexibility that comes with formal planning. In this paper, however, we argue that project planning provides guidance for the realization process. Project plans grow out of intense communication processes that precede project realization activities. Team members share their existing knowledge about current customer requirements, production techniques, etc., so that plans which are developed by the project team should be more accurate in terms of cost and time targets. Furthermore, the planning process helps to clarify product conceptualization. Although the product concept may change or grow in some ways during the project realization process, project planning should help identify what is fundamental to the product concept and what can be modified.

All activities that are part of the NPD process result in higher or lower success of NPD projects, what we call project performance. Although many studies have focused on the financial aspects of project performance, in this study a customer-based non-monetary view has been chosen (Griffin and Page 1993, 1996). In the food industry retailers play a particularly important role in choosing whether to include new products into the product range offered to their customers (Menrad 2004). Thus, a customer-based project performance construct seemed more appropriate than a monetary one. In the present study project performance is high if retailers quickly incorporate new products in their assortment, if new products are able to offer advantages and if new products harmonize well with target groups.

We expect project planning to have a direct positive effect on project performance. We argue that without planning, product concepts run the risk of becoming “moving targets” (Smith and Reinertsen 1991). Large parts of the initial plan should be reflected in the innovation outcome.

Thus, comprehensive project plans directly influence the success of NPD projects. In addition to the positive effects of project planning, we also argue that process performance has a positive effect on project performance. The ability to co-operate with customers and other stakeholders during project realization and, nevertheless, being on time, should have positive effects. For instance, customer involvement should lead to more successful NPD outcomes (Cooper and Kleinschmidt 2011) because the final product is more likely to meet customer expectations, offers advantages over existing products and creates incentives to buy. Being on time, on the other hand, increases speed to market which has also been found to positively affect success (e.g. Stanko et al. 2012).

Indirect Model Relationships

The main contribution of the present paper is to demonstrate the indirect influence of senior management support, reflected in the OMR construct, on project performance and firm performance. Since the presence of indirect effects of OMR and project performance and firm performance result from significant direct relationships to and between the mediating constructs, there is no need to add further theoretical explanations for the presence of indirect relationships. In general, however, it is expected that the positive effects of OMR will show advantages in the earlier stages of the NPD process and are associated with project performance in an indirect way only. Furthermore, we also expect project performance to be the central mediator between earlier stages of NPD projects on firm performance, i.e., that project- and firm performance should be positively linked to each other while relationships between firm performance and other constructs should be non-significant.

Summary of Hypotheses

- ***H1****:* OMR and its sub-dimensions are positively related to project planning (Path 1).
- ***H2:*** OMR and its sub-dimensions are positively related to process performance and its subdimensions (Path 2).
- ***H3:*** The positive association of OMR and project performance is fully mediated through project planning and process performance (Path 4).
- ***H4:*** Project planning is positively related to process performance and its sub-dimensions (Path 3).
- ***H5:*** Project planning is positively related to project performance (Path 5).
- ***H6:*** Process performance is positively related to project performance (path 6).
- ***H7:*** Project performance is positively related to firm performance (Path 7).
- ***H8:*** Project performance fully mediates all relationships to firm performance (Paths 8, 9, 10).

Methodology

Sample

The study is based on responses to a survey among R&D managers employed in small and medium-sized food and drink companies in Germany. The developed questionnaire was based on a comprehensive literature study. In addition to the questions for the focal model constructs (see Tables 1 and 2) which were based on Likert-scales, the questionnaire contained questions dealing

with general information on the company (e.g., the branch), the situation of innovation, annual turnover, number of employees, etc. A draft version of the questionnaire has been pretested with five companies. These companies were known by the research team from previous projects. For pretesting, the draft questionnaire was electronically mailed to the company representatives (either working in R&D or in the general management) and asked for comments and suggestions for improvement. The respondents sent their comments either electronically or they were contacted by telephone. Mainly suggestions for changing the wording of single statements or questions emerged, but no clear hints were provided to significantly change the questionnaire.

After pretesting and finalizing the questionnaire, a total of 2,469 companies were contacted. Addresses were provided by food associations and also collected via databases. We mainly focused on the most important branches within the German food and drink industry (based on turnover). This included slaughterhouse and meat processing, beverage industry, confectionary, fruits and vegetables processing, the dairy industry, and fats and oil processing. The questionnaire was sent out by mail in mid-September 2007. Final responses were sent back in March 2008. The identification of SMEs was based on the questions answered concerning the number of employees. According to the definition of the European Commission (2005), companies must have less than 250 employees and an annual turnover of less than 50 million Euro per year to fall into the group of SMEs. However, since many companies did not respond to the question about annual turnover, we decided to use the number of employees as single information to categorize the companies. Sixty-eight percent of the usable returned questionnaires fell within the definition of SMEs. We ended up with 233 usable questionnaires for the main analysis. Nineteen percent of these companies had less than 20 employees, 21.8% had between 20 and 49 employees, 34.5% had between 50 and 199 employees and 24.7% employed between 200 and 250 people. With respect to the branches, the companies in the beverage industry were the largest group (28%) followed by slaughterhouse and meat processing (7%), and dairy (5%). Although a significant number (18%) did not belong to one of the predefined categories, these companies were also included in the analysis.

Evaluating Measurement Models

For the main analyses, we used Partial Least Squares – Structural Equation Modeling (PLS-SEM) to uncover direct and indirect relationships between the constructs of the model. During the analyses we closely followed the recommendations by Hair et al. (2014). Therefore, we first checked discriminant and convergent validity as well as reliability of the measurement models. Cronbach's α values as well as the composite reliability (CR) indicator showed sufficient reliability for the reflectively measured constructs (see Table 1). The average variance extracted (AVE) was greater than 0.50 and the loadings were above 0.50 for each indicator of the reflectively measured constructs. Therefore, convergent validity can be assumed. Discriminant validity was measured by the Fornell Larcker criterion (Fornell and Larcker 1981) as well as by the recently introduced heterotrait monontrait ratio of correlations (Henseler et al. 2015). Both indicators confirmed discriminant validity. For the formatively measured constructs the variance inflation factors were far below 3 (see Table 2). Therefore, a lack of discriminant validity was not an issue for these constructs. Also, all formative indicators contributed significantly ($p<0.01$) to the formation of their constructs. The measurement models and quality criterions of the model constructs are reported in Table 1 and Table 2.

Table 1. Quality Criteria of Reflective Constructs

(n=233)	CR	α	AVE	λ
Project Planning	.842	.750	.514	
1. Before an innovation project is realized all planning activities are fixed in a written document (project plan) which contains all phases of the development project.				.672**
2. In our company the target market (demand forecast, costumer needs) is planned before a new product is launched.				.800**
3. The positioning of a new product against competing products is planned in our company before a new product is launched.				.774**
4. In our company the distribution requirements and the channels of distribution are planned before a new product is launched.				.773**
Firm Performance	.840	.765	.573	
In the previous three years our company was able to:				
5. - reach a profitability above branch average.				.666**
6. - raise the productivity.				.739**
7. - raise product output.				.733**
8. - maintain or provide new jobs.				.644**
9. - stay competitive.				.791**

Note. CR: composite reliability; α: Cronbach's alpha; AVE: average variance explained; λ: loading; **: p≤.01; *: p≤.05

Table 2. Quality Criteria of Formative Constructs

(n=233)	VIF	γ
Team Resource Allocation (TRA)	1.535	
10. Specific project teams are established for innovation projects.	1.614	.491**
11. To employees who are put in charge with innovation projects time and funds are provided.	1.705	.378**
12. Employees who are put in charge with innovation projects have large room for man oeuvre and authority to decide.	1.286	.363**
Cooperation (COOP)	1.021	
13. The general management directly takes care for innovations in the company.	1.021	.425**
14. There is a close co-operation of our different departments (e.g. R&D, marketing) within the scope of an innovation project.	1.021	.846**
Process Performance	1.057	
15. We keep our time and cost targets within the product development process.	1.057	.577**
16. Ideas and reactions of customers, suppliers and experts are continuously gathered during the innovation process.	1.057	.694**
Project Performance	1.106	
17. New products contribute to an improved problem solution or better satisfaction of customers' needs compared to prior products.	1.135	.655**
18. Positioning, target group and design of the products harmonize well in most cases.	1.112	.415**
19. All trading partners quickly incorporate our new or improved products in their assortment.	1.072	.336**

Note. VIF: variance inflation factor; γ: weight; **: p≤.01; *: p≤.05

Test of Mediation Effects

Mediation (indirect) effects were tested with bootstrapping because compared to the commonly used Sobel-test, bootstrapping is a non-parametric procedure which does not assume normality of sampling distributions (Preacher and Hayes 2008). Therefore, it is best suited when PLS-SEM is applied. When testing for mediation, we followed the recommendations of Preacher and Hayes (2008) and tested a multiple mediation model without exclusion of any variable. Therefore, the results represent mediation effects that are conditional on the presence of all other mediators and as a result they should suffer less from omitted variable bias. To remain independent of distributional assumptions, we used 95% and 99% percentile bootstrap CIs to estimate significances of indirect effects.

Results

Table 3. Direct model relationships and explained variances.

Endogenous Construct	Exogenous Construct	Path	Coef. β	Std. Err.	R^2
Management (OMR)					.994
	Team Resource Allocation	0_A	.292*	.127	
	Cooperation	0_B	.782**	.110	
Project Planning					.262
	Management (OMR)	1	.512**	.053	
Process Performance					.207
	Management (OMR)	2	.257**	.075	
	Project Planning	3	.266**	.076	
Project Performance					.403
	Management (OMR)	4	.252**	.073	
	Project Planning	5	.291**	.071	
	Process Performance	6	.261**	.073	
Firm Performance					.152
	Project Performance	7	.331**	.082	
	Management (OMR)	8	.052	.093	
	Project Planning	9	-.056	.085	
	Process Performance	10	.102	.087	

Note. Path: number of path in Figure 1; **: p≤.01; *: p≤.05

The results for the direct model relationships between the model constructs are given in Table 3. These results must be interpreted very carefully because the effect sizes are estimated in the presence of all indirect effects in the model. For example, the effect of project planning on firm performance is negative in Table 3 (β_9=-.056). However, project planning is also indirectly linked to firm performance. Therefore, also the total effect must be considered when evaluating a constructs total impact (see Table 4).

The results from Table 3 show that the effect of OMR on project planning is .512 and highly significant (p<0.01). Thus, H_1 is supported. The same holds true for the relationship between

OMR and process performance whereas the path coefficients are only about half the size (β_2=.257) compared to the effects on project planning. Nevertheless, these effects are significant at p<.01, which supports H_2. Results also confirm H_4 since positive and highly significant relationships between project planning and process performance (β_3=.266) appear. Hypotheses H_5 and H_6 are also accepted as the coefficients of project planning on project performance (β_5=.291) and process performance on project performance (β_6=.261) are found to be highly significant. The positive relationship between project performance and firm performance which is posited in H_7 is also confirmed by the results of the model (β_7=.331).

Hypotheses H_3 and H_8 posit indirect (mediation) effects. Therefore, a multiple mediation analysis was conducted as described above. The results of the total, the direct and the summed indirect effects are given in Table 4[1]. The calculation of these effects is as follows: For example, for the effects of process performance on firm performance (see at the bottom of Table 4), the direct effect corresponds to results in Table 1 (Path 10), whereas small differences between results in Table 3 and Table 4 are due to the bootstrapping procedure that was applied in the multiple mediation model. Indirect effects result from the multiplication of all path coefficients that indirectly connect process performance and firm performance, i.e., coefficients of path 6 times path 7. The total effect is the sum of direct and all indirect effects[2].

Table 4. Results of the Multiple Mediation Model.

Endogenous Construct	**Exogenous Construct**	**BT[a] mean**	**Percentile 95% CI**	
		β	**Lower**	**Upper**
Project Performance	*Management (OMR)*			
Total c_4'+$\Sigma_4(a_ib_i)$		.513**	.371	.634
Direct c_4'		.260**	.113	.398
Indirect $\Sigma_4(a_ib_i)$		.253**	.172	.342
Firm Performance	*Management (OMR)*			
Total c_8'+$\Sigma_8(a_ib_i)$		.239**	.087	.387
Direct c_8'		.057	-.126	.244
Indirect $\Sigma_8(a_ib_i)$		.182**	.069	.291
Firm Performance	*Project Planning*			
Total c_9'+$\Sigma_9(a_ib_i)$		.086	-.074	.241
Direct c_9'		-.060	-.222	.107
Indirect $\Sigma_9(a_ib_i)$		.146**	.072	.234
Firm Performance	*Process Performance*			
Total c_{10}'+$\Sigma_{10}(a_ib_i)$		.188*	.011	.347
Direct c_{10}'		.100	-.079	.261
Indirect $\Sigma_{10}(a_ib_i)$		.088**	.029	.159

Note. BT: bootstrapping; CI: confidence interval; **: p≤.01; *: p≤.05; indexes in formulas correspond to direct paths in Figure 1; a: bootstrapping means differ slightly from direct effects in Table 3 because of the different estimation procedures.

[1] Table 4 only contains results for which hypotheses are suggested. Single direct effects are not reported.
[2] Smart PLS version 3 calculated indirect and total effects automatically.

First, we tested whether the potential mediators together mediate the effect of OMR on project performance. Results show that the sum of indirect effects ($\Sigma_4(a_ib_i)$=.253) is highly significant, indicating that project planning and process performance together are able to mediate the effect of OMR on project performance (Preacher and Hayes 2008). However, there is also a significant direct relationship (c_4'=.260). This indicates that only about 50% of the total effect is mediated through project planning and process performance. Thus H_3 is only partially supported because full mediation was proposed. Bootstrap CIs of the individual mediation paths further show that all mediation effects of OMR on project performance are statistically significant. This indicates that every single indirect path contributes to mediating the effect. However, project planning is the most important mediator (a_1b_5 =.149, not reported in Table 4), accounting for about 60% of the indirect and about 30% of the total effect.

In H_8 it was hypothesized that project performance is the central mediator of all effects to firm performance. Direct path coefficients on firm performance are non-significant in the model (of course with the exception of project performance). The multiple mediation analyses further indicate that indirect effects account for the majorities of variances, so full mediation can be supported (Hair et al. 2014), but with the exception of process performance. For process performance less than 50% of the total effect (c_{10}'+$\Sigma_{10}(a_ib_i)$=.188) is mediated through project performance. Thus, although the direct effect is non-significant in all models, the mediation analyses show that project performance only partially mediates the effect of process performance on firm performance. Thus H_8 is only partially supported.

Discussion and Conclusion

The purpose of this study was to demonstrate that the decisions, behaviour and rules applied by senior management do not (only) influence NPD success and firm performance directly, as suggested by many previous studies, but mainly indirectly through antecedents of project performance and firm performance. To test these assumptions a PLS structural equation model was applied in order to reveal the direct effects as well as the mediated effects of senior management support on the final dependent variables, namely project performance and firm performance.

As hypothesized in H_1 and H_2, the direct effects of OMR on project planning and on process performance were positive and statistically significant. However, the effect on project planning was about two times larger than the effect on process performance. Decisions of senior management seem to have an impact especially at the beginning of an NPD project. This is in accordance with the results of other studies which also found senior management participation to be very important in the early stages (Poskela and Martinsuo 2009). However, project planning and process performance seem not to be the only factors that mediate the effects of OMR on project performance since only about 50% of the total OMR effect on project performance was mediated. The same results were found for the effects of process performance on firm performance. We expected full mediation through project performance, but the multiple mediation model revealed only partial mediation. One reason could be that our model constitutes a great simplification of real-world processes so that non-salient factors are represented in unexpected direct effects. Additionally, process and project performance are operationalized as formative constructs with limited numbers of sub-dimensions. Project performance, for example,

only consists of non-monetary dimensions that seem unable to fully mediate all effects on firm performance.

In general, however, the results of this study clearly demonstrate that the decisions and behaviours of senior management in promoting innovation are omnipresent and have a major influence on the outcome of NPD projects, especially in indirect ways. The results confirm some findings from previous studies. In particular, confirming that senior management support and knowledge-transfer between functions are important drivers of NPD performance. The present study further highlights that indirect effects play prominent roles in explaining the influences on project performance. Project planning and process performance do not only have direct effects on project performance, but also serve as important mediators between senior management support and project as well as firm performance. Results, however, indicate that further factors should exist which mediate the effects of managerial behaviour on NPD performance. One example for such a neglected factor is decision making clarity (Schultz et al. 2013) which for sure is important in any phase of NPD-projects, but was not considered in the present study.

Results further indicate that there are positive effects when senior managers directly take care of NPD projects and foster cross-functional communication and cooperation. Even in small firms, personal animosities can arise and endanger the success of innovation projects. Managers can ensure that motivation to achieve shared project goals and adherence to normal good manners will prevail against individual ambition and any disruptive behaviour. Employees can be motivated by the allocation of time, money and decision-making autonomy. Although other studies have argued that autonomy, for example, could lead to confusion and uncertainty among team members, in this study the positive effects were found to outweigh the negative. The encouragement of autonomous decision-making in project teams together with the awareness that senior management is actively involved can help to motivate higher performance levels.

In summary, senior management has supervisory control of all activities in SMEs. It is up to senior management to decide the way in which NPD projects are conducted, how much formal control is implemented, which resources are allocated to employees and innovation teams as well as the extent with which management itself is actively involved in innovation activities and NPD projects. However, the results of this study clearly indicate the beneficial effects of both, the generous allocation of resources and the active participation of management in fostering good communication and cooperation.

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Appendix

Robustness Checks

Some model constructs in this study were conceptualized as formative constructs. This decision was based on theoretical assumptions. For example, Jarvis et al. (2003) criticized that constructs are often measured reflectively although they should have been measured formatively from a theoretical standpoint. On the other hand, formative constructs are not free of criticism itself (e.g., Edwards 2011). In order to address some of these critics, we tested our model by constraining the indicator weights. For formatively measured constructs, all of them were fixed to contribute the same amount to the constructs they made up (McDonald 1996). Additionally, the path coefficients of TRA and COOP were fixed to a contribution of 50% to OMR. Since the indicator weights could not be freely estimated in the restricted model, it was assumed that the path coefficients are lower compared to an unrestricted model. However, the differences in the path coefficients were only marginal and the restricted model led to the same conclusions as the unrestricted model. Therefore, the model results can be considered robust against the use of formative constructs.

We also tested the influence of common method variance (CMV). CMV refers to variance attributable to the measurement method rather than to the construct of interest (Bagozzi et al. 1991, Podsakoff et al. 2003). CMV could result in biased estimates, known as common method bias (CMB). As survey data are used, CMV and CMB could be a serious problem. Therefore, we checked for CMV and CMB after data collection applying a procedure suggested by Rönkkö and Ylitalo (2011). Results of these tests allowed us to conclude that no serious biasing effects were present.

