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Abstract

This paper explores financial control in new product development (NPD) project managers' work. To supplement previous literature on controlling innovation activities, the paper focuses on NPD project managers' versatile role of being under control (about meeting NPD project objectives), in control (about actually fulfilling those objectives by mobilizing the project team), and in a central role in further developing the NPD project management practice. This paper is an exploratory field study based on in-depth interviews with eight NPD project managers in seven organizations. NPD project managers' viewpoints need to be acknowledged, as they have a significant influence on NPD project performance; the support of financial control should be designed and utilized accordingly. Examining a versatile managerial role, such as that of an NPD project manager, potentially unveils fundamental questions in management control practices, e.g., how could financial control better support innovation activities. In this paper, we contribute to management control research by (1) highlighting the role of financial control in supporting NPD project managers' work both in project model execution and wider reflections on the business impacts; (2) identifying the extended list of units of analysis of financial control needed to ensure that NPD objectives are met; and (3) showing that project managers desire a more active role from financial control in NPD project management. If more comprehensive accounting information was provided and used for project management purposes, this would imply new tasks to NPD project managers, controllers, and other parties involved in NPD projects – possibly shifting focus towards more comprehensive, long-term business impacts. Finally, based on our exploratory results, we provide five propositions to inspire future management control studies.

Keywords: Financial control, NPD, project manager, accounting, project model

1 Introduction

This paper explores financial control in new product development (NPD) project managers' work. To supplement previous literature on controlling innovation activities, it focuses on NPD project managers' versatile role of being under control (about meeting NPD project objectives) and, at the same time, in control (about actually fulfilling those goals by the project team). With respect to the financial control of NPD projects, there is a tension between ensuring effective NPD project execution (i.e., structuring the unstructured, Mintzberg et al. 1976) and helping NPD managers find new ways to critically assess and steer the operations and their outcomes (see e.g., Alvesson and Willmott 2012). To actually be supportive, financial control should take different roles, ranging from information provision for decision-making to building an increased overall understanding about the business context (Hall 2010; see also Mintzberg et al. 1976).

The role of an NPD project manager is of great importance to management control research because the management and implementation of NPD projects significantly affects the success (or failure) of these projects under uncertainty (Tatikonda and Rosenthal 2000a; 2000b). Besides, it is important to examine the financial control that supports NPD project managers because these managers often face multiple, sometimes competing, objectives that are set for NPD projects due to contextual uncertainties and ambiguities (Davila and Wouters 2007). These multiple objectives would require the employment of both financial and non-financial controls for NPD project managers (Ylinen and Gullkvist 2014). The multiplicity of objectives and controls might, in turn, reduce the comprehensibility of the control system, possibly leading to a less beneficial use of innovation controls (cf., Janssen et al. 2011). NPD projects are fundamental vehicles of business renewal and future profitability. However, not much is known about the roles of financial control in NPD project practice in actually supporting the attainment of desired business impacts (see Nixon 1998; Jørgensen and Messner 2010; van der Meer-Kooistra and Scapens 2015; Laine et al. 2016 as exceptions). For example, Jørgensen and Messner (2010) identified strategizing as an alternative means to support NPD activities if financial information was not available. However, the possibilities to extend the support of financial control in NPD activities has not been thoroughly examined. In this vein, not much is known from the viewpoint of the project manager, who is central to project execution. Thus, it is vital to understand how NPD project managers are actually supported in their work by financial control (Jørgensen and Messner 2010; Laine et al. 2016), especially from the viewpoints of structuring their decision-making (Mintzberg et al. 1976) and enabling critical reflection (Alvesson and Willmott 2012).

Financial control in NPD means utilizing financial information for project purposes. The NPD project manager, as a hub, may be primarily the producer or user of the financial information in cooperation with the other NPD project stakeholders. The organization-dependent guidelines for NPD projects form one basis for NPD project control, in general, and the division of tasks for the financial control of NPD projects, in particular. Project models, such as stage-gate model (Cooper 1990), have been designed and implemented to structure the project control and, thus, ensure effective NPD project execution (Lewis et al. 2002; Ylinen and Gullkvist 2012; 2014). In practice, a project model may represent either a tight control system for NPD project execution with high workloads (Tatikonda and Rosenthal 2000a; Sethi and Iqbal 2008) or merely an overall framework for NPD project management, leaving plenty of room for individual managers to deal with project requirements and overcome ambiguities (Laine et al. 2016). In multi-project NPD environments, it is important that the project model and single projects are not seen as separate but interconnected

and mutually influencing entities (Martinsuo et al. 2014; Korhonen et al. 2014; 2016; Laine et al. 2016). Such interconnectedness is also likely to be evident outside of formal¹ project models in actual NPD management practices (see e.g., Korhonen et al. 2016). Research has already identified many useful technical controls (van der Meer-Kooistra and Scapens 2015), such as goal and deviation management and process-based approaches (Davila et al. 2009), but there is an inadequate understanding of supporting NPD project managers both formally and informally outside of the NPD project model. Informal control is typically associated with personnel and cultural controls (e.g., Kleine and Weißenberger 2014) and not with the design and use of financial calculations outside of formal control (e.g., Lukka 2007).

Examining a versatile managerial role, such as that of an NPD project manager, potentially unveils fundamental questions in management control practices, e.g., how could financial control better support innovation activities. Based on the existing literature, the possibilities and limitations of extending the support of financial control in the NPD project execution is not known (Jørgensen and Messner 2010). Besides, the role of financial control in supporting the managerial work of the NPD project manager requires further exploration, not only about the use of specific types of controls (Ylinen and Gullkvist 2012; 2014), but also more broadly about dealing with uncertainties and ambiguities (Laine et al. 2016). In this vein, this paper aims to explore the role of financial control in supporting NPD project managers (Hall 2010), being aware of their organizational context (Hopwood 1983; Alvesson and Willmott 2012). Thus, it seeks to respond to the following research questions:

- 1) What are the requirements for financial control from the viewpoints of NPD project managers in their dual role of in and under control?
- 2) What formal objectives are set for NPD project managers, and what are the units of analysis (i.e., financial measures, indicators, controls) used to ensure those objectives are met?
- 3) What are the possible avenues for developing financial control in NPD projects, as identified by NPD project managers through their critical reflections?

Empirically, the paper is an exploratory field study based on in-depth interviews of eight experienced NPD project managers. The paper intends to provide an understanding of the project manager's viewpoint in NPD financial control, which has not yet been adequately explored in the academia. The NPD project managers in this study were interviewed within a larger study on NPD project management. Relevant to NPD research and practice, the viewpoints of these NPD project managers in financial control provide a unique starting point for studying the roles of accounting information in the complex context, with plenty of potential for accounting development.

The main contribution of this paper is identifying the tension stemming from the role of NPD project managers both in and under control and the implications of this tension to the financial control of NPD project managers. More particularly, first, the paper focuses on project managers' roles and viewpoints on financial control that would actually support their managerial work both in NPD project model execution and wider reflections on the organizational context (building on Ylinen and Gullkvist 2012, 2014 on NPD project control; Hall 2010 on accounting information supporting

¹ The formal project model refers here to the explicated rules of NPD project execution in companies. The formal project model may follow the principles of theoretical project models, as applied in a particular company context. In addition to the formal project model, there is the actual way of executing the NPD projects, which may or may not be in line with the formal model. The practices that *de facto* differ from the formal project model or are not included in it represent the informal project model and NPD project management practice.

managerial work; and Jørgensen and Messner 2010, van der Meer-Kooistra and Scapens 2015, and Laine et al. 2016 on recent insight from NPD management practice). Second, the role of financial control is examined in a detailed manner by discussing the objectives set for NPD projects and the fit between the objectives and (an extensive set of) units of analysis used to ensure the fulfillment of these objectives (see e.g., Davila and Wouters 2004; Tatikonda and Rosenthal 2000b; Laine et al. 2016). Third, four avenues for developing more supportive financial control from NPD project managers' viewpoints were identified to enable a more active support from financial control to NPD project execution, and more particularly, to outline further development of financial control practice through critical reflection on NPD project managers' roles (Alvesson and Willmott 2012).

The rest of this paper is structured as follows: The literature review discusses the current understanding of the roles of NPD project managers and of financial control in supporting them. The empirical part of this paper presents the research process, data gathering, and analyses of the roles of the NPD project manager, of financial control in NPD projects, and of the need for developing financial control support for NPD projects, as experienced by the interviewed NPD project managers. These findings are then put together and discussed. Finally, before the concluding remarks, we provide propositions to be further examined in the management control literature, in order to possibly confirm, elaborate upon or abandon these exploratory findings.

2 Literature Review

2.1 Framing the role of the NPD project manager within and outside of the project model

An NPD project aims at transforming an idea into a commercialized product (Davila 2000). NPD projects are temporary activities for creating a unique product or service and, thus, increasing the firm's competitiveness (Balachandra and Friar 1997); whereas, project management refers to the adoption and use of knowledge, skills, tools, and techniques to fulfill stakeholders' needs and expectations (Munns and Bjeirmi 1996; Project Management Institute 1996).

NPD projects have different interfaces for different business functions, from purchasing and operations to sales and marketing. Thus, various models have been developed for structuring and organizing NPD work. A well-known design in this respect is the stage-gate model for NPD project management, which was introduced by Cooper (1990) as an effective way to manage and control product innovation processes. Essentially, the stage-gate model implies that product innovations take place as processes and that these innovation processes can be managed. In the stage-gate model, the innovation process is managed through gates, where the innovation needs to fulfill the set goals and requirements at each gate. Despite clear benefits that have been reported (Lewis et al. 2002; Ylinen and Gullkvist 2012; 2014), the process approach and stage-gate model have also been criticized. Sethi and Iqbal (2008) argue that the stage-gate model results in rigidity, reduces flexibility in management, and potentially hinders learning during innovation processes. Tatikonda and Rosenthal (2000a) also argue that a formal process model enactment—with its notable needs for information gathering, reporting, and administration—may require too much work from critical resources.

Regardless of the actual project model design and enactment, NPD projects always have a specified project manager who is responsible for NPD project implementation and performance. The NPD project manager essentially plays a dual role because he/she is controlled by the overall organization as per the NPD project objectives and he/she

also controls both the project execution and the project stakeholders to ensure proper project performance. As a result, the role of the NPD project manager is not limited to efficiently managing the NPD project execution according to the guidelines. However, more critical reflections on the business context and management are needed to ensure effective management (see Alvesson and Willmott 2012). In fact, in practice, although the means to control NPD projects are chosen by the top management or R&D management, practically, it is the NPD project manager who affects the forms of control within a single NPD project (Tatikonda and Rosenthal 2000a). In the literature on accounting and financial control, there are several studies on organizational level controls, but only a few studies address accounting and control at a single project level (Ylinen and Gullkvist 2014). However, by examining the role of the NPD project manager as an organizational actor and the practice of financial control in NPD projects, research can understand the mechanisms that underlie NPD project performance and the potential means to enhance NPD project management practice in a changing environment (Korhonen et al. 2013). In general, management control research has identified some determinants for different types of control, i.e., results control, action control, personnel control, and cultural control (Haustein et al. 2014); however, the interconnectedness of the formal project model with controls outside of the formal model and the role of project managers in NPD have not been sufficiently explored.

Besides controlling and being controlled, an NPD project manager needs to prioritize and find a balance between different (competing) project objectives (Project Management Institute 1996; Rozenes et al. 2006). The presence of multiple objectives simultaneously results in the complexity of NPD projects, which increases even more when the number of NPD project stakeholders rises (Jørgensen and Messner 2010) or when a project's scope and desired outcomes are relatively new for the organization (Tatikonda and Rosenthal 2000b). In addition, the project objectives can either be relatively static or evolve during the project due to learning within the project team (Schön 1983, p. 251). If new issues emerge with regard to the product technology or other aspects, these could (or should) affect the project objectives in some way, thus providing an additional challenge for NPD project managers. Altogether, it is essential that NPD project managers are able to cooperate with different NPD project stakeholders and that they understand both technical and economic aspects related to the new product at hand (Tatikonda and Rosenthal 2000a).

The form of support for NPD project managers may vary between organizations. Tatikonda and Rosenthal (2000a) studied the effects of formality, project management autonomy, and resource flexibility on project performance according to the given objectives. As a key finding, they argued that formality may hinder resource flexibility, which can, in turn, hinder project performance, particularly when there is uncertainty or new possibilities emerge. On the other hand, the formal checkpoints of the formal model may provide the desired support for the NPD project manager (Lewis et al. 2002). Project management autonomy, despite its benefits, requires NPD project managers to have the ability to solve emerging problems (Lewis et al. 2002) and use organic controls (instead of or besides mechanistic ones) (Ylinen and Gullkvist 2012; 2014). According to Ylinen and Gullkvist (2012), NPD project managers' abilities to deal with uncertainties affect the NPD project controls in use. Some managers seek to use several different controls and means to gather information in order to reduce their perceived uncertainty. In some organizations, in order to reduce the uncertainty related to the NPD project that is perceived by the project manager, market uncertainty is taken care of by the sales and marketing department (Davila 2000).

In sum, the NPD project manager has a remarkable role that features (at least) the following aspects: 1) NPD project managers should ensure efficient NPD project execution according to the formal NPD project model guidelines and the objectives set to a particular project; 2) NPD project managers have a role both in and under control, and they

should critically reflect on their role to ensure their performance from one project to another; 3) As the objectives set for NPD projects are typically partially competing and need to be prioritized, management control for NPD projects cannot be mechanistic. Also, financial control should be used in different ways to actually support project execution.

2.2 The role and content of financial control in NPD projects

The fundamental meaning of control is to steer an organization and its personnel toward objectives that have been set (Malmi and Brown 2008; Merchant and Van der Stede 2012). When a project is closed, its success can be measured against the objectives. The objectives can be set for each project separately in order to allow variance in weighting measures and case-by-case interpretation of measurement results (Shenhar et al. 2011). Even control, however, cannot save a project that has initially been (too) challenging or ambitious. As reminded by Munns and Bjeirmi (1996), while control may contribute to success, it cannot guarantee it. Basically, the question is whether a project has a chance of succeeding and how success is evaluated.

Fig. 1 provides an overview of the literature review, with research gaps highlighted in grey. This figure combines the viewpoints of the NPD project manager and organizational context (cf., Hopwood 1983), including factors that influence control, the project model as an overall framework for project control, project type, factors that affect project execution, and the roles taken by and given to the NPD project manager regarding financial control for the NPD project. To understand the NPD project manager's role in financial NPD control, the (multi)project context, itself, sets some demands for controls. The NPD project managers may take (or be given) different roles in different NPD projects, and to succeed in such roles, critical reflection on the roles and responsibilities may be required (Alvesson and Willmott 2012). Hence, it is meaningful to understand that the project model context and single project execution are mutually influencing entities (Jørgensen and Messner 2010; Korhonen et al. 2014; 2016; Laine et al. 2016). Single project executions might result in pressures on the formal project model as well (Martinsuo et al. 2014).

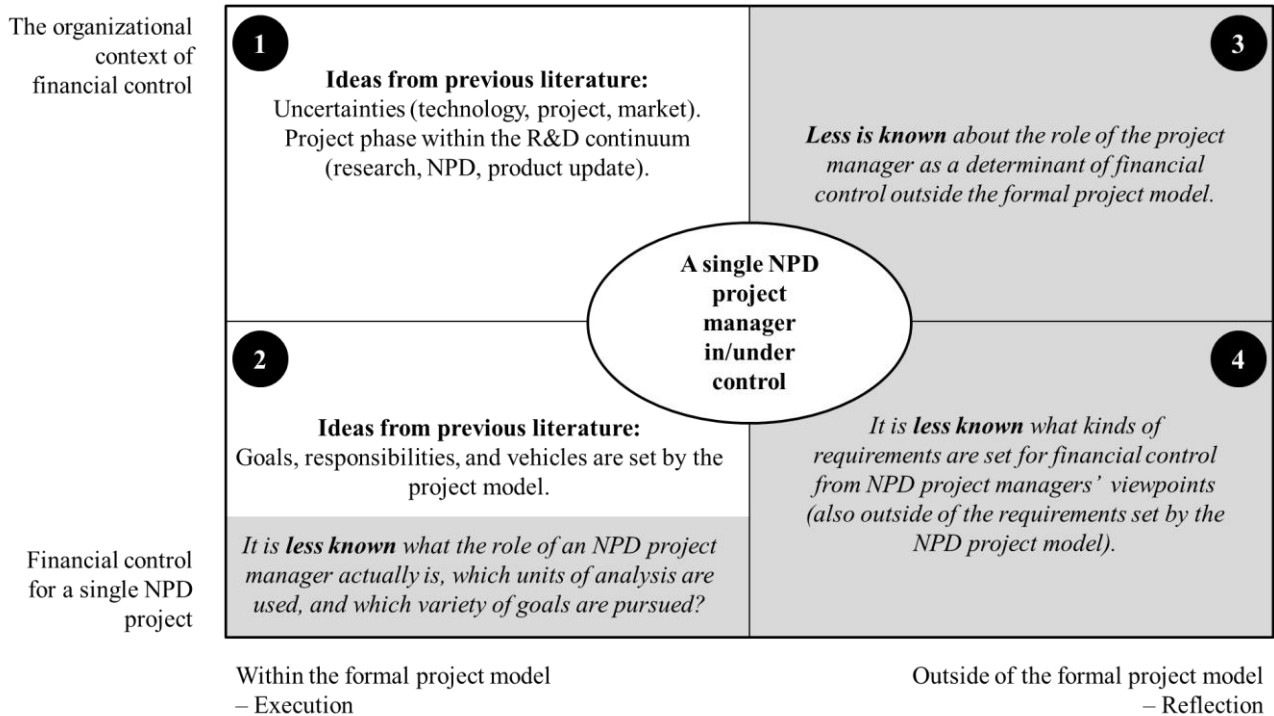


Fig. 1. Financial control of NPD projects in the organizational context with the project manager in dual role.

NPD projects have been seen as a challenging organizational context for financial control (Quadrant 1, Fig. 1), as the traditional, analytical means have not been easily adopted in NPD organizations due to uncertainties and ambiguities. Still, several studies highlight the importance (and positive consequences) of using financial control for different types of innovation projects, in general, and product development, in particular (Nixon 1998; Davila 2000; Rabino 2001; Davila and Wouters 2004; Suomala 2004). Suomala (2004) highlights the need for NPD performance measurement and states that there are at least two reasons for financial control in the NPD context. On the one hand, financial controls should provide information about the current status of relevant accounting objects, i.e., units of analysis, and enable decisions accordingly. On the other hand, financial control should provide information and scenarios about technologies and markets that enable long-term learning and development efforts.

Regarding financial control for NPD projects, there can be several units of analysis related to the fulfillment of the project objectives of single NPD projects (Quadrant 2, Fig. 2). First, project budgeting and project cost measurement are commonly used in the NPD project context (Project Management Institute 1996; Tatikonda and Rosenthal 2000a; 2000b; Turner and Müller 2004). Second, Davila and Wouters (2004) find that target costing is widely used in NPD projects. Even if target costing is not used as a method, a target is set for the new product cost. Davila and Wouters (2004) point out that the cost target is not enough for financial control, i.e., long-term aspects and multi-product perspectives need to be taken into consideration. Third, a more comprehensive approach to profitability can be taken by conducting business impact analyses (BIA). Such analyses refer to models where the effects of the new product on the profitability and business of the company are identified and analyzed. Such effects include not only the product prices, costs, and volumes but also more indirect effects, such as after-sales services, cannibalization, or competitiveness. Fourth, another comprehensive approach for NPD project impacts is the product life cycle (PLC) analysis. Suomala

(2004) suggests that life-cycle costing (LCC) could help the NPD organization and, according to Meyer et al. (1997), life-cycle perspectives could help NPD organizations that have a too short-term orientation.

However, even if there is a lot of potential to use financial control for NPD, and a vast literature on management control in innovative contexts, research does not shed much light on the matter in actual practice (Jørgensen and Messner 2010; Laine et al. 2016). Especially little is known about the actual role of financial control in NPD projects. Nixon (1998) conducted a case study on accounting for NPD projects and concluded that accounting information can support NPD projects significantly and that the communication between the project team and the accountant(s) can be of clear value. Rabino (2001) and Uusi-Rauva and Paranko (1998) have also argued that it is beneficial for the NPD project management to cooperate with an experienced accountant (or cost estimator). Such support from an accountant could be desired both at and within gates, as reminded by Jørgensen and Messner (2010). Van der Meer-Kooistra and Scapens (2015) studied governance in an inter-organizational NPD project. Their analysis also covers project manager viewpoints, but it is not focused on project managers or intra-organizational projects. Overcoming uncertainties and ambiguities regarding the financial impacts of NPD activities was recently examined by Laine et al. (2016), who observed cross-functional discussions on the financial performance of NPD programs and single NPD projects. In NPD projects with notable technical challenges, the provision and use of accounting numbers may represent a peripheral activity, and financial control does not become a proactive means to manage the financial consequences of NPD projects. However, establishing such a role from a project manager's viewpoint was largely excluded from the study of Laine et al. (2016).

Even if the proactive use of these relatively comprehensive calculations is desired under uncertain conditions, this uncertainty, itself, may exacerbate the complexity of the calculations and hinder the design and use in practice. Jørgensen and Messner (2010) argued in their case study that it is relatively difficult to conduct accounting in highly uncertain conditions and that accounting should, thus, serve the purpose of providing an overall understanding about central business phenomena ('strategizing'). Such use of accounting and financial control, however, requires a lot from NPD project managers, including being controlled by budgets, cost targets, schedules, and several technical aspects. As a result, NPD project managers need to comprehensively capture and manage the requirements set by the NPD context, beyond the immediate requirements of the project model execution (Quadrant 3, Fig 1), in order to enable the realization of the desired business impacts. At the same time, it is a difficult task for NPD project managers (and the overall organization) to critically reflect upon the existing practice and find a balance between the analytical measurement of the NPD project execution and the proactive exploration of the (emerging) business impacts (Quadrant 4, Fig 1). Although they acknowledged this challenge and highlighted the financial control "between the gates" of the formal project model, Jørgensen and Messner (2010) did not examine the desired roles of accounting and financial control from the viewpoint of individual managers' roles. More precisely, the role of NPD project managers in accomplishing NPD projects, with the help of accounting and financial control, remains under-researched in the literature.

In sum, financial control is situated in organizational contexts (Hopwood 1983). This means that financial control affects and is affected by the roles given to project managers in NPD. NPD project managers' roles reflect the extent to which a project manager can influence management control. If his/her role is insignificant, the organization dictates certain mechanisms or forms of control. In contrast, when a project manager's role is significant, his/her routines may override or supplement some of the organizational control mechanisms. Hence, organizational control mechanisms and

forms, together with routines, will define how NPD projects are actually managed. Also, an individual project manager's tolerance for uncertainty may be reflected in the controls that are actually in use.

3 Research Process, Data Gathering, and Analysis

The exploratory field study on NPD project management was conducted between November 2011 and June 2012 among R&D-intensive companies in Finland. All the interviewees of the field study worked directly for R&D or had a clear connection to R&D activities. For analysis purposes, the interviewees were categorized as R&D director, business controller, product manager, or project manager in order to specify their viewpoint to the financial control for NPD projects. Among the sample of 10 companies, eight (8) NPD project managers were interviewed in seven (7) companies consisting our primary data set (Table 1). Six of these seven companies operate in the mechanical engineering field (Companies A–F), and one operates in the information and communication technology (ICT) sector (Company G). In Company E, two individual project managers were interviewed. Additional insights on these companies' NPD activities were attained from other informants and publicly available information to validate the interpretations presented here (as secondary data).

The interviewed companies employ 100–5,000 people, with an average of 2,000 employees. The number of R&D personnel in these companies ranges from around 10 to hundreds of people, and the typical NPD projects last 1–2 years with several R&D people involved, supported by related business functions such as purchasing, production, and sales and marketing. Companies B and C are smaller than the others, and the size of the R&D portfolio varies respectively. However, in all the companies, there are portfolios of several NPD projects, and the R&D activities represent a major source of competitive advantage. Besides, a formal NPD project model (such as stage-gate model) had been implemented in all R&D organizations. Thus, the requirements of the financial control set by the project model were substantially similar across all cases.

Table 1 Overview of the data set.

<i>Company</i>	<i>Industry</i>	<i>Number of project managers interviewed</i>	<i>Total number of informants</i>	<i>NPD project model in use</i>
A	Machinery and services	1	5	Yes
B	Manufacturing systems and services	1	3	Yes
C	Machinery and services	1	3	Yes
D	Production machinery	1	5	Yes
E	Production machinery	2	3	Yes
F	Machinery and services	1	3	Yes
G	ICT products and services	1	1	Yes
TOTAL	7	8	23	

An underlying assumption in this paper is that the interviewees can give a rich account about a phenomenon that can be used as a basis for interpretation, although the interview material contains NPD project managers' subjective perceptions. Thus, the research has been carried out in a way that it is descriptively and interpretively valid (Maxwell 1992). In this vein, the NPD project managers were chosen based on the researchers' previous access to some of the organizations and the suggestions received from the organizations regarding NPD project managers that are capable of responding to a relatively comprehensive interview guide. The interviewed NPD project managers were rather experienced, as they all had more than five years of experience in their work—the experiences ranging from five to more than 15 years. They also had experience in other roles and responsibilities, such as research and development, production planning, production technologies, and strategy processes, which strengthen the credibility of their viewpoints to financial control for NPD projects. The interviewees from smaller companies had an especially lengthy and versatile experience with R&D activities. In this vein, we believe that the empirical material could provide examples and detailed level examination of financial control practice from NPD project managers' viewpoints, with an emphasis on understanding how financial control actually supports project management.

The interviews were semi-structured (Saunders et al. 2009, pp. 320–321), and additional questions were asked during the interviews when needed. The interviews, which were recorded and transcribed, lasted (on average) for 110 minutes. The interview questions were considered suitable for the explorative purpose of this study and, thus, covered the following broad themes of controlling the R&D activities:

- The background of the company and interviewee;
- The objectives, content, and focus areas of R&D in the interviewee's company;
- The forms and roles of R&D management control in the company;
- Measurement and financial control in R&D in the company; and
- R&D financial control in different decision-making situations.

The themes outlined above were considered suitable for identifying the roles of managing, organizing, and controlling innovation activities (Malmi and Brown 2008; Merchant and Van der Stede 2012; see also Cooper 1990), as well as providing a rich account on the power and responsible structures in NPD organizations (Alvesson and Willmott 2012). Among other questions regarding the aforementioned themes, the interviewees were specifically asked the following questions that are related to Tables 2–4:

- Which objectives have been set for R&D in the company?
- What are the measurement/accounting objects in different phases in NPD in the company?
- How would the content and language of financial control need to be developed in order for them to better serve the needs of managerial work?

These questions enable the examination of financial control for NPD projects in a broader sense (and also in terms of providing broad support for the managerial work of NPD project managers). The dual role of control and tensions identified in such a role among the NPD project managers have been interpreted from the interviewees' responses (Table 2). Altogether, the results are based on the interviews as a whole, not limited to certain questions only.

We used the ATLAS.ti software for the purpose of analyzing the interview material. The researchers' interpretations were coded in the interview material. Initially, some possible codes were identified; during the analysis process, new codes were defined, previous codes were unified or separated when needed, and the list of codes was updated accordingly. The list of codes included the direction of control (project manager either in or under control,

based on the stated responsibilities and reporting practices) in order to unveil the different viewpoints of financial control in supporting the NPD project managers and identifying the tensions that being in and under control causes. Besides, the empirical material was coded according to the research questions and areas of contribution of the paper: written/spoken statements of the objectives², units of analysis in the financial reports regarding the projects³, and the ideas for further developing the financial control for NPD projects (tensions, limitations, and avenues)⁴. The codes were created inductively (based on the emerging data) but focused on aspects that would reveal project managers' viewpoints on NPD financial control and related tensions. After several rounds of coding the interview material, the analysis enabled the cross-tabulation of the issues mentioned and the individual managers (and managerial roles) who brought up those issues. After cross-tabulation, the content of the material was revisited in order to more thoroughly understand the dynamics between the aspects under examination.

4 Empirical Findings

4.1 *The role of the NPD project manager and implications of financial control*

With regard to the role of NPD project managers, one can question whether organizations consider them primarily as actors who are under control or as actors who (due to their responsibility) actually control the project organization. In fact, both "directions" of control exist simultaneously, but the NPD project manager's role of being under control is much more widely discussed. In our results, there are two project managers, neither of whom mentions the viewpoint of controlling a project team or other project stakeholders in their role as project manager (Table 2). Particularly, in Table 2, focusing on the directions of control, it was meaningful to calculate the times the NPD project managers discussed the role of control in different situations.

Table 2 NPD project managers either under control or in control, as perceived by them.

<i>Project manager</i>	<i>Organization</i>							<i>Total</i>
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>Occurrence</i>
Under control	15	25	20	37	13	34	15	159
In control	3		2	4	3	4		16

The formal project model is a clear frame that controls the activities undertaken by NPD project managers. This fact is quite easily interpreted such that the NPD project managers are there to ensure effective project execution with

² codes: Product content/features, Schedule, Customer value, Cost reduction, Budget, Standardization/platform, New idea, Strategy, Effectiveness, Quality

³ codes: Project budget, Product cost, Price, Profitability, Investment/pay-back, Volume, BIA calculations, After-sales, Cannibalization, Life-cycle calculation, Share of new products (of revenues)

⁴ codes: Data analyses and use for control, Data integration and usability, Estimates and planning, Life-cycle orientation, BIA calculations, Cooperation within organization, Availability of data, Learning from ex post data, Value analyses, Cost consciousness, Need for flexibility and risk appetite, Avoiding sub-optimization, Systematic measurement, Easier data interpretations, Overcoming dominant technical orientation, Long-term perspectives, Real-time data, Personal knowledge and understanding

limited flexibility and power. However, also within the project model, some of the NPD project managers saw the possibility for communication in both directions and, especially, the possibility to bring up uncertainties and surprises during project execution. Project manager D described their project model enactment in the following way:

“...the project model forces us to report, follow certain issues very carefully. And at the same time, it provides us a formal route to bring up problematic issues. These issues escalate [and will be managed] quite naturally, if we follow the project model.”

Another viewpoint on the same issue was also discussed. One of the project managers felt that, in their project model, the formal process was overemphasized, and the decisions were sometimes made formally, at the cost of the *de facto* business possibilities visible outside of the project model.

The role (or identity) of the project manager seems to be a result of the project model context and the organizational choices and practices in its enactment. Besides, as suggested by Ylinen and Gullkvist (2012), the educational backgrounds of NPD project managers seem to clearly affect their professional roles. In this paper, personality aspects are not discussed, but we provide an example of the difference between NPD project managers with purely technical education and those who are also educated in business. The business controller in Organization A described a potential difference in the following way:

“I have noticed that the more you are an engineer [you have purely technical education], the more difficult it is for you to give estimates. It is a way of thinking; there is uncertainty and it can be very difficult to give a rough estimate.”

In other interviews, as well, there was some discussion on the differences between technical orientation (product features) and business orientation (profitability) and their implications on NPD project management.

In sum, as the NPD project manager lies between the senior managers, individual team members, and other NPD project stakeholders, the role of the NPD project manager and the activities undertaken by him/her have significant implications on the business impacts of the NPD project. In Companies B and C, with smaller R&D organizations, the role of the NPD project manager was more versatile in bridging the gap between the different organizational levels. This may also be due to the substantial experience of those project managers. At the same time, in larger organizations, differences in NPD project managers' roles were witnessed, stemming from their technical or business orientation as a mindset. The former group of NPD project managers placed the emphasis on the technical features; whereas, the latter group discussed the projects primarily in financial terms.

4.2 The role and content of financial control in NPD project management

As presented in Table 3, many different objectives are set for NPD projects. This table shows the total number of times each objective was mentioned. Total occurrence in Tables 2–4 (ranging from uncommon to strongly highlighted) was classified based on the total number of citations dealing with a particular topic and the importance of the discussion regarding the topic. For example, new ideas were seen as objectives of many NPD projects but were not highlighted by the respondents. Similar examples may be found in other tables. The NPD project goals, as brought up by the interviewees, are in line with the typical project objectives, as described by Turner and Müller (2004), i.e., content and features of the product, process aspects of the project, quality, budget and time-frame issues, control aspects, and

aspects related to the project manager. The occurrence of objectives was assessed qualitatively based on the number of interviewees discussing an issue and the emphasis given to the issue in the interviews.

Overall, the ICT company seemed to set a more comprehensive set of objectives for NPD project managers compared to the mechanical engineering companies. This finding may be due to the interviewed NPD project manager's linkages to product strategy formulation and may not represent differences between the industries. Meanwhile, in the smaller companies (B and C), the linkages to the strategy are more readily present in the objectives set for individual NPD projects; whereas, in some other companies, single NPD projects are merely parts of a larger entity.

Table 3 The objectives set for NPD projects, as perceived by project managers.

<i>NPD project objective</i>	<i>Organization</i>							<i>Total Occurrence</i>
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	
Product content/features	x	x	x	x	x	x	x	Strongly highlighted
Schedule	x			x	x	x		Mildly highlighted
Customer value		x	x			x	x	Mildly highlighted
Cost reduction	x	x				x	x	Mildly highlighted
Budget				x			x	Not highlighted
Standardization/platform	x				x	x		Not highlighted
New idea		x		x	x		x	Not highlighted
Strategy		x	x				x	Not highlighted
Effectiveness							x	Uncommon
Quality							x	Uncommon

Not surprisingly, the emphasis in this data is on technical aspects; technical performance is typically one of the key objectives of NPD projects (Tatikonda and Rosenthal 2000b). However, with respect to the role of the project manager, all the project managers brought up several (typically competitive) objectives, meeting all of which is not a straightforward task. In many organizations, the project managers considered that the project objectives are quite clear after project acceptance. However, Project Manager A, for example, admitted that several objectives stem from external sources, i.e., outside of the actual project model execution, and are not clear enough for NPD project managers.

Regarding the business impacts gained from NPD projects, the most commonly mentioned project objectives—product content, schedule, and customer value—do not explicitly include the business impacts of a project for an organization. However, cost efficiency/reduction and the project budget were brought up several times. Although project budgets were set in all organizations, two interviewees considered it as a central project objective.

The interviewees also named the units of analysis that were used in the NPD projects for planning and control purposes, i.e., financial measures, indicators, and controls that were used in order to ensure the fulfillment of the NPD project objectives (as listed above). Thus, the units of analysis listed in Table 4 can be connected to the objectives discussed in Table 3. For example, project budget is connected to the schedule and, as such, was sometimes mentioned as an objective. Meanwhile, product cost and price are connected to the product content/features, customer value, cost reduction, etc. Additionally, wider profitability or BIA calculations are connected to several individual objectives set for

NPD projects. By examining the units of analysis and their use in NPD projects, one can conclude how actively accounting information is used during an NPD project and what kind of support can be attained for NPD project managers from accounting information. The units of analysis that were brought up during the interviews are listed in Table 4. Again, the occurrence of different units of analysis in the interviews was also assessed qualitatively. Some of the larger companies seemed to have a rather comprehensive set of financial controls in place, but also, the others had enabled financial control from multiple viewpoints according to the project models in place. Remarkably, some interviewees mentioned that the units of analysis vary by case, i.e., from one project to another.

Table 4 Units of analysis of NPD projects, as perceived by project managers.

<i>Unit of analysis</i>	<i>Organization</i>							<i>Total Occurrence</i>
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	
Project budget	x	x	x	x	x	x	x	Strongly highlighted
Product cost	x	x	x	x	x	x		Mildly highlighted
Price	x	x	x		x	x	x	Mildly highlighted
Profitability	x	x	x		x	x	x	Mildly highlighted
Investment, pay-back	x		x	x	x	x		Mildly highlighted
Volume	x				x	x	x	Not highlighted
BIA calculations					x	x	x	Not highlighted
After-sales	x				x			Uncommon
Cannibalization					x	x		Uncommon
Life-cycle calculation					x			Uncommon
Share of new products (of revenues)			x					Uncommon

The project budget represents a basic unit of analysis for NPD projects, and it was quite naturally brought up in all the interviews. However, one can argue that accounting support for NPD projects managers is considered far too narrowly if the project budget aspect represents the most important financial control aspect in NPD projects. This means input measurement rather than output measurement. Besides, there are several other NPD project impacts on profitability with notable uncertainty; thus, NPD project managers would greatly benefit from support with regard to those issues.

The product cost aspects are considered in many organizations; most of the interviewees discussed these as well. The product cost, which has direct implications on product profitability, should be managed from the beginning of the NPD project. Due to the future orientation of NPD projects, project managers need support from different stakeholders, such as a purchasing department in product cost estimation and management. This was described by Project Manager B:

“[Regarding the product cost], pre-studies are required; our purchasing helps in that, suppliers help in that. We estimate the factory production cost [of the product under development] and update [the estimate] as the project proceeds.”

In fact, the project managers discussed the importance of different units of analysis in meeting their objectives and actually realizing desired business possibilities. Project Manager F criticized the overemphasis on the project budget and highlighted the importance of the active product costing in NPD projects:

“Product cost is more essential; it is the mechanism for future profits. It enables keeping the contribution margin. (...) The project cost is paid only once, and it will pay back typically in months or in a few years. It should not be that strict, but the product cost is the important one; it will accumulate the profits or losses.”

Product price was also mentioned as a unit of analysis several times. The NPD project managers, however, saw price as a rather distant factor. While customer value was seen as a relatively important objective for NPD projects, the interviewees mentioned that they did not personally know the rationale underlying price estimates; rather, the estimates were given by sales, marketing, or product managers. Moreover, although the product price and estimated volume were considered as important aspects in pay-back calculations, they were only estimated in the beginning and were left more or less aside during project execution. Project Manager A described their situation in the following way:

“It is merely in the beginning that we estimate the pay-back time; then, we discuss the future sales volumes and sales prices (...) It feels [like] once we have set the figures, they are not that important anymore.”

Profitability was mentioned in many interviews, but it was discussed rather implicitly with a connection to more specific units of analysis. However, sometimes even the wider impacts on profitability were discussed, as described by the project managers from Organization E:

“Project Manager E1: I think that [BIA] responds more to [the project as an] investment, and we expect income from it and we look at the pay-back time...”

“Project manager E2: We look at those issues, but our analysis also includes all the potential cannibalizations, after-sales expectations, total business impacts, and there are different scenarios, (...) what do we expect, best-case and worst-case scenarios. And the project should provide input according to the current status.”

Altogether, an extensive set of different units of analysis and related financial perspectives were brought up by the interviewees. At the same time, however, the active use of accounting information in managing the project impacts seemed to vary greatly between organizations and project managers. It can be argued that the perceived support from financial control may vary based on organizational rules and routines (the project model), as well as on the needs and preferences of individual project managers (also outside of the project model). It also depends on individuals whether business possibilities are interpreted primarily as financial or technical/operational/quality aspects.

Although the scope and content of financial control varied significantly, most of the interviewees considered accounting information to be beneficial for them. Most project managers stated that they were satisfied with the support in light of the economic facts provided to them regarding the formal project model enactment.

Besides using economic facts within the project model, NPD project managers are generally supposed to identify and analyze a variety of business opportunities related to the products under development. The actual role of financial control related to those opportunities was discussed by some of the interviewees. For example, Project Manager A highlighted the fact that financial control should play a crucial role from the beginning, when the business opportunities

are estimated under relatively high uncertainty, and, at the same time, the managers should make (perhaps, the most) important decisions regarding the new products.

Regarding the values and valuations of new business possibilities, Project Manager B brought up the need for analyzing the big picture and, at the same time, estimating the value of sub-units. Financial control could also be helpful in unveiling causes and effects regarding financial values. As an example, Project Manager F suggested that the actual need for resources and capabilities in NPD projects could be better managed if the actual numbers from past projects were revisited during the planning phase of new projects.

Besides supporting individual actors, financial control is also helpful in cooperation and communication among NPD project stakeholders. Project managers in Organization E stated that financial control has reduced the barriers between organizational functions. Even without direct implications to project managers' daily work, the increased awareness of financial aspects can help cooperation in the NPD project context. This is in line with Hall's (2010) idea of accounting information supporting managerial work, in general, i.e., both inside and outside of the project model. The formal project model was seen as a mechanism for communicating NPD project issues to different stakeholders. The maturity of such a communication culture, however, seems to vary from one organization to another, along with the scope of the financial control in use.

4.3 *The means to enhance the support of financial control for NPD project managers*

The interviewees were asked about the potential avenues for developing the form and roles of financial control in order to better support their work performance (Table 5).

Table 5 The means to enhance financial control support for NPD projects, as perceived by project managers.

<i>Development idea</i>	<i>Organization</i>							<i>Total</i>
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>Occurrence</i>
Data analyses and use for control	x	x		x	x	x		Strongly highlighted
Data integration and usability	x			x	x	x		Mildly highlighted
Estimates and planning	x	x		x	x	x		Mildly highlighted
Life-cycle orientation		x		x	x			Mildly highlighted
BIA calculations		x		x	x			Mildly highlighted
Cooperation within organization				x	x			Not highlighted
Availability of data					x	x		Not highlighted
Learning from ex post data			x			x		Not highlighted
Value analyses		x		x	x			Not highlighted
Cost consciousness		x		x	x			Not highlighted
Need for flexibility and risk appetite				x			x	Uncommon
Avoiding sub-optimization		x		x				Uncommon

Systematic measurement		x	Uncommon
Easier data interpretations		x	Uncommon
Overcoming dominant technical orientation	x		Uncommon
Long-term perspectives			x Uncommon
Real-time data	x		Uncommon
Personal knowledge and understanding		x	Uncommon

The most commonly mentioned ideas were connected to the need for analyzing and using the accounting information (instead of just gathering data), providing more comprehensive calculations (including long-term perspectives), analyzing business impacts regarding the projects, and integrating accounting information for easier utilization. Regarding BIA calculations, three interviewees discussed much about the further development of their utilization from multiple viewpoints. All interviewees recognized development avenues regarding the financial control supporting them (or the overall organization). In the relatively small organizations (Companies B and C), there was a remarkable difference between the number of development avenues brought up. This may be connected to the personal preferences of overcoming the challenges with enhanced financial control in different forms. Interestingly, also in Company C, reflections and learning from the financial control in forthcoming projects was recognized, and the interviewees' own (lack of) understanding about financial aspects was explicitly brought up only once, as an example of self-criticism.

Based on the content analyses of interview discussions, we categorized development ideas into four groups, representing major avenues for developing financial control for NPD projects: *more comprehensive analyses, with a well-defined connection to the business impacts* (24 mentions, four interviews); *enhanced data gathering, used also as a learning device* (19 mentions, six interviews); *enhanced design and availability of the accounting information* (18 mentions, four interviews); and *increased financial orientation and cooperation among the NPD stakeholders* (16 mentions, four interviews). All these aspects were considered as important among the NPD project managers interviewed. The aspects of data gathering and learning were discussed with almost everyone, but the four aspects listed above were discussed several times and appeared in the interviews naturally, i.e., without any suggestions made by the interviewers.

First, the category of more comprehensive analyses, with a well-defined connection to the business impacts, includes BIA calculations, life-cycle orientation, avoiding sub-optimization, and long-term perspectives. These items (together) convey the message that financial control, especially in NPD projects, should include a wider range of the relevant business impacts to actually support NPD project managers' work towards the realization of those impacts. This finding is in line with the analyses by Davila and Wouters (2004) and Meyer et al. (1997), who emphasize the broader view on NPD project impacts, even across single projects, to actually control and support NPD activities.

Second, enhanced data gathering, used also as a learning device, includes several issues—namely, data analyses and use for control, learning from *ex post* data, estimates and planning, value analyses, systematic measurement, and real-time data. In sum, the interviewees highlight the need for more systematic performance measurement which is usable for different purposes with a future orientation. For example, the initial investment calculations were not

reviewed or revisited afterwards. This means that the results are not compared with the initial estimates and that there are not many opportunities for learning about the actual realization of the business impacts of NPD projects.

Third, enhanced design and availability of the accounting information is a seemingly clear category. This theme includes data integration and usability, availability of the data, and easier data interpretations. Because NPD projects are essentially about future business, there is no single data source. However, NPD project managers need to collect data from different, often technically challenging, sources. This challenge is also related to individuals and wider organizational contexts and cultures.

Fourth, the category of increased financial orientation and cooperation among NPD stakeholders, thus, summarizes the need for changing traditional rules, routines, and ways of thinking in NPD organizations. This category includes overcoming dominant technical orientation, cost consciousness, limited personal knowledge and understanding, the need for flexibility and risk appetite, and the need for cooperation within an organization. These issues cannot be overcome only by NPD project managers or by top managers setting overall rules but, rather, through cooperation over a relatively long period of time.

4.4 Summary of the findings

The interviewed NPD project managers considered themselves more under control than in control, as the project models set requirements for them in charge of the NPD project execution. Besides, some NPD project managers recognized the formal NPD project model as means for communication within the R&D organization. Although several development ideas were brought up, one cannot conclude that NPD project managers were dissatisfied with the financial control in their organizations. While none of the interviewees explicitly criticized financial control or support from the overall organization, the development ideas represent the need to improve different aspects of their work and the overall functioning of the NPD organization in a given context. Many interviewees referred to the fact that only recently has more attention been paid to the development of accounting and financial control for NPD project management. This refers not only to the implementation of NPD project models but also to making things happen more effectively within the model in use, as summarized by Project Manager E:

“(...) if one tries to summarize, I think we are... in the right path from the viewpoint of financial control. We have recently emphasized these aspects much more than earlier. And we seek to integrate many aspects as well as we can, also into the project model, so that the [critical] issues quite naturally resurface.”

After implementing the NPD project model, many companies seek to strengthen the overall support from financial control in their NPD projects, and such a support is actively endeavored by the NPD project managers. The avenues for further developing the financial control for the NPD projects are related both to the information needs for the NPD project execution and to the reflection of the parties involved regarding the financial aspects of the NPD projects. Following such development avenues could lead into an enhanced financial control practice for the NPD projects and better perceived support from the financial control to the NPD project managers.

5 Discussion

The contribution of this paper lies in identifying the tension stemming from the role of the NPD project managers both in and under control and unveiling the implications of this tension to the financial control of the NPD projects. It is found out in this paper that NPD project managers play a central role in further developing NPD project management practice. Altogether, as a response to our research questions, we contribute to management control research in the following ways:

- (1) In this paper, we propose that the financial control for NPD projects should be more clearly connected to NPD project managers' actual managerial work (Hall 2010), including both project model execution and critical reflection on the current and forthcoming projects (building on Jørgensen and Messner 2010; Alvesson and Willmott, 2012; Korhonen et al. 2014; van der Meer-Kooistra and Scapens 2015). Existing research is largely focused on the effective execution of NPD projects. Further research should, however, examine the NPD project management practices outside single NPD project execution to better understand learning possibilities between projects and the development of the financial orientation among key NPD project stakeholders.
- (2) The paper proposes an extended list of units of analysis needed for financial control to ensure that NPD objectives are met (by elaborating on Davila and Wouters 2004; Tatikonda and Rosenthal 2000b). As found out in the interviews, relatively traditional units of analysis still dominate NPD project execution, whereas more comprehensive financial considerations and more proactive use of the traditional measures are still relatively scarce among companies. Further research should examine the design, implementation and use of these newly defined approaches for financial control that our field study suggests.
- (3) The paper shows the interviewed NPD project managers desire a more active role from the financial control for NPD project management (in line with Laine et al. 2016; also supported by Alvesson and Willmott 2012). Reflecting on Jørgensen and Messner (2010), the NPD project managers desire more support from accounting to the NPD projects. Further research should thus examine the prerequisites for such an advanced financial control practice, and the circumstances under which financial control is not available.

Altogether, Fig. 2 portrays the contribution of the paper to reflect our literature review and provides a more detailed description of the desired avenues for further developing the financial control of NPD projects (i–iiii). After Fig 2, we elaborate the outlined three contribution areas and formulate propositions to inspire future studies.

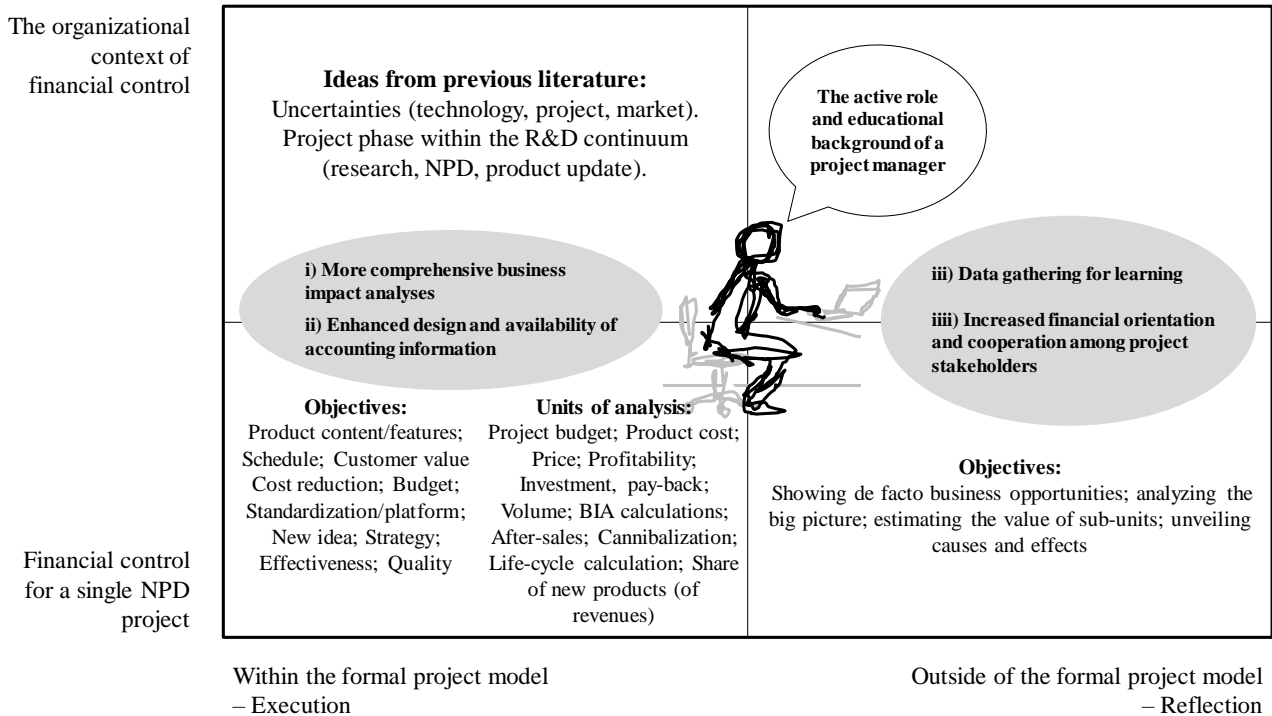


Fig. 2 Development needs for financial control in supporting NPD project managers.

First, the role of NPD project managers, both in and under control, was witnessed in all the companies interviewed and explicitly discussed by most of the project managers. More specifically, the project model in some organizations provides project managers with limited autonomy; whereas, other NPD project managers see the project model as a mechanism to support their work with substantial flexibility (cf., Tatikonda and Rosenthal 2000a). In our results, as a new insight into NPD project control literature (cf., Jørgensen and Messner 2010), the project managers saw their roles primarily as being *under control*, instead of primarily *controlling* the project they are responsible for. In some organizations, there are several other aspects overruling financial control in NPD projects. Thus, the actual practice of financial control seems to be highly dependent on the role taken by the project manager.

The formal project models still outline the overall context and practice of financial control for NPD. This paper combines an examination of NPD project model execution (building on Ylinen and Gullkvist 2012; 2014) with NPD project managers' roles and viewpoints on wider objectives for financial control. Our results suggest that financial control is primarily used to ensure project execution according to formal requirements. Only rarely do NPD project managers seem to initiate discussions among project stakeholders about wider business impacts (as suggested by Laine et al. 2016; also in line with the critical reflection suggested by Alvesson and Willmott 2012), even if those new ideas about business impacts would help the project personnel to fulfill project objectives. However, such discussions are not clearly supported by the *de facto* financial control for NPD projects. Altogether, these exploratory findings suggest that:

Proposition 1: NPD project managers will perceive the financial control more supportive, if the dual role of being both in control and under control is recognized in an organization.

Proposition 2: NPD project managers will perceive the financial control more supportive, if the financial control is connected not only to an ongoing NPD project but wider business impacts (including reflections on other projects).

Second, regarding the objectives set for NPD projects and the units of analysis used, we found that NPD project managers are sufficiently supported with economic facts directly related to project model execution. At the same time, the priorities and actual meaning of different objectives set for NPD projects are not widely translated into requirements for financial control (as units of analysis in financial control). Rather, there are emerging issues regarding, for instance, technical features, budgets, and schedules that may overrule updating business impact analyses and managing profitability accordingly. As noted in earlier studies, formal project models may turn stakeholders' attention towards wrong issues such as the budget, in some cases (Davila and Wouters 2004; see also van der Meer-Kooistra and Scapens 2015). Compared with earlier studies, in this paper, we examine the role of financial control in a detailed manner by discussing the objectives and units of analysis related to NPD projects (see e.g., Davila and Wouters 2004; Tatikonda and Rosenthal 2000b). As a result, we found that only the traditional units of analysis (such as budgets, cost targets, and expected profits) were widely used in NPD projects in our results. If long-term business impacts were analyzed, they were not revisited afterwards so as to ensure a proactive management style (Lewis et al. 2002; Laine et al. 2016). One may argue that project models provide seemingly analytical frameworks for NPD project management, but proactive support for meeting the emerging business opportunities is not currently attained through existing NPD project control. Altogether, we propose that:

Proposition 3: NPD project managers will perceive the financial control more supportive, if the units of analysis are derived from the objectives set for NPD projects.

Proposition 4: NPD project managers will perceive the financial control more supportive, if the units of analysis are utilized in a proactive manner.

Proposition 5: Using more comprehensive units of analysis in the financial control for NPD projects will increase communication and learning between projects.

Third, regarding the possible avenues for developing the financial control of NPD projects, interviewed project managers desired a more comprehensive and yet more active role from financial control for NPD project management. In particular, we found i) the need for more comprehensive analyses, with a well-defined connection to the business impacts; ii) enhanced design and availability of the accounting information; iii) enhanced data gathering (also used as a learning device); and iv) increased financial orientation and cooperation among NPD stakeholders. All these aspects would serve the purpose of better supporting NPD managers in their work and the NPD project personnel, in general (Hall 2010). More particularly, the first two of these aspects may be directly connected to the execution of single NPD projects according to the (enhanced) project models (structured decision-making, e.g., Mintzberg et al. 1976); whereas, the two latter aspects are connected to the increased critical reflection among NPD project managers and other stakeholders (Alvesson and Willmott 2012). We expect that, following these guidelines, more comprehensible control systems could support NPD project managers (cf., Janssen et al. 2011) by, perhaps, focusing their work towards certain topical goals. Addressing the effect of the identified development guidelines on the comprehensibility of controls and

the identity construction of an NPD project manager, might be fruitful topics for future researchers to address. These findings lead to the following proposition:

Proposition 6: Following the avenues for further developing the financial control for the NPD projects would lead into a more mature financial control practice (e.g., comprehensive calculations, active role of key project stakeholders, reflections and communication) and thus increased perceived support among NPD project managers.

As conveyed in Fig 2, establishing new discussions on the financial impacts of an NPD project (see e.g., Laine et al. 2016) requires informal practices of increasing financial orientations and enhancing the availability of financial information. Such discussions are not meant to increase the power of NPD project managers (or financial controllers) in NPD project execution but to provide a platform for developing the practice of financial control for supporting NPD project managers and, thus, enable desired business impacts. Based on our results, it seems clear that researchers and practitioners alike need to delve deeper into how learning from financial numbers is facilitated in NPD. This finding further adds to the notion of informal control in NPD as not only personnel and cultural controls (e.g., Kleine and Weißenberger 2014) but also as calculations that supplement formal project models. This means that it is necessary not to look only forward or only backward but, rather, do both. Reflection on past events can inspire new ways of working and enable learning from mistakes or feasible practices (Alvesson and Willmott 2012). A project manager plays a central role in this learning-from-numbers process. It is natural for a financial manager to look forward (e.g., rolling estimates) and backward (e.g., actual numbers), but when a new product is in question, a number of stakeholders need to cooperate in order to build a profound understanding of what short-term and long-term goals are realistic, what their mutual weights are, and what actions need to be taken in order to reach these goals. Financial numbers provide a platform for this discussion, e.g., in the form of BIAs that are being updated during NPD projects to enable discussions on numbers and, hence, enable learning during projects (not just after their completion).

It is noteworthy that developing more supportive financial control for NPD projects does not necessarily mean new or more numerous NPD project controls or related financial reports. Instead, a balance between formal and informal NPD project control practices is desired. Our findings are somewhat similar to those of Lukka's (2007), where informal controls supplemented the formal control system and, thus, shielded the formal systems from change pressures. We interpret that the project managers in our data perceived some vast objectives for financial control outside of the formal project model (i.e., showing *de facto* business opportunities, analyzing the big picture, estimating the value of sub-units, and unveiling causes and effects). Although bringing up these issues would be important avenues for further developing financial control, they could also potentially bring a burdensome bureaucracy in the project model execution. Therefore, increased financial orientation outside of the formal project model can at least, to some extent, be a response to these vast objectives for financial control. Hence, these objectives further fortify the need for more available accounting information (to the NPD project managers) and increased orientation and cooperation around financial aspects. Altogether, our results show that there is no need for "more is more" thinking; instead, only some needs for financial control development require changes in the formal NPD project model and project managers' responsibilities.

This paper presents an exploratory field study on a relatively unaddressed phenomenon. Methodologically, there are, of course, some challenges in drawing conclusions based on the coding of qualitative material. In a coding process

(with ATLAS.ti, in this case), interpretations are needed. Besides, if one of the interviewees brings up one issue several times, one has to qualitatively analyze its importance in light of other interviews and existing research. Altogether, this paper is purely qualitative in nature. As an implication, there can be several factors affecting the actual practice of financial control for NPD projects, which are unaddressed in this study, including different sources and types of uncertainties and complexities affecting the NPD project management and project managers (see e.g., Laine et al. 2016). Therefore, we highly encourage addressing the propositions outlined in this paper as a basis for further studies to possibly confirm, elaborate upon or abandon our exploratory findings. One additional avenue for further study could be a more detailed and comprehensive examination of financial control that supports NPD projects in the ICT sector. This is because the recently adopted agile methods could provide a new organizational context for NPD project managers.

6 Conclusion

The originality of this paper lies in addressing the versatile role of NPD project managers, i.e., in and under control, and the current and potential support of financial control perceived by these project managers. Our suggestion is that the viewpoints of NPD project managers need to be acknowledged, as project managers have a significant influence on NPD project performance. Thus, the support of financial control should be designed and utilized accordingly. In particular, there seems to be a clear need for proactive use and discussion regarding more comprehensive business impacts gained from NPD projects. This requires, however, a balance between the different managerial roles within NPD projects, as well as a balance between formal NPD project model execution and informal, more reflective NPD project control practice. A detailed examination of NPD project control, as experienced by NPD project managers, was required in order to better understand the dynamics of NPD project control and identify the most appropriate avenues for further developing the financial control of NPD projects.

Finally, managers' multifaceted roles deserve further attention in management control research. Examining managers' roles as organizational hubs potentially unveils fundamental challenges in management control practices. In this vein, future research could test the relationships between the advanced control aspects identified in our paper, explicating the significance of enhanced design and the availability of accounting information, more comprehensive BIAs, data gathering for learning, and increased financial orientation and cooperation to support NPD project success. Such significance could well be tested with quantitative analysis. At the same time, in-depth accounts of these aspects (such as case study narratives) could bring to light important insights of NPD control in practice.

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