

Empirical Research Paper

Practices of strategic alignment in and between innovation project portfolios

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ABSTRACT

Strategic alignment of project portfolios concerns the match between projects in the portfolio and the organization's strategy. It is often considered either as a selection criterion when creating the project portfolio or as a performance indicator when assessing success. Organizations pursue optimal strategic alignment while retaining responsiveness to changes in the environment. The problem guiding this study is the need to understand how strategic alignment occurs in practice in the work of project portfolio management in the context of multiple project portfolios. We explore large firms' practices of strategic alignment and cross-portfolio interplay in the innovation project portfolios of three industrial firms. The findings reveal social, mechanistic, and structural practices of portfolios' strategic alignment and sharing, synergy creation, and boundary-spanning practices in cross-portfolio interplay. Strategic alignment is reported as a dynamic, continuous activity in the work of managers and personnel, with versatile practices that drive both efficiency and renewal.

1. Introduction

Firms want their innovation projects to produce outcomes that implement their strategy while at the same time promoting the renewal of the business. In project portfolio management (PPM), the strategic alignment (or fit) of the project portfolios and individual projects within them is considered a principle and assessment criterion guiding the selection of projects (Archer and Ghazemzadeh, 1999; Cooper et al., 1997a, 1997b; Dye and Pennypacker, 1999; Englund and Graham, 1999) as well as a project portfolio success criterion (Cooper et al., 1999; Jonas et al., 2013; Kock and Gemünden, 2019; Kock et al., 2016; Kopmann et al., 2017). Large firms usually have multiple project portfolios designed for different purposes and strategies, and the organization of these project portfolios may follow the structural arrangements of the entire organization (Artto and Dietrich, 2004). This study concentrates on large firms' innovation project portfolios and their strategic alignment and cross-portfolio interplay in multi-portfolio contexts.

Innovation project portfolios are the collection of a firm's innovation projects included under the same management umbrella (Dye and Pennypacker, 1999). For example, a firm might decide to have separate innovation project portfolios for its product development, service development, technology development, and long-term research (Artto and Dietrich, 2004), or separate project portfolios might emerge based

on different management styles (Loch, 2000). Alternatively, the firm might organize separate innovation project portfolios for each business unit or geographic area. In this study, strategic alignment in PPM is defined as ways of connecting or fitting the project portfolio and its projects with the firm's official strategy. Extant research dominantly treats this as the extent to which the projects (individually) or the portfolio (as a whole) fit with the strategy. In this study, we also acknowledge that project portfolios do not exist in isolation but are connected with other portfolios and activities in the firm as well as the external business environment, in line with Martinsuo and Geraldi (2020).

The previous research on project portfolios' strategic alignment is limited in two primary ways. Firstly, its treatment is often very static; it is used as an *episodic measure* that is observed externally and momentarily, but the research does not discuss how organizations develop and achieve it in practice. As described above, strategic alignment is frequently treated as an *input* (i.e., assessment criterion) into project selection or as an *outcome* (i.e., success criterion) of doing the right projects. Yet, organizations need to *do some aligning* in practice, too, when managing the project portfolio, and this dynamic, proactive aspect of strategic alignment is weakly understood. Consequently, we adopt the practice-centric view of portfolios' strategic alignment following some previous influential portfolio studies (Blichfeldt and Eskerod, 2008;

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Christiansen and Varnes, 2008; Clegg et al., 2018; Jerbrant and Karrbom Gustavsson, 2013; Martinsuo, 2013).

Secondly, strategic alignment is often considered merely for a *specific project portfolio*, as if it represents all portfolios in the firm and as if there is only one strategy with which the projects and portfolio should be aligned. However, medium-sized and large firms are likely to have multiple different project portfolios, each with their own specific strategy (or multiple strategies) and related selection and success criteria. Previous research has rarely considered the *interplay and relations between different project portfolios* in the firm when pursuing strategic alignment, but the need for context awareness has been explicated in conceptual portfolio research (see Martinsuo, 2013; Martinsuo and Geraldi, 2020). Our research is motivated by the need for a more context-sensitive treatment of strategic alignment of innovation project portfolios, especially acknowledging cross-portfolio linkages.

The purpose of this study is to explore firms' practices of strategic alignment and cross-portfolio interplay in innovation project portfolios. The goal is to increase the knowledge on how strategic alignment happens in practice in the work of personnel involved in PPM in the multi-portfolio contexts of large firms. The research focuses on two main questions: 1) *How, through what kinds of practices, do firms implement strategic alignment in their project portfolios?* and 2) *How do firms consider cross-portfolio linkages when implementing strategic alignment in their project portfolios?* The study is delimited to innovation project portfolios of large business-to-business firms that have multiple portfolios, while smaller firms and other types of project portfolios are purposely excluded. The chosen firms are innovation-oriented in their strategies but represent conventional industrial manufacturing, which may limit the transferability of the findings. We purposely excluded the consideration of formal structural arrangements of project portfolios as they tend to be pre-defined by top management instead of at the portfolio level.

Next, we summarize previous research on how strategic alignment has been considered both for selecting projects for inclusion in the project portfolio and assessing project portfolio success. Also, we introduce how the multi-portfolio context of large firms has been discussed in previous research and how it portrays strategic alignment to highlight the potential for further research. We then introduce the qualitative multiple-case study conducted with three large firms that have multiple innovation project portfolios. Data collection was done primarily through key informant interviews and the consequent thematic data analysis approach. Social, mechanistic, and structural practices are reported as key mechanisms of strategic alignment in project portfolios. The interplay between multiple project portfolios is handled through sharing, synergy creation, and boundary-spanning practices. We discuss the continuity of strategic alignment practices of managers and personnel as key contributions, the possibilities for exploring the identified strategic alignment practices as topics of future research, and the contextuality of strategic alignment in the organizational cultures and subcultures of firms.

2. Literature review

2.1. Aligning projects with strategy

Companies organize their innovation activities into portfolios of projects to ensure that the projects fulfill the strategic objectives of the firm. Strategic alignment, strategic fit, or strategy implementation is considered one of the key goals of portfolio management. Other goals include value maximization and portfolio balance (Cooper et al., 1997a, 1997b), average project or product success, and exploitation of synergies (Jonas et al., 2013; Kock and Gemünden, 2019; Kock et al., 2016; Kopmann et al., 2017). The expectation of alignment may deal with any aspects of strategy, ranging from its ideological standpoint and market positioning to resources, competences, benefits, and risks. Often, the general assumption is that strategic alignment should be considered

early on, when projects are being proposed, assessed, prioritized, and consequently selected for the portfolio (Archer and Ghasemzadeh, 1999; Cooper et al., 1997a, 1997b; Dye and Pennypacker, 1999; Englund and Graham, 1999). In this way, projects are designed, prioritized, strategically selected, and considered as vehicles or mechanisms of strategy implementation.

For single projects to be aligned with strategy, they need to be planned in such a manner that the goals, benefits, and ways of operating are defined with the strategy in mind (Englund and Graham, 1999). In the context of innovations, this causes a dilemma. On the one hand, innovations are expected to bring renewal to the firm and potentially pave the way for enabling emergent strategies in PPM (Kopmann et al., 2017; Loch, 2000). On the other hand, if renewal intentions are built into a strategy that guides innovations, then such a strategy may directly guide projects' goal setting and planning (Cooper et al., 1997a; Englund and Graham, 1999). Thereby, innovation project portfolios may serve both renewal and strategy implementation simultaneously (Kopmann et al., 2017), and the different project portfolios in a firm may be used to follow strategies that emphasize incremental versus radical innovation pursuits differently (Loch, 2000).

At the individual project level, the dilemma between strategy renewal and implementation may be resolved when each project has its own strategy that may or may not obey the parent organization. Project strategy specifies the direction of the project and ways in which its success is assessed (Arto et al., 2008; Arto et al., 2008); it includes the perspective, position, and guidelines on what is done in a project and how in order to achieve the best value from the project and, thereby, beat competitors (Patanakul and Shenhar, 2012). Project strategies vary depending on the complexity of the stakeholder setting and autonomy that the project can adopt in its environment (Arto et al., 2008). According to Arto et al. (2008), innovation projects within one parent organization can either serve the strategy of the organization obediently or purposely contradict such a strategy in pursuit of radical renewal. When a firm has multiple different project portfolios, they and their specific projects can be designed with different strategies in mind.

At the level of single projects, strategic alignment is often considered only in terms of an assessment and selection criterion at the start of the project. However, a project's strategic alignment is expected to continue through its implementation so that its outcomes eventually fulfill the strategic goals set for the project and the firm. Project success is increasingly considered from broader business and customer perspectives (Atkinson, 1999; Shenhar et al., 1997, 2001) and concerning strategic outcomes. As many kinds of changes may occur during a project (Dvir and Lechler, 2004; Steffens et al., 2007), there is a need to consider strategy alignment and re-alignment later on in the project and during project termination (Unger et al., 2012). Particularly in uncertain environments surrounding innovations, there is a need to manage uncertainties as part of the projects and take them into account in managing project portfolios (Martinsuo et al., 2014; Petit and Hobbs, 2010).

2.2. Strategic alignment or fit of the project portfolio

In PPM research, strategic alignment (i.e., fit or implementation) is considered among the central criteria for assessing the success of the project portfolio (Jonas et al., 2013; Kester et al., 2014; Kock and Gemünden, 2019; Kock et al., 2016; McNally et al., 2013) or its management (Martinsuo and Lehtonen, 2007; Spieth and Lerch, 2014). It is often considered in terms of projects in the portfolio fitting or implementing the official strategy and serving the future pursuits of the organization. Previously, there has been a tendency to include strategic alignment or fit as a first-order construct as part of a more comprehensive second-order measure of project portfolio success or PPM success (Jonas et al., 2013; Kock and Gemünden, 2019; Kock et al., 2016; Spieth and Lerch, 2014). However, some authors have shown that some antecedents of portfolio success yield different results for different first-order constructs of portfolio success (Kock and Gemünden, 2019;

McNally et al., 2013).

Quantitative project portfolio success studies tend to seek managerial factors that would explain project portfolio success for instance in the criterion of strategic alignment. However, Martinsuo & Geraldi (2020) offered a critique for assessing strategic alignment as a measure of portfolio success when the nature of the strategy is not specified. They pointed out that organizations have different strategies, and the strategic alignment or fit of portfolios in one organization cannot be directly compared with that of another organization. For example, the strategic alignment for differentiation strategies is not the same as the strategic alignment for cost efficiency or customer intimacy strategies (Martinsuo and Geraldi, 2020). In a similar way, strategic alignment might differ for different time intervals and different project portfolios. Portfolios of radical innovation projects would likely differ from portfolios of incremental projects in how strategic alignment is defined (Loch, 2000). Likewise, technology development project portfolios would differ from service development project portfolios. In many research studies, portfolio managers' or directors' assessment of and satisfaction with strategic alignment is used as a proxy, likely because it is challenging to acknowledge exactly what strategies the portfolios are aligned with and make them otherwise comparable.

In the pursuit of better portfolio success, plenty of research has considered the practices through which organizations attempt to promote portfolio success, but only a few studies have concentrated on factors that specifically explain or contribute to strategic alignment. Unger, Kock, et al. (2012) found that senior managers' involvement and project termination quality were positively associated with portfolio strategic fit. Beringer et al. (2013) reported that the level of certain senior managers' involvement and role clarity had interaction effects on portfolio strategic fit. McNally et al. (2013) concentrated on decision-making effectiveness and showed that portfolio mindset, focus, and agility were antecedents of strategic alignment (as well as other portfolio success criteria). In the study by Kock and Gemünden (2019), proactive and reactive lineage of projects were both associated with strategic fit, but their effects varied for the other first-level measures of portfolio success. Such studies clearly draw attention to managers' actions.

The outcome-centric view of strategic alignment, however, does not offer a clear view on how such aligning occurs in practice, i.e., what managers actually do when they *strategically align* the project portfolios. While some conceptual studies clearly encourage exploring managers' and personnel's actions in managing project portfolios (Clegg et al., 2018; Martinsuo, 2013), practice-centric studies tend to concentrate on how managers deviate from established norms, rules, and routines (Blichfeldt and Eskerod, 2008; Christiansen and Varnes, 2008; Jerbrant and Karrbom Gustavsson, 2013). If innovation project portfolios are established to implement renewal-oriented strategies, we need to understand how strategic alignment occurs in the practices of managers and personnel.

2.3. Strategic alignment between project portfolios

Particularly in large firms, it is likely that innovation projects are organized into not just one but several different project portfolios. In organizations, this multi-portfolio issue is commonly treated as a structural solution whereby portfolios are defined by business areas or organizational units, geographic areas, or innovation types (Arto and Dietrich, 2004; Loch, 2000), or they could be considered "project buckets" to which resources and money are allocated based on strategic priorities (Cooper et al., 1997b). However, PPM studies are often carried out concerning a specific project portfolio only, neglecting the possible multi-portfolio circumstances in the organization.

The existence of and relations between different project portfolios are rarely discussed in the literature, but multi-portfolio interplay could be very challenging and influential with regard to strategic alignment. The context connections of project portfolios may be influential and

require attention in PPM (Engwall, 2003; Martinsuo, 2013; Martinsuo and Geraldi, 2020). Multiple portfolios in an organization may compete for and share some of the same resources as projects do (Engwall and Jerbrant, 2003; Elonen and Arto, 2003; Fricke and Shenhar, 2000). They might share the same project management office as a source of support coordination, tools, and guidelines as well as the guidance and engagement of senior management (Beringer et al., 2013; Unger et al., 2012). Organizations may occasionally observe that the same or overlapping tasks are done in multiple project portfolios (Elonen and Arto, 2003) or that the portfolios could benefit from each other by sharing information and learning from each other to reach synergy (Kock and Gemünden, 2019). There is increasing understanding that portfolios are connected temporally, with current projects building on past projects' lineage (Maniak and Midler, 2014; Midler, 2013), learning from each other, and creating a lineage for the future in the form of roadmaps (Kock and Gemünden, 2019). These examples indicate that the interplay between project portfolios is strategic, relevant, and may have significant consequences both at the portfolio and organizational levels, but research has yet to purposively tackle cross-portfolio linkages.

In our view, strategic alignment is not only something that occurs between a certain project portfolio and the strategy it implements but also something that requires cross-portfolio interplay when multiple project portfolios exist in parallel. Fig. 1 summarizes three aspects of strategic alignment of project portfolios as covered in previous research. The focus of this paper is on the strategic alignment of the project portfolio as a whole (marked with 2 in Fig. 1) and in terms of the cross-portfolio interplay (marked with 3 in Fig. 1). The attention is in practice, i.e., what managers actually do when they align the innovation project portfolio strategically.

3. Methods

3.1. Research design and cases

This study was carried out using a qualitative multiple-case study with three firms that implemented their innovations through projects. We purposely selected large firms that had at least two innovation project portfolios and prioritized innovation in their strategies. One firm represented the forest industry, and two firms represented the mechanical engineering industry. All firms operated internationally in business-to-business markets, and their headquarters were located in the same country. Table 1 summarizes the background information of the companies and interviewees.

The focus is on the PPM of innovations in these firms, and the case (unit of analysis) is each firm's approach for handling strategic alignment as part of PPM. Firm A divided its innovation activities into two main innovation project portfolios according to product and service

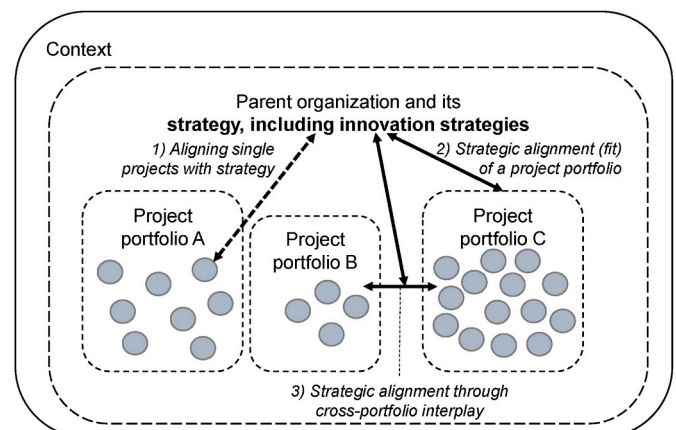


Fig. 1. Summary of strategic alignment in and across project portfolios.

Table 1
Background information on the studied firms.

	Firm A	Firm B	Firm C
Industry Offering	Forest industry Renewable wood-based materials	Mechanical engineering Mobile work machines and related services	Automation for mechanical engineering Automation solutions and related services for mobile machines
Turnover (M€)	>1800	>3000	>1500
Personnel	>2000	>16,000	>10,000
Nr. of innovation project portfolios	2	>3	>3
Nr. of interviews (interviewees)	3 (4)	5 (5)	3 (3)
Job profiles of interviewees	Vice president of Research and development, process owner, project manager	Vice president of technology, process owner, technology director, service manager, innovation manager	Director of product management, portfolio manager, product manager

offerings. Firm B organized its product and service development within business units, each of which had its own innovation project portfolio containing both incremental and radical development. Firm C had separate product development and process development project portfolios for business areas and guided such activities through strategic themes such as sustainable development and automatization.

3.2. Data collection

Data were collected through semi-structured interviews with key informants involved in managing the innovation project portfolios. A contact person in charge of innovation activities in the firm helped identify interviewees to ensure that they were key persons involved in steering and managing an innovation portfolio and/or leading the innovation activities in a business unit. All interviewees therefore had first-hand knowledge of one or more innovation portfolios. Within each firm, three to five such persons were interviewed to gain a comprehensive picture and triangulate the data. Table 1 summarizes the interviews. There were 12 interviewees total (one interview included two persons), and the interviews lasted 50–96 min (average 60 min).

The interview outline included questions concerning the company’s and interviewee’s background, the key stakeholders involved with innovation project portfolios, their responsibilities and tasks, how the project portfolios were organized, how uncertainties in the project portfolios were managed, connections and interfaces between the project portfolios, and linkages between the portfolios and strategy. The main topics were supplemented with more detailed questions as needed. This paper concentrates on the strategy connections and cross-portfolio interfaces. The second author conducted all interviews using the interview outline, but the order and coverage of the questions varied across the interviews depending on the interviewees’ spontaneous coverage of the relevant issues. The interviews were recorded and transcribed for the purposes of analysis. Company-specific public documentation such as websites were used as secondary data, particularly to understand the business contexts and industries.

3.3. Data analysis

The data analysis proceeded in three main phases. First, the interview transcripts were read through, and a tentative analysis was conducted using an open coding approach to identify possible repeating codes on strategic alignment at the level of the portfolio, portfolio connections, and stakeholder interactions with the portfolio. Case-specific results from these analyses were drafted and reported back to the companies to verify the tentative findings and potentially gain feedback and improvement suggestions from the company personnel.

Second, based on the positive feedback from the companies, an additional reading of the interview data, and the authors’ creative discussion, we developed more structured and robust analysis frameworks to serve the recurring patterns in the interview data. One coding framework concerned the strategic alignment in the project portfolios

(covering social, mechanistic, and structural practices; see Table 2). The other coding framework examined strategic alignment across multiple project portfolios (covering sharing, synergy creation, and boundary-spanning practices; see Table 3). Each case was systematically coded according to these themes, and cross-tabulation was used to summarize the extent to which the issues were discussed in the interviews. As background information, we explored each firm’s strategies and governance of the innovation project portfolios.

Third, we tracked the similarities and differences between the target companies’ strategic alignment of project portfolios to understand the cases both separately and together. We went back to detailed interview transcripts to discover illustrative quotes and examples for the findings. This final phase is reported through a thematic storyline that spans across the cases. Lastly, we reflected on the key findings in the literature to discover and discuss the novel findings.

4. Results

4.1. Strategies guiding innovation project portfolios

The studied firms had established strategies to guide innovation activities with the intent of securing the firms’ future existence by delivering the right types of innovations at the right time. The firms differed in the terminology regarding their strategy—technology, product development, and business unit strategies—but all three had the same intent of specifying and directing future innovations. For example,

Table 2
Practices used for strategic alignment expressed in the interviews.

Category	Practices	A (n = 4)	B (n = 5)	C (n = 3)	Sum (N = 12)
Social practices	Interacting and communicating strategically	3	1	2	6
	Involving and engaging stakeholders	3	2		5
	Cooperating in defining the strategy		1	1	2
Mechanistic practices	Using the PPM system	4	1	1	6
	Using key performance indicators and measures		1	1	2
	Visualizing portfolio status on a dashboard (linked to project control)			1	1
Structural practices	Clarifying the value chain for innovations		2		2
	Considering the roadmap of projects over time (to prepare for long-term future)		1		1
	Reducing or avoiding the hierarchical layering of innovation planning and reporting		1		1

Table 3
Practices for strategic alignment in cross-portfolio interplay expressed in the interviews.

Category	Practices	A (n = 4)	B (n = 5)	C (n = 3)	Sum (N = 12)
Practices of sharing	Sharing of resources	4	3	3	10
	Sharing of (internal) information regularly	3	3	2	8
	Sharing of information and weak signals from external stakeholders	2		2	4
Practices of synergy creation	Using the same external partners (repeatedly)	3	3		6
	Using the same technologies and facilities		2	3	5
	Encouraging competition and openness on successful innovations between portfolios (but avoiding resource competition)			1	1
Practices of boundary spanning	Acknowledging the benefit of cross-portfolio interplay (or failure thereof)		2	1	3
	Using tools to depict cross-portfolio interfaces	1			1

in Firm C, the importance of strategy with regard to projects was emphasized in business units' activities: "There is no separate innovation strategy, but it is covered as part of the technology unit's business strategy – we can clearly see that innovation is a focus area and an issue visible in the strategy" (H12). Irrespective of the terms used, the innovation strategies contained priorities regarding customer needs, creation of added value, differentiation, technological leadership, and competitive means, thereby guiding the direction of innovation activities.

The strategies in all three firms featured goal orientation, improvement orientation, and creation of functional solutions to customer needs. The firms differed slightly in the emphases communicated in the strategies: Firm A included innovations as part of its corporate strategy and management group decision making, Firm B developed separate innovation strategies for each business area, and Firm C emphasized corporate-level technological capabilities as part of its innovation strategy. In all firms, the focus was on steering innovation activities holistically as entire portfolios and not just single projects.

The interviewees had somewhat different experiences concerning how the corporate strategy was reflected in innovation strategies and detailed in innovation projects and activities, even within the same firm. Some interviewees saw a very evident linkage between the different strategies and innovation projects, for example, in terms of how customer needs were acknowledged in the strategy and reflected in innovation projects. Similarly, the strategic priority of environmentally friendly solutions appeared as a clear continuum from strategies to projects. In Firm B, however, the division into multiple different business unit strategies caused versatile interpretations of innovation in the strategies: "The product strategy is quite siloed and is not that well-visible in innovation activities" (H8). Such experiences varied, though, and the silo experience was not necessarily shared across the business units.

Interviewees did not spontaneously express how the innovation project portfolios influenced the firms' strategies. Because the directors and managers themselves were involved in strategic analysis and planning, they as individuals had an influence on the strategies. Also, some interviewees expressed that the strategies were to some extent vague and general and that they required individuals' interpretation when converted to project portfolios. Therefore, the interpretation process from strategy to projects required creativity and innovativeness. For example, one interviewee in Firm A explained this as follows: "The mission given in the strategy is not always very accurate; of course, it

never goes directly to the project level ... so we have to translate the strategic task somehow into project portfolio goals and project goals to specify more concrete accomplishments and performances." Interviewees in Firm C emphasized the multiple levels of the organization and cooperation in and between business units in designing the strategies. The overarching strategies required portfolio and project-level interpretation among the people involved in those portfolios, and this collaborative interpretation process yielded both the visions of desired states in a few years' time and the steps toward such visions.

4.2. Practices for strategic alignment of project portfolios

The analysis revealed three main categories of practices for strategic alignment of project portfolios: social, mechanistic, and structural. The social practices required individuals' interaction at and between the different levels of the organization and between the firm and other stakeholders. The mechanistic practices dealt with systems, tools, and measures harnessed for enabling and enforcing strategic alignment of portfolios. The structural practices dealt with how the organization and its projects and other activities were organized to enable strategic alignment. The firms differed to some extent in how the practices were used. Strategic alignment was most visible in the practices of Firm A, which had systematized the strategic alignment of project portfolios very recently. Firm B interviewees mentioned many different practices for strategic alignment but also identified areas of improvement in how strategic alignment could be achieved. Firm C interviewees emphasized that innovation activities were already strategically well-aligned and that alignment-related routines were in regular use. Table 2 summarizes the practices identified and the extent to which they were discussed by different interviewees.

The interviewees most frequently discussed the *social practices* of communicating the strategy, involving stakeholders, and cooperating to define the strategy. Firm A interviewees discussed how the management led a very concentrated approach to strategy communication and required strategy-related justifications for proposing projects. This was also reflected in strategy-related assessments of projects both before their selection and during implementation. This shift to strategy-oriented communication in innovation PPM was recent and had improved personnel's awareness of aligning projects with strategy and the future orientation of innovation projects: "Earlier, our communication was on a quite different level ... now managers constantly repeat in their talk which strategy we follow and what are the largest and most significant projects that are related to [that] strategy" (H3). The centrality of strategy communication was also visible when cooperating with external stakeholders.

Firms B and C had somewhat more versatile experiences of the social practices of strategic alignment and less emphasis on communicating innovation strategies. Interviewees in Firm B discussed regular strategy meetings and cooperation between project portfolio actors and with other stakeholders to build awareness of strategic priorities in innovations. Firm C interviewees discussed the use of documented product roadmaps and plans as a means of involving personnel and stakeholders in planning, communicating, and implementing innovation strategies in projects. This, in a way, combined the use of mechanistic and social practices.

All the firms had some kind of PPM information system in place, which represents an example of *mechanistic practices* used for strategic alignment. Firm A had recently implemented a new management system for leading and steering the project portfolio, which was a major topic of discussion in their interviews. The system enabled steering the projects in the portfolio toward strategic goals systematically and effectively and identifying dependencies and synergies between projects. Particularly when the number of projects increased, the system was considered a useful way to help decision makers comprehend the complex portfolio entity.

In Firms B and C, such systems, dashboards, and performance

measures were mentioned as useful in forming a complete picture of the portfolio status and monitoring single projects, but interviewees expressed them as possibilities not yet in use. For example, in Firm C, one interviewee felt that a more comprehensive PPM system could be useful in guiding and monitoring innovation activities “so we would not need man-made monthly reports, but we could just open the dashboard and see different scenarios” (H12) of what the portfolio could offer and require in the future. Some interviewees, especially those in Firm B, felt that visualization, automatization of repeated functionalities, and offering decision options in the tools could help not just in assessing strategic alignment and consequent monitoring and decision making but also in sharing information among stakeholders and improving the innovation culture. They also expressed a need for more accurate measures and a more systematic approach to handling the entirety of the innovation project portfolio.

Besides current practices, Firm B interviewees expressed some *structural practices* that either could be useful or that should be avoided to drive strategic alignment and complement the social and mechanistic practices. Some interviewees mentioned the need to look at the upcoming projects over time to form a comprehensive picture of the project roadmap. They expressed the need to reduce hierarchies in the organizational structure to avoid “tunnel vision” and to assist strategy orientation in innovation projects. One interviewee used the following example: “We have these technology platforms for multiple products. As long as profit and loss responsibility is here [in the business units], there is a risk that we are building an extra layer of hierarchy with them. Eventually, we may notice that the platform layer will employ itself with all kinds of reporting needs and does not add value to the customer interface in any way.” They pointed out the necessity of understanding value throughout the entire innovation value chain as well as involving external partners in the supply chain in order for the innovation outcomes to fulfill strategic objectives. The structural practices were in this case expressed as issues requiring personnel’s understanding and attitude adjustment and as improvement needs that could potentially be resolved in the future to strengthen strategic alignment.

4.3. Practices for strategic alignment across portfolios

Each firm had at least two separate innovation project portfolios, so we explored strategic alignment and its practices concerning cross-portfolio interplay. Interviewees acknowledged the existence of boundaries between innovation project portfolios, and they mentioned various practices of cross-portfolio interplay and related strategic alignment, which we categorized into sharing, synergy creation, and boundary spanning. While resource and information sharing and synergies have been well-explored in the previous literature, they are often examined solely within the firm; in our study, they were also connected to other stakeholders and complemented with practices concerning purposive boundary spanning between project portfolios. Table 3 summarizes practices of cross-portfolio interplay dealing with strategic alignment and how they were covered in the interviews. Many practices were covered in all organizations, but interviewees also expressed clear needs for improvement in these kinds of cross-portfolio strategic alignment practices.

The *practices of sharing* concerned both resources and internal and external information across the project portfolios. They dealt with offering access to competences and information between the portfolios to overcome resource scarcity and benefit from learning. Interviewees in Firm A described how cooperation and allocation of resources between different project portfolios was open and transparent, which helped with managing the complex settings: “We cross-use our competences [between portfolios], and by competences we mean people, so this is the way in which the project portfolios are connected, I would say continuously” (H1).

Firm B interviewees characterized their innovation project portfolios as somewhat separate entities despite their position within the same

business units. They had product development teams that served the needs of different business areas using the same technology knowledge. In their view, resource sharing would require some official guidelines and procedures, which had yet to be developed. Such sharing requires deep insights and years of experience regarding personnel competences from the portfolio owners: “We need to have persons who know this firm’s ways of working, the competences that we have inside the firm; otherwise this [sharing] does not function properly” (H5).

In Firm C, innovations took place in the same geographical location, which implies that engineering teams inside portfolios engaged in active and open dialogue and flexible resource sharing. However, cooperation across portfolio boundaries was perceived as somewhat challenging. They also experienced resource scarcity and emphasized learning from the other business units as a way of sharing: “We noticed that they [the other business unit] have an interesting solution [to certain needs] that we also would like to use, instead of us reinventing the wheel. So we set up a team they would manage, serving only our needs” (H10). Firm C utilized external cooperation particularly as a source of weak signals and input into innovation projects in and across the project portfolios.

The *practices of synergy creation* deal with exploiting the same technologies, facilities, and external partners to create mutual benefits from successful innovations, which imply cost and time savings. Firm A interviewees noted that the same facilities and equipment were used across project portfolios. They had recently created an innovation center specifically for promoting the efficient use of facilities shared by the different project portfolios. Interviewees in Firm B emphasized the replication and modification of the same technologies for different business areas’ needs as a way to create synergies between project portfolios, save resources, reduce workload, and avoid redundancies. According to one interviewee, “We have a few core technologies that we govern and replicate in several projects, so they in a way operate in a matrix with the projects across business area[s]” (H9). Firm C interviewees perceived that the co-location of innovation activities, as opposed to geographically dispersed locations, improved efficiency: “We can use the same testing equipment in the innovation centers for any projects ... so the customer delivery and solution benefits from combining [development in multiple areas]” (H5). The practices for synergy creation were tightly connected to resource and information sharing as well.

Innovation projects often involve external partners such as customers, research institutes, and engineering services, and the involvement of partners might increase as the new product’s market launch approaches. Particularly for Firm A, this external cooperation was a source of synergy benefits because external partners learned from one project to another, making the cooperation more efficient: “We have a lot of external partners, it is a long list of different organizations and firms. The most of such collaborations are so repetitive that we know the people and the cooperation functions with ease” (H1). Firm B interviewees involved customers in the idea generation phase of innovation projects in one portfolio, benefiting from their earlier knowledge, but this practice was not shared with another project portfolio. Firm C organized innovation contests between business areas, which both increased the level of ambition in the innovations and created synergies by having the areas learn from each other. Furthermore, successful innovation in a neighboring project portfolio sparked ideas for the other portfolios.

The *practices of boundary spanning* were concerned with understanding the benefits of cross-portfolio interplay as well as the use of tools for boundary spanning. The existence of boundaries between project portfolios was acknowledged in all the firms, but the benefits of crossing the boundaries and ways of managers to support boundary crossing were less discussed. Firm A interviewees felt that the new PPM system was beneficial for revealing overlaps and possibilities for sharing and synergies between project portfolios, but as the access to the system was restricted to certain persons only, its usefulness for boundary spanning was limited. Visibility to other project portfolios through such

tools was considered useful for the purposes of sharing and synergy practices and for managing risks stemming from project overload if an individual was allocated to too many projects.

5. Discussion

This study explored practices of strategic alignment and cross-portfolio interplay in large industrial firms' innovation project portfolios. We adopted a practice-centric view of portfolios' strategic alignment following the work of previous researchers (Blichfeldt and Eskerod, 2008; Christiansen and Varnes, 2008; Clegg et al., 2018; Jerbrant and Karrbom Gustavsson, 2013; Martinsuo, 2013). Following Martinsuo and Geraldi (2020), we acknowledge that innovation project portfolios are managed in their context, including their connection with multiple other project portfolios. We thereby wanted to complement such research that treats strategic alignment primarily as a project selection criterion (see Archer and Ghasemzadeh, 1999; Cooper et al., 1997a, 1997b; Dye and Pennypacker, 1999; Englund and Graham, 1999) or as a criterion for assessing portfolio success (see Jonas et al., 2013; Kester et al., 2014; Kock and Gemünden, 2019; Kock et al., 2016; Martinsuo and Lehtonen, 2007; McNally et al., 2013; Spieth and Lerch, 2014). Strategic alignment, in our view, is something that managers, as well as personnel more broadly, can do in practice throughout the life-cycles of projects and portfolios.

The first research question focused on firms' practices of implementing strategic alignment in their project portfolios. The findings confirmed our above assumption that strategic alignment of project portfolios occurs continuously over time in the practices of managers and personnel and not just during project selection or performance evaluation. In particular, the analysis revealed the use of various social, mechanistic, and structural practices of strategic alignment. The findings suggest that formal PPM systems are clearly supplemented with less formal communicative practices, thereby lending support to improvised and norm-breaking behaviors in PPM (Blichfeldt and Eskerod, 2008; Christiansen and Varnes, 2008; Jerbrant and Karrbom Gustavsson, 2013), and also with structure-related practices that represent the dynamic potential for portfolio reconfiguration (Martinsuo, 2013). The differences between the firms suggest that strategic alignment practices may be a feature of the organizational culture, which is reflected in the formalization of PPM systems and diversity of strategic alignment practices used.

The framework developed during the analysis offers a nuanced picture of potential ways to implement strategic alignment of project portfolios from the viewpoint of traditional high-tech manufacturing firms. The framework thereby complements and adds to previous research on a select few antecedents of strategic alignment (Beringer et al., 2013; Kock and Gemünden, 2019; McNally et al., 2013; Unger et al., 2012) by showing how the aligning actually takes place in practice. As the practices of strategic alignment vary over time, they may continuously renew the portfolios, and thereby, the findings contribute to research of emergent strategy in project portfolios (Kopmann et al., 2017). Our empirical findings revealed a diversity of experiences concerning the use of different strategic alignment practices even within the firms, indicating that even the job positions and business units of the informants offer different views of such practices and lend support to the context dependency of these practices (Martinsuo, 2013; Martinsuo and Geraldi, 2020). It is possible that the exploration of strategic alignment in more dynamic contexts such as information system portfolios and new service development portfolios would reveal additional practices.

The second research question was: How do firms consider cross-portfolio linkages when implementing strategic alignment in their project portfolios? With this question, we wanted to draw attention to the fact that large firms tend to have multiple different innovation project portfolios, which may serve different strategies and be managed in different ways. Yet, the innovation project portfolios together are supposed to fulfill the innovation strategies in the firm and may compete

for the same resources, which is why they must somehow be aligned. The empirical analysis revealed various sharing, synergy creation, and boundary-spanning practices for cross-portfolio strategic alignment. Here especially, the findings concerning sharing and synergy creation add a cross-portfolio view and related details to previous research that has considered resource sharing across projects (Elonen and Artto, 2003; Engwall and Jerbrant, 2003; Fricke and Shenhar, 2000) and learning and synergies between portfolios (Kock and Gemünden, 2019). While boundary spanning practices were not discussed much, acknowledging and visualizing the multiple portfolios and creating possibilities for their interface management is a novel idea to enhance cross-portfolio strategic alignment.

In the cross-portfolio strategic alignment practices, we identified the firms' simultaneous pursuit of efficiency and strategic renewal. While resource and information sharing and synergy with partners, technologies, and innovation contests were used to create savings in a certain portfolio, they also drove more influential innovation outcomes, potentially in another portfolio and the firm more generally. This implies that the same cross-portfolio strategic alignment practices serve the needs of efficiency and renewal. Where Kopmann et al. (2017) covered portfolio analyses as a key mechanism for emergent strategy recognition, our findings suggest sharing, synergy creation, and boundary-spanning practices are also suited for renewal and emergent strategies.

Some of the strategic alignment practices dealt with external stakeholders, including involving stakeholders (concerning portfolio strategic alignment), sharing information from stakeholders, and using the same external partners across portfolios (concerning cross-portfolio strategic alignment). These findings offer empirical evidence on the centrality of including stakeholder interests and views in innovation PPM (Martinsuo and Geraldi, 2020). External stakeholders may both add and reduce uncertainty in innovation project portfolios, support strategy implementation, and drive strategic renewal. Our findings encourage further investigations of stakeholders' interests and related dynamics in strategic alignment of innovation project portfolios.

6. Conclusions

6.1. Main contributions

This study offers three main contributions in the form of increased knowledge on how strategic alignment happens in practice in the work of personnel involved in PPM in the innovation-centric multi-portfolio contexts of large firms. First, strategic alignment is the continuous activity of managers and personnel taking place over time during PPM. Thereby, this study contributes by offering a more dynamic view of strategic alignment to complement its static treatment during project selection or portfolio performance evaluation. Second, the study contributes by revealing a variety of strategic alignment practices concerning both portfolios and their interplay in connection with the parent organization's strategy. The qualitative findings concerning social, mechanistic, and structural practices of aligning a portfolio with the strategy, sharing, synergy creation, and boundary-spanning practices of cross-portfolio strategic alignment will be useful in future research and can help managers strategically align project portfolios in organizations.

Third, the findings revealed differences between and within firms regarding how the use of strategic alignment practices is experienced. This contributes to the research emphasizing the contextuality of PPM by connecting PPM practices with the organizational culture and its subcultures. The findings indicate that strategic alignment practices need to be developed to support the local organizational culture while at the same time enabling innovativeness (as this is the purpose of innovation projects). Thereby, strategic alignment not only deals with strategy implementation but may simultaneously drive renewal.

6.2. Practical and policy implications

A central practical implication in this study is the necessity of project portfolio managers and project managers considering strategic alignment *in practice* in their day-to-day work. In our view, strategic alignment cannot be treated merely as an assessment criterion at the start of the project and performance indicator after project completion. Strategic alignment must be practiced throughout the implementation of the project and the steering of the project portfolio. This study offers practical ideas on how strategic alignment could be implemented. Another practical implication deals with the strategic interplay of different project portfolios within the firm. As large firms tend to have multiple project portfolios, they can benefit from their interplay in strategic ways through knowledge and resource sharing, purposive synergy creation, and spanning of project portfolio boundaries as needed. While this study offers some tentative ideas on how industrial firms use this cross-portfolio interplay for strategic purposes, its broader uses and applications require future research.

For PPM policies and frameworks, this study offers two main recommendations. Firstly, PPM policies and frameworks should acknowledge strategy not just episodically during portfolio selection and success assessment but as part of managers' continuous and active process of strategic alignment throughout PPM. Secondly, such policies and frameworks should increasingly acknowledge the multi-portfolio circumstances of organizations as the contextual conditions of project portfolios. Strategic alignment cannot be considered merely between the project portfolio and the parent organization's strategic aspirations; it must also be considered between different project portfolios. Even if the different project portfolios follow different strategies in their organization, they may compete for and benefit from the same resources, information, facilities, and top managers' attention. This study shows that project portfolios can support each other in many ways, and portfolio managers can collaborate to achieve cross-portfolio efficiencies through strategic alignment.

6.3. Validity limitations

This qualitative multiple-case study has some validity limitations that may limit the transferability of the findings. The empirical study was purposely delimited to industrial firms operating in business-to-business markets, and thus consumer businesses were not covered. The companies were selected based on the innovation orientation in their strategies, and it is likely that firms with other strategies may have a different approach to the strategic alignment of innovation project portfolios.

The use of interviews for data collection also limits the validity due to the chosen cross-sectional research design. Longitudinal approaches with real-time observations of ongoing strategic alignment in and between portfolios could open up completely new possibilities in future research. The interviewees were selected from key persons, i.e., managers involved in innovation PPM. The selection of a limited number of interviewees with the help of a contact person may have caused sample-related validity limitations. It is possible that project managers, other directors involved in portfolio committees, and managers of other portfolios might have different experiences and viewpoints concerning strategic alignment. However, with the sampling approach and the use of multiple informants from the same firm, we attempted to triangulate the data and ensure sufficient diversity of responses.

The analytical framework was developed iteratively while analyzing the data, which may limit the validity. Some sub-categories in the frameworks were mentioned merely by single interviewees and thus do not necessarily reflect the organization's reality in full. Since strategic alignment has been treated in the literature either as an input for or as an outcome of PPM, the practice-centric analysis and further development of the frameworks may require further consideration.

6.4. Ideas for future research

The findings create new possibilities for investigating strategic alignment of and between project portfolios in the future. The categorizations developed in this study could be useful for future hypothetico-deductive studies to test whether and how such factors follow from selecting projects strategically or achieve the success criterion of strategic fit in project portfolios. It is important to acknowledge the exact strategy guiding innovation project portfolios and to analyze the differences in strategic alignment between firms with very different innovation strategies. Due to the contextuality of PPM, this study encourages research on the use of different PPM practices in connection with organizational culture and possible subcultures within the organization. Furthermore, as the empirical context was delimited to traditional manufacturing industries, it would be important to study the use of strategic alignment practices in more dynamic contexts, such as information system portfolios and new service development portfolios.

The issue of boundary identification and spanning between multiple project portfolios requires further attention, as it emerged only weakly in this study. It is possible that the sampling or question setting did not enable a sufficiently thorough coverage of the issue. It might be important to carry out more in-depth case studies in organizations that have several project portfolios to map their portfolio interfaces even more thoroughly. Additionally, since innovation project portfolios can both implement and renew strategies, we suggest further research on how the practices of strategic alignment serve the purposes of reconfiguration and renewal. Our findings indicate that certain strategic alignment practices are particularly geared toward restructuring the portfolio, but more focused empirical research is needed to understand such dynamics.

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Declaration of competing interest

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Data availability

The data that has been used is confidential.

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References

- Archer, N.P., Ghasemzadeh, F., 1999. An integrated framework for project portfolio selection. *Int. J. Proj. Manag.* 17, 207–216.
- Arto, K.A., Dietrich, P., 2004. Strategic business management through multiple projects. In: Morris, P.W.G., Pinto, J.K. (Eds.), *The Wiley Guide to Managing Projects*. John Wiley and Sons, London, pp. 144–176.
- Arto, K., Kujala, J., Dietrich, P., Martinsuo, M., 2008a. What is project strategy? *Int. J. Proj. Manag.* 26 (1), 4–12.
- Arto, K., Martinsuo, M., Dietrich, P., Kujala, J., 2008b. Project strategy – strategy types and their contents in innovation projects. *Int. J. Manag. Proj. Bus.* 1 (1), 49–70.

- Atkinson, R., 1999. Project management: cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria. *Int. J. Proj. Manag.* 17, 337–342.
- Beringer, C., Jonas, D., Kock, A., 2013. Behavior of internal stakeholders in project portfolio management and its impact on success. *Int. J. Proj. Manag.* 31, 830–846.
- Blichfeldt, B.S., Eskerod, P., 2008. Project portfolio management: there's more to it than what management enacts. *Int. J. Proj. Manag.* 26, 357–365.
- Christiansen, J.K., Varnes, C., 2008. From models to practice: decision making at portfolio meetings. *Int. J. Qual. Reliab. Manag.* 25, 87–101.
- Clegg, S., Killen, C.P., Biesenthal, C., Shankaran, S., 2018. Practices, projects and portfolios: current research trends and new directions. *Int. J. Proj. Manag.* 36, 762–772.
- Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J., 1997a. Portfolio management in new product development: lessons from the leaders – I. *Res. Technol. Manag.* 40 (5), 16–28.
- Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J., 1997b. Portfolio management in new product development: lessons from the leaders – II. *Res. Technol. Manag.* 40 (6), 43–52.
- Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J., 1999. New product portfolio management: practices and performance. *J. Prod. Innovat. Manag.* 16, 333–351.
- Dvir, D., Lechler, T., 2004. Plans are nothing, changing plans is everything: the impact of changes on project success. *Res. Pol.* 33 (1), 1–15.
- Dye, L.D., Pennypacker, J.S., 1999. *Project Portfolio Management: Selecting and Prioritizing Projects for Competitive Advantage*. Center for Business Practices, West Chester, PA.
- Elonen, S., Arto, K., 2003. Problems in managing internal development projects in multi-project environments. *Int. J. Proj. Manag.* 21, 395–402.
- Englund, R.L., Graham, R.J., 1999. From experience: linking projects to strategy. *J. Prod. Innovat. Manag.* 16 (1), 52–64.
- Engwall, M., 2003. No project is an island: linking projects to history and context. *Res. Pol.* 32, 789–808.
- Engwall, M., Jerbrant, A., 2003. The resource allocation syndrome: the prime challenge of multi-project management? *Int. J. Proj. Manag.* 21, 403–409.
- Fricke, S.E., Shenhar, A.J., 2000. Managing multiple engineering projects in a manufacturing support environment. *IEEE Trans. Eng. Manag.* 47, 258–268.
- Jerbrant, A., Karrbom Gustavsson, T., 2013. Managing project portfolios: balancing flexibility and structure by improvising. *Int. J. Manag. Proj. Bus.* 6, 152–172.
- Jonas, D., Kock, A., Gemünden, H.G., 2013. Predicting project portfolio success by measuring management quality: a longitudinal study. *IEEE Trans. Eng. Manag.* 60 (2), 215–226.
- Kester, L., Hultink, E.J., Griffin, A., 2014. An empirical investigation of the antecedents and outcomes of NPD portfolio success. *J. Prod. Innovat. Manag.* 31, 1199–1213.
- Kock, A., Gemünden, H.G., 2019. Project lineage management and project portfolio success. *Proj. Manag. J.* 50, 587–601.
- Kock, A., Heising, W., Gemünden, H.G., 2016. A contingency approach on the impact of front-end success on project portfolio success. *Proj. Manag. J.* 47, 115–129.
- Kopmann, J., Kock, A., Killen, C.P., Gemünden, H.G., 2017. The role of project portfolio management in fostering both deliberate and emergent strategy. *Int. J. Proj. Manag.* 35, 557–570.
- Loch, C., 2000. Tailoring product development to strategy: case of a European technology manufacturer. *Eur. Manag. J.* 18, 246–258.
- Maniak, R., Midler, C., 2014. Multiproject lineage management: bridging project management and design-based innovation strategy. *Int. J. Proj. Manag.* 32, 1146–1156.
- Martinsuo, M., 2013. Project portfolio management in practice and in context. *Int. J. Proj. Manag.* 31, 794–803.
- Martinsuo, M., Gerald, J., 2020. The management of project portfolios: relationships of project portfolios with their contexts. *Int. J. Proj. Manag.* 38, 441–453.
- Martinsuo, M., Korhonen, T., Laine, T., 2014. Identifying, framing and managing uncertainties in project portfolios. *Int. J. Proj. Manag.* 32, 732–746.
- Martinsuo, M., Lehtonen, P., 2007. Role of single-project management in achieving portfolio management efficiency. *Int. J. Proj. Manag.* 25 (1), 56–65.
- McNally, R.C., Durmuşoğlu, S.S., Calantone, R.J., 2013. New product portfolio management decisions: antecedents and consequences. *J. Prod. Innovat. Manag.* 30, 245–261.
- Midler, C., 2013. Implementing a low-end disruption strategy through multiproject lineage management: the Logan case. *Proj. Manag. J.* 44 (5), 24–35.
- Patanakul, P., Shenhar, A., 2012. What project strategy really is: the fundamental building block in strategic project management. *Proj. Manag. J.* 43 (1), 4–20.
- Petit, Y., Hobbs, B., 2010. Project portfolios in dynamic environments: sources of uncertainty and sensing mechanisms. *Proj. Manag. J.* 41 (4), 46–58.
- Shenhar, A., Dvir, D., Levy, O., Maltz, A.C., 2001. Project success: a multidimensional strategic concept. *Long. Range Plan.* 31, 699–725.
- Shenhar, A., Levy, O., Dvir, D., 1997. Mapping the dimensions of project success. *Proj. Manag. J.* 28 (2), 5–13.
- Spiehl, P., Lerch, M., 2014. Augmenting innovation project portfolio management performance: the mediating effect of management perception and satisfaction. *R&D Management* 44, 498–515.
- Steffens, W., Martinsuo, M., Arto, K., 2007. Change decisions in product development projects. *Int. J. Proj. Manag.* 25, 702–713.
- Unger, B.N., Gemünden, H.G., Aubry, M., 2012a. The three roles of a project portfolio management office: their impact on portfolio management execution and success. *Int. J. Proj. Manag.* 30, 608–620.
- Unger, B.N., Kock, A., Gemünden, H.G., Jonas, D., 2012b. Enforcing strategic fit of project portfolios by project termination: an empirical study on senior management involvement. *Int. J. Proj. Manag.* 30, 675–685.