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THE INTEGRATIVE ROLE OF THE PROJECT MANAGEMENT OFFICE IN THE FRONT END OF INNOVATION

ABSTRACT

This research addresses management control in the front end of innovation projects. We conceptualize and analyze PMOs more broadly than just as a specialized project-focused organizational unit. Building on theories of management control, organization design, and innovation front end literature, we assess the role of PMO as an integrative arrangement. The empirical material is derived from four companies. The results show a variety of management control mechanisms that can be considered as integrative organizational arrangements. Such organizational arrangements can be considered as an alternative to a non-existent PMO, or to complement a (non-existent) PMO's tasks. The paper also contrasts prior literature by emphasizing the desirability of a highly organic or embedded matrix structure in the organization. Finally, we propose that the development path of the management approach proceeds by first emphasizing diagnostic and boundary systems (with mechanistic management approaches) followed by intensive use of interactive and belief systems (with value-based management approaches). The major contribution of this paper is in the organizational and managerial mechanisms of a firm that is managing multiple innovation projects. This research also expands upon the existing PMO research to include a broader management control approach for managing projects in companies.

Keywords: Management control, Project management office, Innovation projects, Front end of innovation, Organization design

INTRODUCTION

The front end of innovation projects includes fostering issues and ideas before the start of the formal project development phase (Koen et al., 2001). Previous studies consider the front end to be the most troublesome and chaotic phase of the innovation process, but at the same time the front end provides the greatest opportunities to improve the overall innovative capability of a company (Herstatt et al., 2004; Reid and de Brentani, 2004). Crucial strategic decisions related to target markets, customer needs, value propositions, expected prices and costs, the main functionalities, and the most useful technologies of new products are all made at the front end stage (Bonner et al., 2002; Smith and Reinertsen, 1998; Wheelwright and Clark, 1992). Prior empirical and conceptual front-end studies have focused on product and service innovations (e.g. Herstatt et al., 2004; Koen et al., 2001; McAdam and Leonard, 2004; Reid and de Brentani, 2004). Less research has focused on other types of innovation projects such as process, marketing, managerial or organizational innovations, which might have even greater implications for the organization.

The management control literature, starting as early as the 1970s (e.g. Lawler and Rhode, 1976; Ouchi, 1979) address the question of how executives manage their firms. Control in this stream of literature is not to be considered equivalent to vertical top-down management but also contains various autonomous and emergent mechanisms, which emphasize lateral mechanisms and softer leadership issues such as values, empowerment and freedom (Simons 1994, 1995). Building on this stream of literature, the concept of ‘management control’ in this paper includes a wide range of organizational arrangements that rely on soft leadership as well as lateral and bottom-up mechanisms in the organization. The role of management at the front end of innovation is to

ensure that decisions and choices serve the best interest of the company and fulfil long-term strategic needs. Management's ability to influence strategic choices is naturally the greatest at the front end of innovation. However, executives typically become heavily involved in the initiatives too late, often just after the design phase, when development problems have become apparent and when financial commitment is needed (McGrath, 1996; Smith and Reinertsen, 1998). However, a proactive management approach is needed to make sure that the choices made at the front end are strategically feasible (McGrath 1996; Smith and Reinertsen, 1998) and that the strategy is both effectively implemented and innovatively renewed. Due to its profound implications in the long term, we suggest that management control is of paramount importance especially in the front end of innovation. We further suggest that having management involved in the front end is important for the following reasons; yielding high quality new ideas, developing these ideas into concrete concepts and business cases, enabling cross-functional coordination, creating knowledge transfer across projects and their front ends, and achieving project synergies. This creates the challenge to finding a balance between empowerment and accountability, intended and emergent strategy, and experimentation and efficiency, which is the key in management control of organizations that need room for innovation and flexibility (Simons, 1995).

Based on the above characterization, project management offices (PMOs) or related organizational arrangements can be considered to have a key role in the management of innovation projects, especially at the front end. These offices may be formal organizational units or less formal arrangements, which may include facilitators, innovation groups, innovation processes and/or idea management and innovation software systems. Despite its significant potential implications for managing the front end of innovation, prior research has not addressed

the role of PMOs as such organizational arrangements in front ends of innovation projects. The recent research by Hobbs and Aubry (2007) and other practical-oriented literature (Hill, 2008) suggests that PMOs are specialized organizational units that play various roles and have different tasks. However, the existing PMO literature suggests that the role of a project management office is to support, coordinate and control project-related work. Based on this suggestion, it is not clear as to the appropriate manifestation of a PMO in the front end of innovation project context. Additionally, formal PMOs or related specialized units do not exist for such a purpose, which is the case in many of the case companies in our empirical study, then we can ask what other relevant organizational arrangements would help the executives to manage the front end of innovation projects.

This research addresses management control in the front end of innovation projects. We assume that the organizational arrangements for such management controls serve as an organizational element of what constitutes an object that is comparable to a project management office. In this study, we address three gaps in the existing PMO literature. First, the existing PMO literature tends to focus on project execution, with less emphasis on specifically addressing the PMO's role in the management of the front-end phase of innovation projects. Second, the existing PMO literature is highly practical and does not extensively use an established theoretical basis for assessing the concept of a project management office. We address this gap by using theories of organization design and management control in particular for assessing the role and the tasks of a PMO. Third, building on theories of organization design and management control, we address organizational arrangements from a wider perspective rather than focusing solely on the PMO as a specialized organizational unit. In this respect, our results show a variety of organizational

arrangements outside the traditional conception of a PMO as a specialized unit, and our results show how such organizational arrangements are involved in the management of the front end of innovation projects. Such arrangements can be considered alternative mechanisms to a non-existent PMO, or to complement a (non-existent) PMO's tasks. Therefore, our research expands the existing PMO research by including a broader aspect of organizational arrangements for the management control of projects. This paper addresses the following two research questions:

- What control mechanisms can managers use in managing the front end of innovation projects?
- How can the project management office (PMO) or related organizational arrangements be used for the management control in managing the front end of innovation projects?

We build on the theories of organization design and management control. Due to our context of innovation front end in this research, we use the innovation front end literature to understand the management control in that specific innovation context. The empirical data used in this paper is derived from four case companies.

The major contribution of this paper is related to the role of PMOs related to the organizational and managerial mechanisms of a firm in the context of managing multiple innovation projects. The research relates to the wide area of organizational and managerial mechanisms for managing multiple projects in a project-based firm (PBF; Artto and Kujala, 2008; Lindkvist, 2004; Whitley, 2006). In general, we use the term 'project-based firm' to refer to two types of firms; firms that conduct only a segment of their operations in project form even though their primary productive activity might be volume-based (Hobday, 2000 calls these project-led firms) and firms that organize most of their internal and external activities in projects ('project-based' also in the

terminology of Hobday, 2000, and of Lindkvist, 2004). Project-based firms and organizations are found in a wide range of industries, such as consulting and professional services, cultural industries, high technology, and complex products and systems (Sydow et al., 2004). Management control in this paper refers to activities that maintain or alter patterns at the front-end work of projects to achieve successful results (adapted from Simons, 1995). And in line with the extensive management control literature, we also interpret the concept of control broadly, including organizational arrangements, practices, processes and tools that relate to the appropriate strategic decisions concerning the whole project portfolio, as well as providing direction and support for the advancement of single pre-project ideas and projects.

ORGANIZATION THEORY VIEW TO INTEGRATIVE ORGANIZATIONAL ARRANGEMENTS

In the following we discuss organization design literature, leading to the conclusion that a PMO can be considered an organizational unit representing an integrative structure; it spans various organizational sub-units within a firm to coordinate the activities that take place between these units. However, such a unit is only one way to integrate the organization; as the literature suggests, there are also number of others. Below, we discuss these different integrative organizational arrangements to address how executives manage front end of multiple innovation projects in their firms.

As PMO is a (formal or informal) organizational unit, the assessment of PMO is a matter of organizational structure and design. Designing an organization consists of two types of decisions that include: (1) the division of tasks, and (2) coordination and integration of activities (Child,

1977; Mintzberg, 1983; Adler, 1995; Lawrence and Lorsch, 1967). The division of tasks means dividing the organization into sub-units and assigning specific sub-tasks to each sub-unit. Coordination and integration refers to the design of processes and systems that ensure the accomplishment of broader, overall organizational tasks to which the sub-units contribute.

In order to coordinate and integrate activities, managers have a variety of tools and practices. Integration mechanisms include vertical and horizontal mechanisms (Child, 1972, 1973; Hage et al., 1971; Lawrence and Lorsch, 1967; Pugh et al., 1968). Vertical mechanisms include centralization (which is built by placing one person or sub-unit in charge of coordination and decision-making) and standardization (which is based on rules, procedures, and plans) and they are both built on organizational authority. Horizontal (or lateral) mechanisms are based on communication rather than authority. Horizontal mechanisms may be formal or informal structures such as task forces, liaison and integrator roles, boundary roles, and various teams and meeting arrangements and integrative units. Information systems are a separate set of integration mechanisms (Daft and Lengel, 1986; Galbraith, 1973; Ghoshal and Gratton, 2002). Their role is to complement the vertical and horizontal mechanisms, since information systems alone rarely integrate anything but they can be used to transfer information both vertically and laterally across sub-units. Finally, various social mechanisms, such as incentives, can also be used as integrative mechanisms (Edström and Galbraith, 1977; Ouchi, 1980). The focus with social mechanisms is more on social consistency of behaviour for example. Based on the way the integration mechanisms operate, integration mechanisms can be classified into five broad categories (Galbraith, 1973; Martinez and Jarillo, 1989). The categories of integration mechanisms or what we label as organizational arrangements for integration are presented in Table 1.

Table 1. A categorization of integration mechanisms

Integration mechanisms	References
Vertical mechanisms of centralization, standardization and formalization	Burns and Stalker ,1961; Child, 1972, 1973a, 1973b, 1975; Pierce and Delbecq, 1977; Pugh et al., 1968, 1969
Information systems	Galbraith, 1973, 1977, 1994
Informal lateral mechanisms, such as cross-functional job rotation, informal lateral communication	Edström and Galbraith, 1977
Formal lateral mechanisms, such as cross-functional teams, committees, integrative departments, and integration roles	Adler, 1995; Galbraith, 1973, 1977, 1994; Hage et al., 1971; Lawrence and Lorsch, 1967; Tushman, 1977
Organization-level incentives and other social mechanisms	Barnard, 1938; Grandori and Soda, 1995

At a higher level, there are two different theoretical perspectives to integration with different underlying assumptions: the information processing perspective and the behavioural perspective. The information processing perspective (e.g., Galbraith, 1973; Tushman and Nadler, 1978) considers that conflict and sub-goal pursuit in an organization arises due to lacking, ambiguous, asymmetrical or error prone information, which requires coordination. Cooperation, on the other hand, can be linked to the behavioural perspective of organizations (e.g., Lorsch and Morse 1974; Ouchi 1980; Pelled and Adler 1994; Simon 1991), which assumes that organizational members are driven by personal motives or opportunistic behaviour. The behavioural perspective suggests that differences in members' personal motives are the source of a sub-goal pursuit, which requires cooperation and serves as a starting point for a wide variety of organizational literature (e.g., Transaction cost theory). Some of the managerial mechanisms discussed above target information processing, some target behavioural management, whereas some mechanisms can be used for both.

MANAGEMENT CONTROL OF INNOVATION PROJECTS AND RELATED CONTROL MECHANISMS

Management control and control mechanisms are understood as a wide range of organizational arrangements reflecting a rich discussion of management control theory from 1970s (e.g. Lawler and Rhode, 1976; Ouchi, 1979) to the present. Management enters controlling activities for various reasons, including ensuring strategy implementation (Anthony, 1988; Ouchi, 1979), influencing and steering the behaviour of employees (Jaworski, 1988), enabling coordination (Anthony, 1988), and ensuring strategic renewal (Simons, 1995). The set-up of multiple and partially conflicting goals for management control in firms requires that a full array of control mechanisms are applied. We adopt into our analysis the four distinctive management control systems from a holistic management control model developed by Simons (1994, 1995), and accordingly, we use Simons' four types of control systems as a framework for discussing management control in the front end of innovation projects (see Table 2). These four types of management control systems are (Table 2): (1) belief systems, (2) boundary systems, (3) diagnostic control systems, and (4) interactive controls systems. These types of management control systems include control mechanisms that represent specific organizational arrangements, and are linked to different conceptions of strategy by demonstrating how different categories (or control system types) of management control mechanisms can serve different strategic purposes. Table 2 summarizes our literature analysis on management control and innovation front end literature, by summarizing control mechanisms, in our terms specific organizational arrangements, using Simons' four types of management control systems.

Table 2. Four types of management control systems, and their control mechanisms as specific organizational arrangements

Levers of control	Control mechanisms	References
Belief systems	Mission statement	Simons, 1994
	Strategic vision	Simons, 1995; McGrath, 2001
	Values	Merchant, 1985; Trott, 2002; Zien and Buckler, 1997
Boundary systems	Strategic plans	Simons, 1995; Wheelwright and Clark, 1992; Artto et al. 2008
	Process models	Koen et al., 2001; Cooper, 1998; McGrath, 1996
	Standard operating procedures	Cooper, 1998
	Document templates	Cooper, 1998
	Concept limitations	Ulrich and Eppinger, 2003
Diagnostic control systems	Task assignments	Merchant, 1982; Bonner et al., 2002
	Budgets and schedules	Rockness and Shields, 1988; Lindkvist et al., 1998
	Human resource allocation	Stevens and Burley, 2003; Brown and Eisenhardt, 1995; Kim and Wilemon, 2002
	Performance goals	Bonner et al., 2002; Cooper, 1998
	Steering groups	Tatikonda and Rosenthal, 2000; Englund and Graham, 1999
	Regular/exception based reporting	Cleland and King, 1975; Simons, 1995
	Rewarding	Simons, 1995; Chester, 1995
	Screening and evaluation criteria	Cooper, 1998; Koen et al., 2001
	Competing development teams	Pich et al., 2002
Interactive control systems	Managerial observation and surveillance	Anthony, 1988
	Informal visits	Cleland and King, 1975; Bisbe and Otley, 2004
	Telephone conversations	Cleland and King, 1975
	Ad hoc meetings	Merchant, 1985; Anthony, 1988
	Participative planning	Bonner et al., 2002
	Management intervention	Bonner et al., 2002

Belief systems (Table 2) perceive strategy as a perspective or as a collective mind and they are used to inspire and direct the search for new business opportunities and to define and communicate basic values, purpose and direction for the organization (Simons, 1995). Existing NPD studies emphasize the importance of strategic vision, which gives an overall direction to

organizational activities and integrates individual accomplishments into the common goal (McGrath, 1996). A shared strategic vision decreases different interpretations of expected outcomes and increases the consensus on goals at the front end (Zhang and Doll, 2001). In addition, the importance of an innovation-favorable culture and values which support risk-taking and experimentation and which appreciate innovations and an entrepreneurial attitude are widely acknowledged in the NPD context (Zien and Buckler, 1997).

Boundary systems (Table 2) are used to set explicit limits and rules for opportunity-seeking behaviour. Boundary systems define the risks that must be avoided and how they relate to strategy as a position, by setting boundaries for the strategic arena. One serious challenge with NPD projects is their linkage to the company's strategies is often weak. Wheelwright and Clark (1992) have argued that there is a need for a process that connects individual projects to the broader strategy of the company. It is further argued that development projects need to have their own specific project strategy that fits within the broader development strategy (Artto and Kujala, 2008; Artto et al., 2008, Wheelwright and Clark, 1992). Management can also try to ensure that activities that were considered necessary and critical for the success of innovation are thoroughly accomplished through process control. A variety of benefits have been associated with the creation of a formal process in the NPD context: the ability to focus; the possibility for managers to intervene and give guidance on project decisions (Tatikonda and Rosenthal, 2000; Poskela and Martinsuo 2009; Koen et al., 2001); and the possibility for replication, learning, and improved coordination (Bonner et al., 2002; Tatikonda and Rosenthal, 2000).

Diagnostic control systems (Table 2) refer to traditional bureaucratic control, which is used to set goals, monitor achievement and reward the achievement of specified goals. Strategy is seen as a plan defined at the top of the hierarchy. There are several diagnostic control mechanisms identified in the front end innovation and NPD literature such as task assignments that define expected activities more precisely (Bonner et al., 2002), the choice of the team leader and team members (Brown and Eisenhardt, 1995; Kim and Wilemon, 2002; Stevens and Burley, 2003), rewarding (Chester, 1995), and screening and evaluation procedures (Cooper, 1998; Koen et al., 2001).

Interactive control systems (Table 2) refer to the management's personal involvement in the decision-making activities of subordinates. Interactive control is typically used to search out strategic uncertainties and stimulate organizational learning. Strategy is manifested as patterns of streams of actions. Bonner et al. (2002) have conceptualized interactive control in the NPD context as the interaction between management and project members during the formulation of project strategies, goals and procedures early in the project.

THE PROJECT MANAGEMENT OFFICE AND ITS TASKS

We used the organization design literature above to conclude that PMO can be considered an organizational arrangement for integration. In addition, we have pointed out that a PMO is typically considered a specialized formal organizational unit that is responsible for some specific task. Therefore, a PMO is considered a specialized unit being just one in a group of many mechanisms for integration. We suggest that in order to understand the role of a PMO as an integrative arrangement, we need to identify different kinds of PMO-related integrative organizational arrangements for the management control of innovation projects, whether a PMO

is a formal organizational unit or not (note that many of the case companies in our empirical study did not have a unit that they would call PMO, but relevant organizational arrangements were still in place).

The Project Management Institute provides the following definition for PMO: “An organisational body or entity assigned various responsibilities related to the centralized and coordinated management of those projects under its domain. The responsibilities of the PMO can range from providing project management support functions to actually being responsible for the direct management of a project.” (Project Management Institute, 2008). Aubry et al. (2007) point out that this definition is relatively broad but revealing since the current practices are very heterogenic. Indeed, a study by Hobbs and Aubry (2008) conclude that PMOs vary significantly with regards to their structure, their assumed roles and their perceived value. Further, Aubry et al. (2007) argue that there are many questions and choices regarding organizational position and the tasks of the office that are not clearly addressed by the current theoretical studies on PMOs.

In order to understand the form that a PMO takes in a firm’s organization with regards to the relevant organizational arrangements required for management control of the front end of innovation projects, we analyzed literature on suggested PMO roles and tasks. Table 3 summarizes the literature analysis. The literature analysis shows a wide range of possible tasks assigned to PMO and the responsibilities that a PMO could adopt to fulfil the needs of the organization. This highlights the ambiguity of PMOs with regards to organizational structures and managerial practices embedded in the firm’s organization. Letavec (2006) distinguishes between three PMO tasks: PMO as (1) a consulting organization, (2) a knowledge organization,

and (3) a standards organization. Rad and Levin (2002) introduce the project-focused and enterprise-oriented tasks of a PMO. The project-focused tasks include consultation, mentorship, and augmentation. The enterprise-oriented tasks include promotion, archiving, practice, and training. Hill (2008) introduces five distinctive PMO tasks and their sub-tasks: (1) practice management, including the sub-tasks of project management methodology, project tools, standards and metrics, and project knowledge management, (2) infrastructure management, including the sub-tasks of project governance, assessment, organization and structure, and facilities and equipment support, (3) resource integration, including the sub-tasks of resource management, training and education, career development, and team development, (4) technical support, including the sub-tasks of mentoring, project planning, project auditing, and project recovery, and (5) business alignment, including project portfolio management, customer relationship management, vendor/contractor relationship management, and business performance management. The empirical study of Dai and Wells (2004) analyze the use of PMOs and its inherent benefits. In their study on PMOs as change agents, Pellegrinelli and Garagna (2009), talk about the value of project management offices through some of the tasks they perform. “PMOs create value by facilitating control: e.g. supervising funding submission; ensuring mandated processes are followed; collating, summarising and reporting on the progress and status of projects and programmes, and by extracting synergies: e.g. leveraging economies of scale and scope (e.g. deployment of specialist skills, shared tools); transferring knowledge; facilitating re-use (e.g. templates, software modules, development protocols).” In their inclusive empirical study of PMO tasks Hobbs and Aubry (2007) reported a survey of 500 different project management offices and analyzed their attributes. A set of 27 tasks were identified and they reported that only ten of the 27 tasks were found in at least half of the studied PMOs.

Based on the PMO literature, we grouped the tasks of a PMO into five distinctive categories (see Table 3): (1) managing practices, (2) providing administrative support, (3) monitoring and controlling projects, (4) training and consulting, and (5) evaluating, analyzing and choosing projects. ‘Managing practices’ focuses on developing standard procedures, information systems, and tools to help with project management within the organization. It incorporates the continuous improvement of the organization’s project management processes. When ‘providing administrative support’, the PMO takes responsibility for some of the project managers’ tasks in order to benefit from the accumulated expertise and economies of scale in the project management office or to reduce the workload of individual project managers. ‘Monitoring and controlling projects’ is an important task of the PMO. Monitoring and controlling involves collecting reports, auditing projects, conducting post-project reviews and allocating resources among others. ‘Training and consulting’ deals with developing the organizational culture with regards to project management, and consulting, mentoring and training employees who deal with project management in the organization. ‘Evaluating, analyzing and choosing projects’ refers to all methods of portfolio management, including championing ideas and project seeds.

Table 3. Project management office tasks

Task category	Specific tasks of PMO	References
Managing practices	<p>Monitor and control performance of the project management office.</p> <p>Develop, implement and maintain project tools, standards and processes (methodology).</p> <p>Implement and operate a project information system.</p> <p>Manage project documentation archives.</p> <p>Manage customer interfaces.</p> <p>Provide a set of tools without efforts to standardize.</p> <p>Implement and manage a database of lessons learned.</p> <p>Implement and manage a risk database.</p> <p>Develop and maintain a project scoreboard.</p> <p>Ensure mandated processes are followed.</p> <p>Project organizations and structure.</p> <p>Standardize report forms.</p> <p>Promote issue resolution.</p> <p>Maintain a project workbook or library.</p> <p>Improve accuracy and timeliness of timesheets.</p> <p>Standardize project reviews.</p> <p>Identify and document best practices.</p>	Hill 2008; Hobbs and Aubry, 2007; Hobbs and Aubry, 2007; Letavec, 2006; Marsh, 2001; Pellegrinelli and Garagna, 2009; Rad and Levin, 2002.
Providing administrative support	<p>Report project status to upper management.</p> <p>Provide advice to upper management.</p> <p>Execute specialized tasks for project managers.</p> <p>Conduct networking and environmental scanning.</p> <p>Recruit, select, evaluate and determine salaries for project managers.</p> <p>Leverage economies of scale and scope.</p> <p>Provide facilities and equipment support.</p> <p>Support project planning.</p> <p>Support customer relationship management.</p> <p>Coordinate vendor / contractor relationship management.</p> <p>Facilitate project kickoff meetings.</p> <p>Track and record changes made to project requirements.</p> <p>Support project closeouts.</p> <p>Assemble project assets from across the organization.</p>	Hill, 2008; Hobbs and Aubry, 2007; Letavec, 2006; Marsh, 2001; Pellegrinelli and Garagna, 2009; Rad and Levin, 2002.
Monitoring and controlling projects	<p>Monitor and control project performance.</p> <p>Manage benefits.</p> <p>Allocate resources to different projects.</p> <p>Conduct post-project reviews.</p> <p>Conduct project audits.</p> <p>Manage risks.</p> <p>Evaluate and develop a reward system.</p> <p>Measure and track customer satisfaction.</p>	Hill, 2008; Hobbs and Aubry, 2007; Letavec, 2006; Marsh, 2001; Rad and Levin, 2002.
Training and consulting	<p>Develop competency in personnel, including training.</p> <p>Promote project management within organization.</p> <p>Provide mentoring for project managers.</p> <p>Capture knowledge and enhance knowledge dissemination.</p> <p>Supply experience and knowledge.</p> <p>Facilitate re-use, Career development.</p> <p>Enhance team development.</p> <p>Facilitate communication.</p> <p>Provide consultations to troubled projects.</p> <p>Create a project management training material.</p>	Hobbs and Aubry, 2007; Hill, 2008; Letavec, 2006; Marsh, 2001; Pellegrinelli and Garagna, 2009; Rad and Levin, 2002.

Evaluating, analyzing and choosing projects	Coordinate between projects. Participate in strategic planning. Manage one or more portfolio. Identify, select and prioritize new projects. Manage one or more programs. Evaluate project definition and planning. Conduct cost/benefit analysis of projects. Supervise funding submissions. Assess competency, capability and maturity. Provide project start-up assistance.	Hobbs and Aubry, 2007; Hill, 2008; Letavec, 2006; Marsh, 2001; Pellegrinelli and Garagna, 2009; Rad and Levin, 2002.
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RESEARCH METHODS AND DATA GATHERING

The literature review highlighted the role and nature of integrative organizational arrangements and various management control mechanisms, and the complex role that a PMO can have in a firm. In this section, we discuss the research methods and data collection for the empirical part of this research. The purpose of this research was to engage in an empirical analysis to increase the understanding of management control and PMOs as integrative arrangements. The research can be characterized as exploratory in nature. We chose a qualitative research method. We consider this approach to be highly beneficial for the several reasons. First, due to the lack of research in the area of management control and the role of the PMO as an integrative organizational arrangement, especially in terms of providing theoretical explanations for relationships among concepts, this research started without precise hypotheses or propositions. Second, research questions focused on understanding the role and nature of organizational arrangements rather than on their effects also supported the use of qualitative research approach. Finally, recent research on organization design has strongly recommended the use of qualitative studies when studying organizational designs in contemporary complex settings (Greenwood and Miller, 2010).

We collected empirical data in four companies. Because the purpose of this research is to provide insight into management control and the role of a PMO as an integrative organizational arrangement and is rather exploratory in nature, the purpose of the empirical study is not to make highly generalizable conclusions but to gain insight and develop ideas for further research. Therefore, we chose companies from different contextual conditions; they operate in different industrial environments and are also different internally (e.g. size). This provides the potential for a high variation in the empirical findings. In addition, we used three specific criteria for selection of the companies. First we selected companies that have gone through extensive development in their management practices for front end innovation in the last two to four years. Second, we selected companies that are large enough to require separate PMO-like organizational structures or related organizational arrangements. And finally, we focused only on companies, which conduct their innovation and development activities in project form. Hence, these can be considered as project-based firms in which the business includes innovation activities for governing multiple innovation projects.

The data was gathered in semi-structured thematic interviews. Altogether six informants were interviewed; two from companies A and C and one from companies B and D. All the informants were in charge of some integrative organizational arrangement. The following themes were covered in the interviews: the work history and current role of the informant, the history and the current position of the innovation organization within the company, the different management procedures used in the company to manage innovation projects with a specific focus on the front end, and the flow of the innovation process itself and the role of various organizational bodies (like innovation groups or development groups) that were formed for steering innovation

projects. The interviews were recorded and transcribed. Table 4 illustrates the characteristics of the four case companies (A, B, C, and D) and the type of innovation project discussed. Furthermore, Table 4 explains the scope of management control of innovation projects, and characterizes the types of integrative organizational arrangements for the management of innovation projects in the companies.

Table 4. Characteristics of the four case companies, their innovation projects, management control and integrative organizational arrangements

Company: Industry	A: Broadcasting	B: Forestry	C: Communications services	D: Gaming and lottery
Personnel	3250 + freelancers	2250	3000	400
Types of innovation projects	The development of innovative program production schemes, offerings and services, broadcasting formats and technology; process & organizational development	The development of products, services, offerings, processes & organization	The development of products, services, processes, and supporting infrastructure for a large pre-determined strategic change	The development of products, services, offerings, processes & organization
Scope on the management control of innovation projects	The organization operates in a creative industry, and therefore innovation occurs in an organic way , supported by the development schemes and/or development infrastructure and supportive facilitation provided by the company management .	The management of innovation projects is based on the pursuit of ideas that become innovations through a systematic process . The focus of such an innovation process may be somewhat limited to company-/unit-wide initiatives.	Goal-setting for major strategic change through programs , the management and follow-up of 15 strategic programs and their portfolios.	The management of innovation projects is based on the pursuit of ideas that are processed into innovations through a systematic process . Innovation projects may also be initiated through the introduction of "challenges" , which initiates a campaign with several ideas to select from.
Characteristics of the integrative organizational arrangements	Altogether 27 trained innovation coaches in a matrix structure , representing all units; the innovation coaches serve as facilitators or champions for larger development schemes , which may focus on developing platforms for	The forestry economics unit uses a cross-organizational 7-person development group that facilitates the processing of ideas. An idea management software system is used to support the development group's work. There is a leader	PMO (comprised of 6 individuals) facilitates program managers in the setting of program-specific goals , and supports programs through offering suitable PM methods and tools . PMO also coordinates the interfaces among the	The company has a cross-organizational 5-person innovation group that facilitates the fostering, and processing of ideas, and the introduction of challenges leading to ideas and solutions . In order to enhance the systematic

	<p>smaller development or everyday creative work. The innovation coaches are coordinated by a responsible team leader who has the mandate of top management.</p>	<p>responsible for the coordination of the development group's activities. The development group includes management and middle management representatives from subunits. A previously established innovation group of 18 individuals is responsible for facilitating creation and fostering ideas.</p>	<p>programs. In addition to PMOs being a temporary taskforce for large strategic change and its related programs, each business unit in the company's permanent organization does roadmapping, and has a project management office-like structure with a project portfolio manager.</p>	<p>processing and storing of knowledge, an idea management software system is used to support the group's work. There is a leader responsible for the coordination of the innovation group's activities.</p>
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DATA ANALYSIS

Table 5 summarizes the main mechanisms for management control of innovation projects in each company. The control mechanisms in Table 5 represent specific organizational arrangements for integration, and they are categorized into the four types of management control systems (see Table 3): diagnostic control systems, boundary systems, interactive control systems, and belief systems.

Table 5. The main mechanisms as specific integrative organizational arrangements for the management control of innovation projects

COMPANY A	COMPANY B	COMPANY C	COMPANY D
Diagnostic control systems			
A group of innovation coaches (27 part-time individuals throughout company)	A development group for the processing of ideas toward innovations (7 part-time individuals that comprise managers and middle managers) An innovation group of 18 part-time individuals for fostering new ideas.	A temporary PMO of 6 individuals is focused on the management of interfaces between the 15 programs for specific strategic change .	An innovation group for creating innovations from ideas; the 5 part-time individuals are comprised of managers from all business functions .
The company's management creates specific roles for mandated leaders for the innovation team.	The company uses an idea management software system , which helps to manage information (storing and reporting)	The PMO helps the 15 programs in interfaces and resourcing ; The PMO supports selection of PM methods that vary according to each program's needs ; the PMO also coordinates the reporting of the 15 programs to management boards .	The innovation group uses idea management software to support systematic process and the management of information (storing and reporting).
Flexible and adaptive models and tools , which help to identify changes in the business environment for adaptive innovation enhancement ; methods for enhancing organic and non-prejudiced discussion among individuals.	An objective for the number of the processed ideas on a yearly basis; recognizing and rewarding individuals for the high volume of ideas processed within the system . Also challenge-driven idea campaigns .	Goal setting in the 15 programs varies from a goal defined at the level of a vision, to a very detailed goal definition. The management structure, approach and the method of the 15 programs also vary.	The concept of a " challenge " is used to initiate idea campaigns for the purposeful generation, selection, and fostering of ideas as a solution for the challenge; a by-product of a challenge-initiated idea campaign is that a portfolio of ideas is not relevant for the specific solution, but useful for other purposes.
Boundary systems			
Clear goals at the level of a vision ; allowing for flexibility and freedom for achieving goals.	Innovation process and the idea management software system provide boundaries to the innovation activities and to the management of information.	The creation of the temporary PMO serves to establish a structure for strategic change .	Innovation process and the idea management software system provides boundaries to the innovation activities and the management of information.
Innovation, strategy of creation of innovation capability; the innovation strategy provides broad direction and boundaries .	The company strategy is used to steer the determination of theme s for idea workshops and campaigns .		

Interactive control systems			
Challenges initiated by the management and the introduction of important issues, which provide specific focus and draw attention to the important; initiating creative thought avalanches, rather than straight and explicit communication.		The strategic change is not organized under the governance of one large program partly separated from the line, but more management interaction is ensured by a matrix-like structure of 15 separate programs, each with a strong involvement from the line unit directors.	
Internal marketing of ideas, directions, and scenarios.			
Belief systems			
The management requires continuous analysis of how the company relates to society through various soft approaches and free discussion.			
Innovation is of great societal importance, and innovation itself has value.			

In order to bring structure to the analysis, we have organized it under subheadings in the following, to point out and summarize our conclusions based on the analysis.

Even though a formal PMO does not exist, there are different organizational arrangements and activities which serve a similar role.

Companies A, B and D did not use the term PMO for any of their innovation organizations or groups. Nor were these innovation organizations or groups PMO-like specialized organization units, but they were organizational bodies in a matrix structure, with circulating part-time representatives from lines in their roles, and organic and ever-changing procedures. Units called PMOs do not exist based on the definitions provided by the company representatives. Company A had ‘innovation coaches’, and company B and D had ‘innovation groups’ (composed of staff members, for fostering and initiation of ideas in B and D, and for selecting them for the further development of innovations in D). Company B also used the term ‘development group’ (for a group or board composed of middle managers, for processing the ideas towards innovations). There was a clear distinction between the group roles for fostering and generating new ideas (often called innovation groups, consisting of staff members) and groups for selecting and transforming ideas into innovations (called often as development groups or boards, consisting of middle managers). Only company C explicitly used the term PMO for the temporary task force that took a managerial and a supportive role in designing and implementing a major strategic change. Company C’s other permanent project support and management support (outside this strategic change) was organized in a matrix structure of portfolio managers in different units and at different levels.

There is a wide variety of integrative organizational arrangements that are embedded in the firm and its management structures.

The results suggest that there are several management control mechanisms that can be considered organizational arrangements outside PMOs or other kinds of organizational bodies in the management of front end of innovation projects. These include (see Table 5): coaches or facilitators for generating opportunities or ideas, innovation groups, development groups or boards for selection and decision making, innovation strategy, innovation process, coordinators for strategy and process implementation, idea management software systems, idea campaigns, specialized task forces for supporting executives and the staff (in goal-setting, in ideation, and in directing the implementation of the innovation process and inherent development projects), and challenge-driven idea generation processes (where challenges are based on strategy, or on observed opportunities or problems). Such relevant organizational arrangements for the management control, suggest that there are arrangements outside a PMO or outside even other kinds of organizational bodies, and such arrangements are embedded in an organic way into a project-based organization and its management structures. These findings expand the existing research on PMOs towards a broader understanding of the organizational and managerial mechanisms of a firm in the specific area of managing multiple innovation projects.

There is an emphasis on systematic process and on information management, and this is often reflected through the use of a software system.

Our empirical findings (companies B and D) point out the use of a management software system for providing boundaries for the innovation process and the management of information (as

boundary systems, see Table 5). Such a system makes the innovation process more systematic, and helps in recording, processing, and storing information effectively. The companies seemed to use the software system more for storing information than for using the information for various tasks during the innovation process. This also reflects research on use of information systems as a way to coordinate activities in an organization: the systems facilitate information exchange and storage but as of themselves do not integrate anything – the outcome depends purely on how the systems are used. Furthermore, our observation was that processing ideas and innovation projects through such a software system reduces the personalized interaction among the company personnel, and the software system increases the social distance between the individuals in the organization. Therefore, when such a software system is used, the leaders of the innovation/development groups must try harder to facilitate personal interaction despite the use of an impersonal software system and the inherent systematic and formal programmed mode of operation. With regards to this sort of facilitation, our observations indicate that the personal characteristics of the innovation/development group leaders might be of importance when considering which personnel to involve in an innovation project. In general, the management at the front end of innovation projects is challenged by the need to carefully balance between freedom and specific directions (Kirsch, 2004; Koen et al., 2001; Zien and Buckler, 1997). Indeed, our results suggest that neither the information management (software) system nor the innovation and project processes are sufficient, but an active and energizing coaching organization (e.g. innovation group) is required, with active and energizing events such as creative workshops and idea campaigns.

In the existing organizational arrangements, the emphasis seems to be in diagnostic and boundary systems.

The results show that all companies relied mostly on diagnostic and boundary systems. This is apparent in Table 5; the diagnostic and boundary system sections are populated with a wide variety of control mechanisms whereas interactive systems and belief systems do not have many mechanisms. Indeed, the use of interactive systems and belief systems (suggested by Simons 1994, 1995) is scarce, which implies that the company management's personalized and/or value-based open interaction with middle management and other personnel is low. Due to a lack of an interactive and a belief system approach to management control, the management remains distant; the mandated innovation/development groups operate with the management through the processing of information, setting goals and making decisions, and interaction with upper management often occurs indirectly through board meetings. This is true especially with companies B, C, and D. Company A uses a more personalized and value-based approach including open interaction among management and personnel through open discussion, while considering innovativeness and openness to be a fundamental value. In general, the emphasis on diagnostic and boundary control approaches (especially in companies B, C, and D) are observed through management's practice of putting strategies in place as inputs, and focusing on innovated-to-market concepts as outputs. However, there is little management focus on the phase between the inputs and outputs – aside from resourcing and mandating an innovation/development group to make the necessary idea enhancements and choices of ideas, and ultimately processing them into full-fledged innovations through deciding, resourcing, involving and/or assigning the innovations to the appropriate organizational sub-units.

The organizational arrangements tend to rely on organic and embedded matrix structures.

The observations regarding the emphasis on diagnostic and boundary systems seems to be in line with the roles and tasks of a PMO in the existing literature, which suggests that mechanisms of diagnostic and boundary control should be used (see Table 3 and the literature analysis on PMO and its tasks above). However, our empirical study with a special emphasis on the management of front end of innovation contrasts with the existing PMO literature by emphasizing a highly organic or embedded matrix structure for an innovation/development group, and emphasizing an even wider set of embedded organizational arrangements than just such groups – including personalized and value-based interactions between the executives and the staff, reward systems, innovation processes and/or idea management and innovation software systems. Concerning the embedded matrix structure, our empirical study concludes that innovation/development groups should include personnel from line organization's units. Therefore, these innovation/development group representatives also represent their line organizations when participating in selecting, processing, and advancing company-wide innovation projects. In this way, this sort of matrix structure in an innovation group (innovation group as an organizational entity or unit that can be compared e.g. to a PMO) ensures the involvement of all line organization units in innovations through evaluation, decision making, and resourcing. Furthermore, such a matrix structure also ensures that the part-time line organization units' representatives in an innovation group distribute information about innovations and innovation practices effectively within their line units, as agreed in the innovation groups' meetings. The innovation/development groups in all organizations represented both the resource unit allocated to work with the front end of innovation projects and the unit given a responsibility to allocate and request other resources from line units for different front end projects. The groups' work focused on typical front-end

innovation activities such as finding new business opportunities, facilitating the creation of new ideas, selecting ideas and concepts, and analyzing the business potential of the proposed concepts (this observation is in agreement with Koen et al., 2001, and Zhang & Doll, 2001). We also recognize that many companies used job rotation for moving personnel between the innovation/development group and the line organization, which enabled a deeper exchange of information and experiences between the innovation/development group and the line. Finally, it was surprising that even though previous studies emphasize rewards as an important control mechanism (Simons, 1995; Chester, 1995), the result of the empirical study did not strongly support the importance of reward schemes (except minor recognitions of ideas or their volume in companies B and D). These results are supported by previous research, which has not found any relationship between a reward system and project performance in a NPD context (Bonner et al., 2002), between rewards and the quality of output (Jenkins Jr. et al., 1998). This is further supported by Amabile's (1998) argument that intrinsic task motivation is more important than external rewards in creative work.

In the existing organizational arrangements, there was not much emphasis on interactive and belief systems.

Only company A used a belief system as their control approach through continuously linking the company to society. This was achieved through various techniques; soft communication and personal approaches, informal discussions, and through promoting innovation as a basic value in the company's operations. The basic operations of company A are innovative and emphasize creativity. Adaptation to the existing environment is required. Our observations concerning the

emphasis on the diagnostic and boundary systems with all the companies (especially B, C, and D) indicates that the management tends to manage through imposing goals, objectives, challenges, instructions, and resources to the front end of innovation. All the companies have mandated innovation and development groups through their resource allocation authority to serve as the spokesperson for management. In their spokespersons' roles, when putting resources and support to their selected ideas and projects, innovation and development group representatives make important strategic choices on behalf of their executives. In this way management uses diagnostic and boundary control when delegating important responsibilities to the innovation and development groups, but a lack of interactive and belief control is apparent through the observation that the delegated innovation/development groups feel uneasy with such an important responsibility. These groups need greater management involvement through interactive discussions and a more open and value-based environment that would enhance the belief approach of control. This discussion concerning 'diagnostic & boundary' vs. 'interactive & belief' control relates to the 'information' (Daft and Lengel, 1986; Galbraith, 1973) vs. 'behavioural' (Barnard, 1938; Lorsch and Morse, 1974) perspective in organizational theories of integration (see Table 2).

A natural development path may exist in firms from diagnostic and boundary systems towards interactive and belief systems.

Based on the observations reported above, we propose that the natural development path of an innovation organization begins with emphasizing diagnostic and boundary systems (with rather mechanistic management approaches) which is followed by a more intense use of interactive and beliefs systems (with a more personalized and value-based interaction between the executives

and the staff). The purpose for expanding management control and PMO's activities towards interactive and belief control approaches is to intensify the discussion between an organization's management and its personnel, and to find common meaning and justification for innovation and new ideas. Influencing beliefs is important to provide common purpose and direction for the organization (Simons, 1994). A coherent value-based influence of normative patterns partially complements and partially substitutes other organizational steering mechanisms (Merchant, 1985). The emphasis on diagnostic and boundary systems may also reflect a maturity in managerial thinking in regards to directing organizational activities. In our empirical study, one reason for the emphasis on diagnostic and boundary system approaches in management control can be found in the average age of innovation/development group participants: the groups are all quite recent hires and therefore the groups are rather young and still early in their careers. Furthermore, all the innovation/development groups were established based on the practical need to quickly improve the functionality of the front end of innovation. At this stage of development the beliefs (in terms of favourable innovation culture) and the meaning of the overall innovativeness in the organization have played only a minor role. As the innovation/development group becomes institutionalized, it may start to take a more active role in advancing an organizational agenda on the belief level.

DISCUSSION

As a synthesis from our empirical analysis, we make the following major observations:

- Even though formal organizational units called PMOs do not exist in some companies, there are different organizational arrangements and activities with part-time participation in a matrix setting. There is a clear distinction between the innovation groups (composed

of staff members for generation of initial ideas) and development groups (composed of middle managers for decisions on resourcing and further development).

- There is a wide variety of integrative organizational arrangements that are embedded in an organic way into a firm and its management structures. Such organizational arrangements can be considered alternatives to non-existent PMOs or to any other kind of organizational bodies. Such arrangements include: coaches, facilitators, groups, boards, innovation strategy, innovation process, coordinators for strategy and process implementation, idea management software systems, idea campaigns, specialized task forces for supporting executives and the staff, and challenge-driven idea generation processes.
- There is an emphasis on the systematic process and on information management, and this is often reflected through the use of a software system. For the management of the staff and their creative innovation processes, a software system represents a formalized artefact (or “machine”) that seems to introduce a problematic man-machine interface. Therefore, software systems are not always well-received by the staff members or middle managers.
- In existing organizational arrangements, the emphasis is on diagnostic and boundary systems. This means that the executives have organized the management through artefacts (groups, boards, coordinators, task forces, processes, strategy, software systems, idea campaigns) that represent a “formalized vehicle” between the executives and the organization, and the staff and middle managers experience that such vehicles cause the executives to remain distant.
- The organizational arrangements tend to rely on organic and embedded matrix structures. Such organic and matrix structures occur through the part-time involvement of staff from

various parts of the organization, the rotation of personnel, the changing roles, and the careful consideration of reward schemes.

- In the existing organizational arrangements, there was not much of an emphasis on interactive systems and belief systems.
- A natural development path may exist from diagnostic and boundary systems, towards interactive and belief systems. This proposition needs more research, but according to our observations it is possible that this natural development in management approach occurs by first emphasizing diagnostic and boundary systems (with mechanistic management approaches) followed by a more intense use of interactive and belief systems (including a more personalized and value-based interaction between the executives and the staff).

The empirical evidence analyzed in this paper points out the dominant role of diagnostic and boundary systems in management control, with a mechanistic approach to how employees are targeted, instructed and rewarded when pursuing organizational goals. Although our empirical data is limited, only company (A) emphasized the role of the innovation organization (coaches) as a key actor in influencing beliefs by facilitating soft management approaches and free discussion. Our empirical data shows that management has clearly mandated autonomy to the innovation/development groups. This means that management has delegated the steering responsibility to such groups. The groups, however, have difficulties when taking on the given role, to use their mandate and to become a key actor in steering innovation. Therefore, mandating innovation/development groups or coordinators was often considered to be a problem among the groups and coordinators. The coordinator's personal involvement and his or her characteristics made a difference in the effectiveness and organizational embeddedness of innovation activities.

The use of software systems also introduced an impersonalized man-machine interface (or user-software interface) to innovation processes, which was often considered to be a problem. Our empirical data does not indicate an emphasis on reward systems as management control mechanisms. With regards to our observations about horizontal/lateral mechanisms, our empirical data does point out the use of matrix structures and job rotation in innovation organizations, both of which are considered desirable for increasing participation, interaction, and involvement. Matrix structures were in place through efforts to embed innovation activities into local units through the part-time involvement of staff in functions. Notably, we observed very little interactive systems and belief systems (except company A), which potentially creates a dangerous gap between the management and the rest of the organization. The large distance between the executives and the staff was often considered to be a problem. Therefore, weak or non-existent interactive systems or belief systems indicate that it is possible that the management is not an active contributor that would show enough interest or provide enough focus on innovation activities. Based on this reasoning, we suggest that, in general, the management should increase the interactive and belief system approaches in management control. This paves the way towards a more organic and embedded structure of managing multiple projects in a project-based firm/organization. The general suggestion to move towards interactive and belief systems also means expanding the role and tasks of PMOs to include more interactive, personalized, social, open, and flexible management control systems. Looking at the results of our empirical and literature studies, we would make such a suggestion for any kind of an organization and PMO. However, we recognize that our empirical study focused specifically on the management control of the front end phase of innovation projects, and therefore it is possible that the more informal interactive and behavioural controls that allow for more freedom may be

more effective in such a context, than in the later implementation phase where more formal and diagnostic approaches may be more effective (see e.g. Kirsch, 2004).

CONCLUSION

This research addresses management control of the front end of innovation projects in organizations. Due to the use of the theories of organization design and management control, we focus on PMOs as an integrative organizational arrangement, both as a formal organizational unit but also including other integrative mechanisms. We also use innovation front end literature, to describe the innovation context and to understand management control in the specific area of front end of innovation projects. We analyze PMO literature in order to establish a narrow interpretation of a PMO as a specialized organizational unit. The empirical material is derived from four case companies. We look at integrative organizational arrangements broadly to observe how executives manage the front end of innovation projects in firms. In this respect, our results show a wide variety of integrative organizational arrangements – but not PMOs – in the management of the front end of innovation projects. Such arrangements include: coaches, facilitators, groups, boards, coordinators for strategy and process implementation, specialized task forces, innovation strategy, innovation process, idea management software systems, idea campaigns, and idea generation processes.

Our research expands the existing PMO research by including a broader definition of organizational arrangements for the management control of projects in companies. The paper also contrasts prior literature by emphasizing the desirability of a highly organic or embedded matrix structure. The results also suggest that a behavioural perspective in management is important, as

is the information processing view (or coordinative view) in the existing PMO literature. We adopt a framework with four distinctive types of management control systems: belief systems, boundary systems, diagnostic control systems, and interactive controls systems. We use these four types of management control systems to categorize control mechanisms representing specific organizational arrangements. We derive several observations and suggestions based on the distinctive nature of the different management control mechanisms categories (or control system types), and on how different control system types serve different strategic purposes. The major contribution of this paper is to organizational and managerial mechanisms of a firm in the context of managing multiple innovation projects.

FURTHER RESEARCH

Our findings provide avenues for future research in the management of innovation projects in project-based firms/organizations. We think that future research could provide particular insights into the following three themes:

1. Management control of innovation especially through interactive systems and belief systems.
 - What are the effective control mechanisms that rely on the interactive and belief approaches?
 - What are the contingency factors that affect the choice and/or performance of such mechanisms?
2. Information processing and behavioural perspectives on the organization of and the management of multiple projects in project-based firms.

- What is the role of the horizontal/lateral between-ideas and between-projects integration?
 - How would the management of the exploration of new directions in individual/local projects differ from the approach of exploitation of standardized/global company practices across of several projects?
 - What role does learning at the project level and at the firm level play, in respect to exploration vs. exploitation?
3. Evolutionary patterns in project-based firms in terms of the evolution of management approaches and the role of a PMO.
- Further research could test the proposal that we presented in this paper: Does the natural development path of management approach and the use of a PMO follow a pattern of first emphasizing diagnostic and boundary systems followed by a more intensive use of interaction and belief systems?
 - Are organization-specific PMOs temporary organizational structures that are useful in their specific forms only for a specific period of time?
 - How do PMOs evolve, and what are the contingency factors that affect specific evolution patterns?
 - When do PMOs become obsolete, i.e. what are the contingency factors that suggest that a PMO should be disbanded? What are pros and cons of various PMO arrangements? Can PMOs serve as a hindrance to the effective management of a firm? In which contextual settings?
 - How can the concept of PMOs be expanded as a conceptual research object so that the broader managerial aspects of managing multiple projects in a project-

based firm/organization, are explained for example by management control and organizational theories?

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