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De Rooij, Mariska M.G.; Janowicz-Panjaitan, Martyna; Mannak, Remco S.

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A configurational explanation for performance management systems' design in project-based organizations

Mariska M.G. de Rooij [a,*], Martyna Janowicz-Panjaitan [b], Remco S. Mannak [c]
[a]Vion IM&T BV, Boseind 10, 5328 RM, Boxtel, the Netherlands
[b]Tilburg School of Economics and Management, Tilburg University, Warandelaan 2, 5038 AB, Tilburg, the Netherlands
[c]Department of Organization Studies, Tilburg University, Warandelaan 2, 5038 AB, Tilburg, the Netherlands
* Corresponding author
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Abstract

This paper investigates what configurations of organization-level contingencies explain different performance management system (PMS) designs in project-based organizations (PBOs). By studying organization-level contingency factors – perceived environmental uncertainty, organizational size, innovation strategy, and opportunity strategy – this paper extends prior literature on PMSs in PBOs, which predominantly focused on project and portfolio level contingencies. In addition, while prior literature studied the contingency factors separately, this paper argues that it is the configurations of contingencies that matter for PMS design choices. Data on 15 PBOs in the management consulting industry reveal that PBOs combine various controls into performance management systems that are either predominantly mechanistic or organic in nature. Qualitative Comparative Analysis (QCA) points to four configurations of organization-level characteristics, two of which are associated with the PBO's choice for mechanistic performance management system, and two that are related to organic performance management system.

Keywords: Performance management system; project-based organization; fuzzy-set qualitative comparative analysis, contingency factor.

Introduction

Project-based organizations (PBOs) are organizations that conduct their main external and internal activities by means of projects (Hobday, 2000; Lindkvist, 2004; Söderlund and Tell, 2011). To "ensure that projects support the strategy and business objectives of the firm" (Artto and Kujala, 2008: 474), PBOs employ performance management systems (PMSs); organizational instruments to achieve alignment of the projects with the strategic objectives of the PBO (Turner and Müller, 2003). The design of the PMS can vary substantially between PBOs. Prior research has identified and studied a range of factors affecting the design of performance management systems in non-PBO as well as PBO contexts (e.g., Chenhall, 2003). The purpose of this paper is to demonstrate that it is combinations of the various contextual factors - and not simply any of them individually – that hold explanatory power in explaining the design of a performance management system of PBOs. By doing so, this study aims to better approximate the design decisions made by managers in PBO contexts, where designing a PMS involves considering multiple contingencies simultaneously.

The motivation for this study is twofold. First, prior literature tends to investigate the effect of the different contextual conditions on the choice of a PMS in an *isolated fashion,* largely ignoring the fit between the variables and the design of the PMSs in PBOs (cf. Martinsuo, 2013). The only study on configurations of factors in relation to PBO's choice of PMS that could be identified through a literature review was Dahlgren and Söderlund (2010). The authors, by way of a multiple case study on 4 Scandinavian organizations, identified what type of PMS (routine-based, planning-based, resource-based and program-based) a PBO is likely to adopt under a combination of high vs. low project dependence and high vs. low project uncertainty. Current paper builds on that research by examining how *configurations* of multiple organization-level characteristics are related to the PBO's choice of PMS. This constitutes the first contribution of the current paper.

Second, according to Miterev et al. (2017b: 527) literature on PBOs mostly "downplays broader organizational issues (such as organizational strategy, incentive schemes and *performance management systems* [emphasis added]) while emphasizing research agenda inherited from research on single project management". Studies of PMSs in PBOs so far focus predominantly on performance management of projects or portfolios of projects and, with a few notable exceptions (Canonico and Söderlund, 2010; Dahlgren and Söderlund; 2010), give little attention to performance management at the *organization level* (Miterev et al., 2017b). Also, the few studies that do focus on organization-level PMSs in PBOs link the PMS design to contingencies at the project, inter-project, or portfolio level (e.g., projects' interdependence, uncertainty and external openness). This study complements the prior studies by applying general organization theory to the study of PBOs, as called for recently by Miterev et al. (2017b). Therefore, this paper takes four general contingencies of PMS design that capture characteristics of organizations as a whole – perceived environmental uncertainty (PEU), organizational size, innovation strategy and opportunity strategy (Chenhall; 2003, 2007; Fischer, 1995; Otley, 2016) – and applies those to PMS design of PBOs. Focus on PMSs of a PBO as *a whole* (Miterev et al., 2017b), rather than on specific elements thereof (Cardinal et al., 2010; Malmi and Brown, 2008) and using contingencies derived from general organization theory to explain the PMS design, is the second contribution this paper makes to the literature. In sum, the research question this paper answers is: *What combinations of organization-level contingency factors are associated with the different performance management system designs in project-based organizations?*

Thus, this paper builds on prior literature studying contingency factors affecting PMS design in organizations in general (e.g., Ezzamel, 1990; Gordon and Narayanan, 1983; Pondeville et al., 2013) as well as on literature studying performance management in PBOs (e.g., Canonico and Söderlund, 2010; Dahlgren and Söderlund, 2010; Kivilä et al., 2017;

Korhonen et al., 2014; Ylinen and Gullkvist, 2012). It combines the general theoretical insights of contingency theory with the literature on PMSs of PBOs. After a thorough literature review, the paper presents the qualitative data on fifteen cases of PBOs in the consulting sector and the form of PMS they use. Next, Qualitative Comparative Analysis reveals combinations of contingencies associated with particular PMSs. The discussion of the results as well as implications for theory and practice follow. The paper closes with limitations and directions for future research.

Literature review

Performance management systems

This study adopts a definition of performance management system developed by Ferreira and Otley (2009: 264): "*the evolving formal and informal mechanisms, processes, systems, and networks used by organizations for conveying the key objectives and goals elicited by management, for assisting the strategic process and ongoing management through analysis, planning, measurement, control, rewarding, and broadly managing performance, and for supporting and facilitating organizational learning and change*". This definition points to a holistic approach to PMSs. Accordingly, a broad scope of controls employed by the organizations was considered in this study without differentiating their specific purpose, as some other research does (e.g., Malmi and Brown, 2008 distinguish between PMSs for decision making and control).

Contemporary research differentiates between performance management systems and performance management packages[1]. "MC [management control] practices form a *system* if the MC practices are interdependent and the design choices take these interdependencies into account. In contrast, MC as a *package* represents the complete set of control practices in place,

[1] We gratefully acknowledge the anonymous reviewers for pointing us to this debate.

regardless of whether the MC practices are interdependent and/or the design choices take interdependencies into account" (Grabner and Moers, 2013: 408, emphasis added). A package can include multiple controls or even multiple control systems, including cultural controls, planning controls, cybernetic controls, reward and compensation and administrative controls (Malmi and Brown, 2008). The holistic framework of Ferreira and Otley (2009), adopted in this study, covers this whole range of controls. This study takes the *systems* approach, assuming controls to be interdependent rather than independent. The implications of this approach have been explored through additional analyses (see Appendix D).

Based on a literature review, Chenhall (2003) constructed a taxonomy of PMSs ranging from mechanistic to organic. An organic PMS functions in a flexible, responsive way, gives a broad range of information about the organizational, team and individual performances. It involves just basic rules and standardized procedures, effectively giving the projects a relative degree of autonomy. On the other hand, a mechanistic PMS relies more on strict rules, standardized procedures and routines and controls output and behavior, leading to a relatively close monitoring of the projects. In line with the long-standing research tradition of contingency theory (Gordon and Narayanan, 1983), recent research found that in the PBO context the design of a PMS is associated with various contingency factors, as elaborated below (Canonico and Söderlund, 2010; Dahlgren and Söderlund, 2010).

Performance management systems and fit with contingency factors

A literature review conducted for this study (see Table 1) reveals a rich tradition of studies on contingency factors affecting PMS design in traditional (non-PBO) organizations (e.g., Ezzamel, 1990; Gordon and Narayanan, 1983; Pondeville et al., 2013). This review and prior reviews conducted by Chenhall (2003, 2007) and Otley (2016) identify in essence the same contingency factors and include environmental factors (e.g., Ezzamel, 1990; Gordon and

Narayanan, 1983, Khandwalla, 1977, Pondeville et al., 2013), technology (e.g., Bruns and Waterhouse, 1975; Khandwalla, 1977) , organizational structure, size (e.g., Barnes et al., 1998; Bruns and Waterhouse, 1975, Simons, 1987), strategy (e.g., Khandwalla, 1977, Simons, 1987) and national culture (Chenhall, 2003, 2007).

The literature review (see Table 1) also identified a few studies on control management at the project or portfolio level within PBOs (Kivilä et al., 2017; Korhonen et al., 2014; Ylinen and Gullkvist, 2012). Ylinen and Gullkvist (2012) studied the use of organic and mechanistic controls by project managers depending on the project managers' perceived task uncertainty and tolerance for ambiguity. Kivilä et al., (2017) scrutinized the PMS of a single, large scale project and found that different control mechanisms (alliance model, project planning, measurement and indicators, external communication) are used differently for different dimensions of sustainability (economic, environmental; and social sustainability). Finally, Korhonen et al. (2014) explored how managers in different roles (project, program and portfolio managers) perceive management controls as a means to managing project portfolio uncertainties. Interestingly, while the level of analysis in this paper is the project portfolio, the sources of uncertainty span the project related uncertainty, organizational complexity related uncertainty and environmental uncertainty, effectively including explanatory variables at the organizational level (besides the project-level uncertainties).

Table 1: Literature review

	Research design	Level of analysis	Outcome variable	Main findings
Research on PBOs				
Canonico and Söderlund, 2010	Comparative case study on 2 Italian PBOs	PBO-level	Management control system	"A low degree of exploitation of mutual interdependencies among projects [and] openness of projects to the external business environment favors the use of diagnostic control mechanisms [formal; preset standards]; [while] a high degree of (...) interdependencies [and] openness (...) favors interactive control mechanisms [dialogue; facilitating new ideas]." (804).
Dahlgren and Söderlund, 2010	Multiple case study on 4 Scandinavian organizations	PBO-level	Management control system	PBOs with low dependence between projects and low project uncertainty mainly use routine-based control systems. Under high dependence and low uncertainty PBOs use planning-based control systems. Under low dependence and high uncertainty, PBOs use resource-based control systems. Under high dependence and high uncertainty, PBOs use program-based control systems.
Kivilä et al., 2017	Single case study on a large construction project in Finland	Project-level (inter-organizational project)	Performance Management Package	"[T]he findings show that a more holistic control package is used in sustainable project management, different control mechanisms [alliance model; project planning; measurement and indicators; external communication] are used differently for the different dimensions of sustainability [Economic; Environmental; and Social Sustainability], sustainability control needs to be integrated as part of general project management, and internal project control needs to be complemented with effective project sustainability governance." (1180)
Korhonen et al., 2014	Multiple case study on 6 Finish manufacturing companies	Project-, program-, and portfolio level (in PBOs)	Performance Management Package	Managers in different roles have "fairly well-balanced perceptions across environmental, organizational, and project-based uncertainties" (31) (i.e. no strong role effect). However, different controls are "differently used by different managerial roles" (32) Accordingly, cooperation across roles is needed, and "effective uncertainty management requires a management control package, featuring multiple planning, cybernetic, cultural, and administrative mechanisms of control" (32)
Ylinen and Gullkvist, 2012	Quantitative study on 119 project managers in Finland	Project manager-level (in PBO)	Management Control System	Project manager's perceived task uncertainty has a negative effect on balanced use of organic vs mechanistic controls, but not on the combined use (total amount of organic and mechanistic controls). I.e. under task uncertainty, managers use more organic controls and less mechanistic controls. Project manager's perceived tolerance for ambiguity has a negative effect on both balanced use and combined use. Task uncertainty and tolerance for ambiguity also have a negative interaction effect.
Research outside of PBOs				
Ates et al., 2013	Multiple case study on 37 European SMEs	Organization-level (not in PBO context)	Performance Management System	"The paper found that SMEs engage with a four-stage performance management process, although there are some gaps between their practice and the complete process as recommended in literature" (28) ""Short-term priorities" and "look for flexibility" are key SME characteristics and they obstruct the development of effective mission vision and values. (...) Planning activities are perceived by entrepreneurs as cause of bureaucratisation and an obstacle to the flexibility of SMEs, particularly if they are formalised using managerial systems (...)" (44)

Barnes et al., 1998	Multiple case study on 20 Australian SMEs	Organization-level (not in PBO context)	Performance Management System	SMEs performance management systems are relatively unstructured, lack formal planning, and use little external data. "Small enterprises see little need for a formal approach to design of their management system. Medium enterprises realize the need for explicit management, but the system tends to grow reactively and spontaneously rather than as a result of planning and anticipation." (p 5)
Bruns and Waterhouse, 1975	Quantitative study on 25 North-American organizations.	Organization-level (not in PBO context)	Control mechanism: budgetary control	This study examines organizational context effects (origin, size, technology, and dependence on other organizations) on organizational structure and subsequently on budgetary control. Larger, more technological sophisticated organizations tend to have an administrative control strategy, while organizations which are small or dependent on other organizations tend to have an interpersonal control strategy.
Ezzamel, 1990	Quantitative study on 81 companies in the U.K.	Organization-level (not in PBO context)	Control mechanism: budgetary control	"The results suggest that: (i) PEU [perceived environmental uncertainty] is positively correlated with budget participation, use of budgets for performance evaluation, required explanation of variances and interactions with superiors, but shows no significant relationship with budget goal difficulty. (ii) Managerial autonomy is negatively correlated with interactions between superiors and subordinates. (iii) Organization size is not significantly correlated with any of the budget characteristics studied." (193).
Gordon and Narayanan, 1983	Quantitative study on 34 U.S. companies	Organization-level (not in PBO context)	Management Information System	The higher the perceived environmental uncertainty, the greater the need for complementing the traditional (financial, internal, ex-post) management information system with external, non-financial, and ex ante information. The paper show that organizational structure has a spurious effect on the management information systems, both being directly affected by the environmental uncertainty.
Khandwalla, 1977	Quantitative study on 103 Canadian firms (book section)	Organization-level (not in PBO context)	Control and Information System	"The more competitive [,] innovation rich[,] technologically sophisticated[,] complex [and] diverse the environment; [and] the larger the organization; and the wider its distribution network[; and] the more professional the orientation of the top management […] the more sophisticated and comprehensive is the control and information system employed in the organization" (507-508).
Pondeville et al., 2013	Quantitative study on 256 Belgian manufacturing companies	Organization-level (not in PBO context)	Environmental Management Control System	"Companies that perceive greater ecological environmental uncertainty are less inclined to develop a [...] formal *environmental* management control system. Market, community, and organizational stakeholders motivate [...] the development of different *environmental* management control systems. Regulatory stakeholders only encourage the development of an environmental information system [but not the environmental management control system]" (317; italics added).
Simons, 1987	Quantitative study on 171 Canadian manufacturing companies	Organization-level (not in PBO context)	(Multi-dimensional) Accounting Control System	"High performing Prospector firms seem to attach a great deal of importance to forecast data in control systems, setting tight budget goals, and monitoring outputs carefully. [...] In addition, large firms appear to emphasize frequent reporting and the use of uniform control systems which are modified when necessary. Defenders, particularly large firms, appear to use their control systems less intensively. In fact, negative relationships were noted between performance and attributes such as tight budget goals and output monitoring. Defenders emphasized bonus remuneration based on the achievement of budget targets and tended to have little change in their control systems." (370).

Finally, only two studies on PMSs of PBOs at the organizational level have been identified (Canonico and Söderlund, 2010; Dahlgren and Söderlund, 2010). In both papers, the design of the PBO-wide PMS is studied as a function of contingencies at the project, inter-project and portfolio level: dependence between projects and project uncertainty (Dahlgren and Söderlund, 2010), and project interdependence and project openness to external business environment (Dahlgren and Söderlund, 2010). The literature review found no research studying the PBO-wide PMS as a function of contingencies reflecting characteristics of organizations as a whole. It is important to stress that there exists a large stream of literature on controls at the project level as a function of project-level contingencies in non-PBOs. However as this literature stream deals neither with performance management systems, nor with the context of PBOs, it falls outside the scope of this paper.

To fill the literature gap identified above, this study focuses on the contingencies of PMS design derived from general contingency theory that vary in the empirical context of this study, i.e. environmental uncertainty, organizational size, innovation strategy and opportunity strategy. The section below elaborates on each of the factors and their association with PMSs as found in prior research.

Organizational-level contingencies of performance management system design in PBOs

The first of the four factors studied is the *perceived environmental uncertainty* (PEU) (Lueg and Borisov, 2014), which assumes that uncertainty emanates from the relationship between the perception of top management and the environment. It is not relevant how uncertain the environment objectively is, but rather how uncertain the top management perceives it to be, since it is perceptions that the managers act upon (Pondeville et al., 2013). In prior research high PEU is mainly associated with organic control mechanisms as they enable organizations to adapt flexibly to environmental changes (Chenhall, 2003; Covin and Slevin,

1988; Gordon and Narayanan, 1983). On the other hand, some authors posit the opposite, namely PEU leading to a mechanistic PMS (Khandwalla, 1977).

According to the organizational structure literature, an increase in *organizational size* – the second factor studied in this paper – is accompanied by an increase in structural complexity of organizations (Haveman, 1993). Complexity in turn is argued to lead to more centralized focus of authority in decision-making, larger use of codes and procedures for coordination (Meijaard et al., 2005) and more administrative controls (Bruns and Waterhouse, 1975), which mainly reflect mechanistic PMSs. Conversely, in small and medium enterprises, PMSs are usually informal and mainly used to solve specific problems (Ates et al, 2013; Barnes et al., 1998; Garengo et al., 2005) i.e., organic. At the same time, small organizational size has also been found to be associated with mechanistic PMSs (Bruns and Waterhouse, 1975), pointing to some conflicting findings.

Factors three and four in this study are derived from the work of Söderlund and Tell (2011), who propose a strategy framework for PBOs consisting of two dimensions, the *innovation strategy* (exploration versus exploitation) and the *opportunity strategy* (voluntaristic versus deterministic). The first dimension – factor three in this study – captures the organizational attitude and behavior towards innovation and differentiates between explorative and exploitative innovation strategies of PBOs. Explorative strategy is characterized by search, risk taking, variation, play, experimentation, discovery, flexibility and innovation (March, 1991) in order to pursue innovations for new customers or markets (Jansen et al., 2006). Exploitative strategy on the other hand includes choice, refinement, efficiency, selection, production, execution and implementation (March, 1991), building on existing knowledge and needs of existing customers (Jansen et al., 2006). Literature links exploitative innovation orientation to mechanistic PMS design (Chenhall, 2003; Jansen, et al., 2006), because exploitation relies on making current processes and outputs more efficient though routinization,

formalization, centralized authority, and standardized responses to environmental issues (Jansen et al., 2006). In contrast to that, Simons (1987) finds that high performing prospectors (i.e., explorative strategy) tend to choose for mechanistic PMSs. This ambiguity is in line with Langfield-Smith's (2006) literature review results.

The second strategy dimension – factor four in this study – captures the (deterministic vs. voluntaristic) *opportunity strategy* of an organization (Miller and Friesen, 1982; Söderlund and Tell, 2011), which consists of risk taking, proactiveness, competitive aggressiveness and autonomy (Rauch et al., 2004). The deterministic strategy is characterized by a reactive approach where strategic decisions are made upon opportunities found in the environment (Söderlund and Tell, 2011), while a voluntaristic strategy is seen as entrepreneurial orientation where (new) strategic options are created. Organizations with a deterministic strategy require the uniformity and routines of a mechanistic PMS to efficiently supply their existing markets and customers (Covin and Slevin, 1988). An organization with a voluntaristic orientation, on the other hand, requires an organic PMS because it enhances adaptability needed for exploring new markets and products (Chenhall, 2003; Covin and Slevin, 1988).

Configurational model of organic or mechanistic performance management systems

This paper argues that PBO's top management team responsible for adopting one or the other form of PMS does not assess each condition in isolation, but rather in combination, i.e., the configuration of conditions. The fact that prior (linear additive) studies examined these conditions in isolation is likely part of the reason for at times contradictory effects of the different contingencies on PMS design. Configurational approach offers potential for resolving these contradictions by comparing a set of cases based on the configuration of key distinctive variables. To illustrate the argument, imagine Will is the CEO of a small PBO in an uncertain environment and Diane is the CEO of a large organization in an uncertain environment.

According to extant literature, Will is likely to adopt an organic PMS and Diane some mix including organic and mechanistic elements. In practice, however, Diane might choose for an organic PMS as her PBO pursues a voluntaristic, explorative strategy and experiences high PEU as an innovation opportunity to which she wants to adapt flexibly. Will, on the other hand, might opt for a mechanistic PMS, because his small PBO has a deterministic and exploitative strategy and perceives all uncertainty as threat that needs to be controlled. In other words, PBO's management in designing a PMS is likely to derive meaning from the configuration of the factors that individually might have little meaning (cf. Miterev et al., 2017a). Since prior findings on contingencies of PMS design result from studies adopting a linear additive approach, while insightful, they cannot become basis for formulating configurational hypotheses. Therefore, this paper continues in an exploratory fashion.

Methods and data

Method

To examine the association between combinations of contingency factors and PMS design, this paper applies fuzzy set Qualitative Comparative Analysis (fsQSA), which is particularly suitable for comparing a small number of cases (10 - 40) on many variables (conditions) (4 - 7) (Rihoux and Ragin, 2009). FsQCA aims to find subsets of cases within the data set that have the same causal conditions, leading to the same outcome. FsQCA is deemed to be the most appropriate method for this study, because: (I) it allows to explore combinations of conditions (pathways) that in conjunction lead to a particular outcome (PMS design); (II) it allows for equifinality, i.e., different pathways leading to the same outcome (Rihoux and Ragin, 2009); (III) it differentiates between sufficient conditions (a single condition sufficient to predict an outcome), necessary conditions (a condition that must be included in every potential pathway to a given outcome); and INUS conditions (conditions that are part of one of the

possible pathways to an outcome); and (IV) it allows for asymmetry, which means that a condition can lead to an outcome while the reverse of the condition does not have to result in the reverse outcome. For example, a combination of high PEU, small organizational size and an explorative strategy might lead to organic PMSs. At the same time, organizations might adopt a mechanistic PMS either in case of environmental certainty or when large organizations apply a deterministic strategy. Accordingly, fsQCA offers the unique opportunity to identify configurations of conditions, which are difficult to identify by means of other methods.

Cases and data collection

Data on the 15 cases of Dutch consultancies were collected by means of a series of interviews and a document study. Consultancies are a well-suited research setting for this paper as they rely on project organizing to deliver professional services to their clients and thus constitute a pure form of PBO (Blindenbach-Driessen and van den Ende, 2006). Their level of project recurrence is sufficient for developing *organization*-level systems, while their role distributions are too fluid to rely on craft-dominated control systems (Whitley, 2006). Additionally, consultancies operate in various market sectors and vary in terms of size and strategy adopted, allowing to assess the joint impact of those factors on PMS design. Given that all companies were Dutch service companies with a project-based structure, conditions 'national culture', 'structure' and 'technology' (Chenhall, 2003) were constant, and excluded from the analysis.

As there is no complete open-access list of consultancy organizations in the Netherlands available, the authors reverted to convenience sampling and looked for cases that varied in size and area of specialization (varying from strategy consulting to HR consulting and IT consulting, as shown in Appendix A). In every consultancy firm, an interview with a top manager or a highly informed middle manager was conducted. Although the interviewees held various

functions, prior research showed that managers with different project-related roles tend to have "good awareness of uncertainties related to project portfolio management" (Korhonen et al., 2014: 32). Importantly, since this study focuses on the PBO organization as a unit of analysis, only interviewees who were involved in the organizational strategy formulation and had good insight into organization-level processes (i.e., higher level management) were selected. See Appendix A for details of the cases and interviewees.

Each interview started with a semi-structured part, to investigate the organic and mechanistic controls used in the PBO's PMS (see: Measurement of outcome). Thereafter, the interviews continued with a structured part based on earlier validated questionnaires, the aim of which was to gain quantitative input data to define the initial value on every condition (see: Measurement of contingency factors). The final part of the interview was semi-structured that, in combination with the document study, enabled the authors to develop full understanding of the case. The outline of the interview can be found in Appendix B. The document study consisted of annual reports (for listed companies), strategy (communication) documents and handouts of PMS dashboards. Thorough understanding of the cases (relative to survey scores only) is key in fsQCA (Rihoux and Ragin, 2009), as it allows the researcher to develop case-comparative expertise, to validate and motive each case score, and to interpret the outcomes of the analysis. Given between-case comparison rather than within-case analysis was the aim of this research, conducting one or two interviews per case complemented with additional secondary data, is a common data collection strategy for QCA-studies (see e.g., Verweij, 2015, and Bakker et al., 2011). More information on the data collection and analysis process can be found in De Rooij et al. (in press).

Measurement of outcome

The nature of the PMS was assessed by way of the semi-structured interview by explicitly asking the respondent how the organization operates around the 8 central PMS aspects outlined by Ferreira and Otley (2009) (see appendix B). The aspects mentioned in the interview were then categorized according to Chenhall's (2003) taxonomy. Based on that classification, the percentage of mechanistic PMS was calculated. For example when the interviewee mentioned 3 aspects of organic and 5 aspects of mechanistic PMSs, the input score was (5/(3+5))*100 = 62.5%. Appendix C includes an overview of illustrative cases with low or high scores on PMS design and on the contingency factors.

Measurement of contingency factors

Organizational size was measured according to the turnover of a consultancy firm and varied between € 400.000 and € 80.000.000. PEU of a consultancy firm was measured by examining the managers' perceptions about predictability and stability of various aspects of their organization's environment using 4 items on a 7-point Likert scale adopted from Miller (1993). Finally, strategy was measured on two subscales. The first scale measured the degree of explorative versus exploitative strategic orientation of the organization. The questionnaire used was developed by Jansen et al. (2006) and included 3 items on a 7-point Likert scale. The second scale measured the opportunity strategy of the organization (voluntarism versus determinism). The questionnaire was retrieved from Naman and Slevin (1993), based upon Khandwalla (1977), Miller and Friesen (1982), Covin and Slevin (1988, 1989) and included 3 items on a 7-point Likert scale. All items can be found in appendix B. It is important to acknowledge that the final scores of cases on contingency factors are not solely based on the above-mentioned items, but crucially also on the in-depth interview and secondary data analysis that followed and allowed to validate and motivate case scores. The case score motivations

enabled relative comparison of scores between PBOs, which revealed a few small inconsistencies between initial scores and motivations (e.g., same motivations for slightly distinct scores). In line with the fsQCA approach for case score validation by means of qualitative data (Rihoux and Ragin, 2009), these inconsistencies were adjusted. For the case score motivations, see De Rooij et al. (in press).

Calibration

To conduct fsQCA, the input data obtained through interviews and document study had to be calibrated to transform the scores into fuzzy scores in the interval between 1.00 and 0.00 (Ragin, 2007). An important step in the calibration process is determination of the threshold values to define to what degree a case belongs to a condition, fully in [1], fully out [0] or maximal ambiguous [0.5 – case-crossover point]. PMS design was rated as the percentage of mechanistic controls relative to organic controls. As further elaborated in the results section, the data include both a case with an exceptionally low score (9.5%) and an exceptionally high (80%) scores on the outcome variable. Therefore, the threshold value for 'fully out' [0] was set at 20% and the threshold value for 'fully in [1] was set at 80%, while the case-crossover point 'fully ambiguous' [0.5] is set at 50%. Cluster analysis, with an average link function and Euclidean measure, reveals two clusters of PBOs, one with less than 44% mechanistic controls, and the other with more than 51% mechanistic controls. Hence, the cluster analysis confirms that the case-crossover point at 50% adequately differentiates the two most prominent clusters in the data.

The threshold values for the condition organizational size were determined using the framework of the European Commission (2014), which indicates that organizations with yearly turnover below €2.000.000 are 'micro' – in this study 'fully out' [0] – while organizations with a yearly turnover above €50.000.000 are 'large' and therefore considered 'fully in' [1]. A yearly

turnover of €10.000.000 makes for a 'medium' organization which is 'fully ambiguous' [0.5]. Cluster analysis confirms the validity of the threshold values. Finally, the conditions PEU, innovation strategy, and entrepreneurial orientation are all measured on a 7-point Likert-scale. Assessment of the literature from which the used scales are derived (Jansen et al., 2006; Miller, 1993; Naman and Slevin, 1993) suggests that organizations with a score of 4 are 'fully ambiguous' [0.5]. Given that Dutch respondents are likely to adopt a middle response style (Baumgartner and Steenkamp, 2001; Harzing, 2006), scores below 2 were considered 'fully out' [0] and all scores above 6 were considered 'fully in' [1]. Again, the threshold values were checked by means of cluster analysis.

Necessity test

A necessity test was executed to examine whether there is a single condition in all pathways to either mechanistic or organic PMS. A condition is necessary when its consistency is above 0.9 (Skaaning, 2011), which indicates the degree to which a condition is present in all cases with the same outcome. In this study no necessary conditions were found.

Fuzzy-set qualitative comparative analysis

To identify sufficient (combinations of) conditions a Fuzzy Truth Table Algorithm was used. The cutoff value was set to 0.8, both in line with the theory (Rihoux and Ragin, 2009), and with (a gap in) the distribution of consistency scores as observed in the Truth Table. Hereafter, the Boolean Minimization was applied to the Truth Table. This allowed to simplify all the combinations of conditions into shorter and more parsimonious combinations of conditions (Rihoux and Ragin, 2009). As shown in the Results section, no single condition was found to be sufficient on its own to predict an outcome, only INUS conditions that are part of sufficient pathways to an outcome.

For the interpretation of the results it is important to note that both the intermediate solution, most often used in fsQCA, and the parsimonious solution which identifies the 'core conditions' were presented. In addition, the consistency and coverage for individual solution terms (pathways) and the overall solution (total set of pathways) were shown. Raw coverage refers to the total percentage of cases with the associated outcome that is represented by a solution term. For example, 49.6% of the cases that adopt mechanistic PMS are represented by solution term 1 in Table 3 (below). Unique coverage refers to the percentage of cases that is only represented by the regarding solution term and not simultaneously by another solution term, i.e. cases that fit to solution term 1 but not to solution term 2 or vice versa. Consistency refers to the percentage of cases of a solution term that result in the associated outcome. For example, 99.4% of the cases that fit to solution term 2 in Table 3 indeed adopt mechanistic PMS.

Results

Form of PMSs

Table 2 provides an overview of all the cases, their raw (uncalibrated) scores on the contingency factors and outcomes (PMS design). The motivation per score can be found in De Rooij et al. (in press).

Table 2: Cases

	Performance management system 0%-Organic, 100%-Mechanistic.	**Perceived environmental uncertainty** 1-Predictable, 7-Unpredictable.	**Organizational size (turnover)** Min € 400K Max € 80M	**Innovation strategy** 1-Exploitative, 7-Explorative.	**Opportunity strategy** 1-Deterministic, 7-Voluntaristic.
Case 1	40	4.25	€ 1M	6	6.5
Case 2	51.43	3.25	€ 6M	4.5	4.5
Case 3	57.89	5.67	€ 3M	4.5	5.33
Case 4	69.23	2.5	€ 1.9M	7	4.67
Case 5	43.57	2	€ 1M	7	2.5
Case 6	36.84	5	€ 1M	2	3.33
Case 7	9.5	4.5	€ 1M	1	3.33
Case 8	29.63	3.5	€ 1.4M	5	3.5
Case 9	66.67	5	€ 80M	3	5.83
Case 10	54.16	2.12	€ 50M	3.5	5.5
Case 11	36.11	2.33	€ 48M	2	6
Case 12	29.63	2.38	€ 27M	2	3.66
Case 13	57.69	4.33	€ 6M	5	6
Case 14	43.75	3	€ 420K	1.5	3
Case 15	80	6	€ 420K	1	2

Respondents mentioned between 2 and 23 organic and 2 and 20 mechanistic controls. As discussed in the calibration section, cluster analysis on the distribution of the forms of PMSs across the fifteen PBOs reveals two clusters; one cluster of 7 PBOs predominantly relies on mechanistic controls while the other cluster of 8 PBOs predominantly relies on the organic controls.

Solution terms: Mechanistic PMS

Table 3 reveals the combinations of conditions under which PBOs adopt mechanistic PMSs. For the individual solution terms, the consistency of the explained outcome is respectively 74.4% and 99.4%, while the overall solution consistency of the combinations of paths to mechanistic PMS is 78.6%. This means that the in 78.6% of the cases that fit the overall solution (either one of the solution terms), the solution sufficiently (above 75%) explains the outcome, i.e., mechanistic PMS (Schneider and Grofman, 2006), while the remaining cases

adopt organic PMSs. The overall coverage of 63.1% indicates that the two solution terms jointly cover 63.1% of the cases that adopt mechanistic PMS.

Table 3: Outcome Boolean Minimization mechanistic performance management system*

	Solution term 1	**Solution term 2**
Organizational size	**Small**	**Large**
Innovation strategy	**Explorative**	Exploitative
Opportunity strategy	**Voluntaristic**	**Voluntaristic**
Perceived environmental uncertainty	-	**Uncertain environment**
Raw coverage	0.496	0.246
Unique coverage	0.385	0.135
Consistency	0.744	0.994
Overall solution coverage	0.631	
Overall solution consistency	0.786	

***The bold conditions are the core conditions resulting from the parsimonious outcome**

Solution term 1 (Table 3) shows that PBOs that are small, and have an explorative and voluntaristic strategy, are most to likely adopt mechanistic PMS. Within this term, the small size, the explorative strategy and the voluntaristic strategy are all core conditions. Solution term 2 shows that large PBOs with an exploitative and voluntaristic strategy in an uncertain environment will most likely adopt a mechanistic PMS. Within this term the conditions large PBO size, voluntaristic strategy and uncertain environment are the core conditions. The cases illustrate the logic behind the individual solution terms, as discussed in the discussion section.

Solution terms: Organic PMS

Looking at Table 4, it is evident that consistency between the combinations of conditions and the outcome (i.e., organic PMS) is high. The consistency of the individual solution terms is respectively 86.3% and 86.9% and the overall solution consistency is 84.8%. The overall coverage of 66.1% indicates that the two solution terms jointly cover 66.1% of the cases that have an organic PMS.

Table 4: Outcome Boolean Minimization organic performance management system*

	Solution term 3	**Solution term 4**
Organizational size	Small	Large
Innovation strategy	-	**Exploitative strategy**
Opportunity strategy	**Deterministic**	-
Perceived environmental uncertainty	**Certain environment**	**Certain environment**
Raw coverage	0.423	0.339
Unique coverage	0.322	0.238
Consistency	0.863	0.869
solution coverage:	0.661	
solution consistency:	0.848	

***The bold conditions are the core conditions resulting from the parsimonious outcome**

Solution term 3 (Table 4) shows that small PBOs with a deterministic strategy operating in an environment perceived as certain, are most likely to adopt organic PMS. The deterministic strategy and certain environment are the core conditions in this solution. Solution term 4 indicates that large PBOs with an exploitative strategy operating in an environment perceived as certain are most likely to adopt an organic PMS. The conditions exploitative strategy and certain environment are the core conditions in this term. The interpretation of the solution terms is presented in the discussion section. Summarizing, results reveal that both small and large organizations adopt both mechanistic and organic PMSs, depending on their strategy and PEU. Explorative and voluntaristic strategies and an uncertain environment turn out to be INUS conditions[2] for the adoption of a mechanistic PMS, while exploitative and deterministic strategies and a certain environment turn out to be INUS conditions for to the adoption of an organic PMS. In other words, rather than having an individual effect, these conditions are part of sufficient configurations leading to the choice for either organic or mechanistic PMSs. Table 5 (see below) summarizes the four solution terms.

[2] Conditions that are part of one of the possible pathways to an outcome.

Table 5: Combinations of conditions leading to the adoption of mechanistic or organic performance management systems

	Performance management system		Perceived environmental uncertainty	Organizational size	Innovation strategy	Opportunity strategy
Solution 1	Mechanistic	=		Small	Explorative	Voluntaristic
Solution 2	Mechanistic	=	Uncertain	Large	Exploitative	Voluntaristic
Solution 3	Organic	=	Certain	Small		Deterministic
Solution 4	Organic	=	Certain	Large	Exploitative	

Discussion

This study set out to address the question what combinations of organization-level contingency factors are associated with different performance management system designs in project-based organizations. Results of Qualitative Comparative Analysis on 15 PBOs in the Dutch management consulting industry revealed four configurations of conditions: two associated with a predominantly mechanistic PMS and two with a predominantly organic PMS. In what follows, the four configurations, the theoretical contributions of this paper, the managerial implications, and the limitations and future research directions are discussed in turn.

A configurational explanation for PMS design

Configuration 1 can be labelled *Innovators on a Leash.* It characterizes a small PBO that follows an explorative, voluntaristic strategy and adopts a **mechanistic** PMS. Organizations with voluntaristic and explorative strategies, especially small ones, flexibly take advantage of opportunities in the environment (Rauch et al. 2004), but tend to exaggerate experimentation and innovation (Dent, 1990). To curb this tendency and bring risk taking to acceptable levels, such organizations tend to adopt mechanistic controls (Simons, 1987). It is well illustrated by Case 3. This small organization supports its voluntaristic and explorative strategy with a mechanistic PMS. It used financial analyses (e.g., turnover per product and per customer) on yearly basis to check which products are successful and which need to be dropped to make room for new products. Dropping numbers were taken as an indication that the market

was saturated and not much more could be expected of that product anymore, quoting the respondent, "*so you come up with a new product and shift business to new areas*". Based on the above, we formulate the following proposition:

Proposition 1: Small PBOs with an explorative and voluntaristic strategy are most likely to adopt a mechanistic performance management system design.

Configuration 2 can be labelled as *Giants with an Ambition.* It includes large organizations that perceive their environment as uncertain. They adopt a voluntaristic and exploitative strategy to maintain their market position albeit through controlled innovation. To cope with the high risks resulting from their voluntaristic strategy and uncertain environment, the PBOs adopt predominantly **mechanistic** PMSs, as is illustrated by case 9. This large organization in the ICT sector used predominantly administrative controls, accounting controls, and operating procedures, budgets and statistical reports. The manager of the PBO explained: "*To a certain extent we have to be frontrunners, but in a controlled way [considering our uncertain environment]." "So that's why [introduction of incremental innovation] has to be timed right... if you are too late, you are not seen as innovative and the customer will go to the competitor".* Accordingly, we propose:

Proposition 2: Large PBOs with an exploitative and voluntaristic strategy that perceive their environment as uncertain are most likely to adopt a mechanistic performance management system design.

Configuration 3, *Settled Pioneers* – small PBOs that follow a deterministic strategy in an environment perceived as certain – adopt **organic** PMSs. Virtually all the matching cases started off with a voluntaristic strategy. Over time, however, they created new markets, found their own niches, and shifted to deterministic strategy. Having differentiated from other organizations at the outset of their existence, they found themselves in small and very

predictable markets, where they were one of the few market players, i.e. they became 'specialists in their field'. Environments of such PBOs tended to be non-dynamic and predictable, and therefore they switched to a deterministic, non-innovative strategy (Manu and Sriram, 1996), while retaining their organic PMS. Also because of their small size, they tended to use simple and organic controls: "*I'm not hiring easily, I need to know people first. It is a small company, so every new person has a large impact"*. Once they did hire someone, they proceeded to carefully train them. Therefore, we propose:

Proposition 3: Small PBOs with a deterministic strategy that perceive their environment as certain are most likely to adopt an organic performance management system design.

Configuration 4, *Gentle Giants,* are large PBOs with an exploitative strategy and an environment perceived as certain. Compared to 'Giants with Ambition' they perceive their environment as certain. This low uncertainty in combination with an exploitative strategy, implies that the management does not need to be very proactive in developing radically new products, but does need to excel in delivering the products with superior customer service. The managers of case 12 explained for instance that their organization's exploitative strategy found reflection in the customization of existing technology to customer needs, as opposed to investing in developing new technology. A 'soft goal' like superior customer service lead the PBO to adopt an **organic** PMS that included among others employee training and coaching. In other words, these PBOS are likely to seek their competitive advantage in intangible aspects that cannot be controlled via mechanistic controls. To empower employees to excel at such intangible performance aspects, PBOs need to focus on shaping the values, norms and knowledge of the employees while minimizing formal controls that might stifle their freedom.

Proposition 4: Large PBOs with an exploitative strategy that perceive their environment as certain are most likely to adopt an organic performance management system design.

Theoretical contributions

Below, the findings of this study are benchmarked against the extant literature (see Table 1 for the literature review), even though the results of configurational analysis *cannot* be in the strict sense compared with those of linear analysis. First, while most of prior literature research found perceived environmental uncertainty (PEU) to be associated with mostly organic PMSs (Gordon and Narayanan, 1983), some scholars suggested that high PEU goes together with mechanistic PMSs (Khandwalla, 1977). The findings of this study support the latter view. Contrary to non-PBOs, PBOs appear to respond to high PEU with stronger monitoring of the individual projects that the mechanistic PMSs offer. In other words, a mechanistic system seems to assure that all projects stay in line as the PBO treads the unpredictable environment. An environment that is more predictable would require less strict monitoring of the projects and thus an organic PMS, offering more autonomy to the projects. It is worth stressing that the above discussion applies for organization level uncertainty only. There are studies that focus on task and project uncertainty in PBOs (Dahlgren and Söderlund, 2010; Ylinen and Gullkvist, 2012). Future research should study various sources of uncertainty simultaneously in relation to PMS design (Korhonen et al., 2014).

Second, prior literature offers contradictory findings on the association between organizational size and PMS design (e.g. Ates et al., 2013; Barnes et al., 1998; and Simons, 1987, vs. Bruns and Waterhouse, 1975). This study sheds some light on those contradictions, confirming that both PMS designs are used by both small and large PBOs. The configurational approach reveals that the way in which size impacts PMS design depends on other contingencies. For large PBOs, the choice depends on the PEU: when the structural complexity inside the organization – resulting from the large size – and outside the organization – caused by high PEU – are both high, PBOs will likely turn to mechanistic PMSs (Bruns and

Waterhouse, 1975), while they opt for organic PMS under low PEU. For small PBOs – i.e., with low internal complexity – the choice depends on the opportunity strategy they pursue. PBOs with a voluntaristic strategy need relatively strict monitoring of their projects to assure alignment and a degree of inter-project coordination to enable the proactive approach this strategy implies. In contrast, PBOs with a deterministic, reactive strategy, are better off giving more freedom to the project teams to organically respond to the opportunities in the environment.

Third, regarding innovation strategy, the study confirms Simons' (1987) findings that PBOs with an explorative strategy tend to choose for mechanistic PMSs. For PBOs with exploitative strategy on the other hand, where prior research has concluded the relation with the PMS design to be ambiguous (Langfield-Smith, 2006), the results of this study provide new insights. The results reveal that exploitative strategy can warrant *either* mechanistic *or* organic PMS *depending* on the level of PEU. PBOs with an exploitative strategy opt for mechanistic PMS when they perceive the environment to be uncertain. This seems to suggest that, executing an efficiency-based strategy under high PEU requires tight monitoring of the projects to prevent uncoordinated experimentation with the winning formula. In a certain environment PBOs opt for an organic PMS, as the aim is to facilitate the project teams to continue exploiting and refining the winning formula.

Fourth, contrary to prior literature suggestions (e.g., Covin and Slevin, 1988), the findings of this study suggest that PBOs with a voluntaristic strategy – irrespective of other contingencies – choose for mechanistic PMSs, while a deterministic strategy goes with organic PMSs. It appears that a voluntaristic strategy, which involves creating new strategic options, requires a tighter degree of monitoring of projects, leading PBOs to choose for mechanistic PMSs, which relies more on strict rules, controls output and behavior. At the same time, PBOs with a deterministic strategy, which involves responding to opportunities found in the

environment, require a somewhat less tight monitoring and thus revert to organic PMSs that used basic rules and procedures, giving project teams a relative degree of autonomy.

Concluding, while prior research has addressed the question under what contingencies organizations use organic controls, mechanistic controls or a combination of both, this was done predominantly in a linear additive fashion. By analyzing the *simultaneous* impact of organization-level contingencies on PMS design – as called for by prior research (Fischer 1995; Miterev et al., 2017a, 2017b) – this paper revealed that none of the contingency factors is either sufficient or necessary in its own right to explain PMS design. Rather, it is the combinations of conditions that matter. The results furthermore refute the implicit notion in most previous studies that the various contingency factors always have the same effect on the type of PMS chosen. This study shows that identical contingencies can lead to different outcomes depending on the other contingencies, and in this way, helps to resolve some of the inconsistent findings of prior research as discussed above. Even more, this research reveals that opposite conditions – in different configurations – can lead to the same outcome.

Additionally, this study contributes to the ongoing discussion about performance management systems and management control in PBOs by showing that organization-level contingencies – next to the project and portfolio level contingencies that were subject to prior research – matter for design choices in PBOs. This finding underscores the fact that projects are embedded in organizations and the way control is exercised over them is contingent on the characteristics of those organizations. Hence, by studying the effect of earlier established organization-level contingencies on the design of PMS in PBOs, this study extends the general organization contingency-theory perspective to the study of PBOs (Martinsuo, 2013; Miterev et al., 2017a, 2017b). In this way, this study is complementarity to the studies by Canonico and Söderlund (2010) and Dahlgren and Söderlund (2010), which associate PMS design with

contingency factors derived from project, inter-project, or portfolio features, like projects' interdependence. A holistic model combining both organizational features and project features is needed in order to fully explain the design of PMS in PBOs, as a unique form of organizing.

Managerial implications

For PBO managers a takeaway from this paper is there are no simple rules of thumb as far as design of PMS in PBOs is concerned. The choice of a PMS design is not derived from any single contingency in isolation, but rather from the combination of contingencies that the PBO faces. Although this study did not examine the performance of the used PMS design for the PBO, one of the most important performance indicators is organizational survival. Three years after the data was collected, the consultancies studied in this paper were followed up. Of the 15 consultancies, 13 survived, 1 ceased to exist and 1 was taken over. Interestingly, the two PBOs that ceased to exist (independently) were among the three cases that did not fit any of the four solution terms identified in this study. Though the evidence is partly anecdotal, it does seem to suggest that a lack of fit between the PMS and the different contingencies can have negative effect on survival. Accordingly, practitioners can match their PBO's configuration of contingency factors with the observed solution terms and use it to make informed design choices for their organizations' PMS.

Limitations and future research

This study is not without limitations. First, cases in the research setting of this study did not vary in terms of national culture, structure and technology, factors also identified by Chenhall (2003). Future research is needed to investigate whether these factors (in configurations) play a role in the PMS designs of PBOs.

Second, since the study includes PBOs in the consulting industry only, the generalizability of this study's findings needs to be confirmed by future research. According to Whitley (2006), PBOs with more stable role distributions are more likely to apply craft-dominated control systems, while PBOs with a higher level of project singularity might rely on project-level controls. Nevertheless, studying PBOs in consulting sector constitutes a valuable addition to the project management literature that is rich in studies of product development projects (Korhonen et al., 2014). Further, considering there are no configurational studies of contingencies affecting PMS design in non-PBOs, it is impossible to conclude to what extent the findings of this paper are specific to PBOs. Prior research suggests that organizations with less flexible organizational form (e.g., non-PBOs) are more likely to choose for mechanistic PMS compared to organizations with highly flexible organizational forms, like PBOs (Chenhall, 2003). Configurational studies might nuance these insights. The organizational structure of a PBO can thus be thought of as another contingency factor that in this study was kept constant. In short, this study calls for more research taking configurational approaches to PMS design both in PBOs and well as in non-PBOs.

Third, the study adopted a holistic view on PMS, focusing on a broad range of control mechanisms serving various organizational purposes. However, Malmi and Brown (2008) suggest that the impact of contingencies on PMS design might be sensitive to the purpose of that system (e.g., decision-making or control). Investigation PMSs with different purposes would certainly allow more fine-grained view of the effect that different contingencies have on PMS design in PBOs.

Finally, analysis in this paper relied on a relatively small number of cases, while the within case knowledge is more limited than in some other case study methods. Conducting more interviews per case could have added deeper, within-case understanding of PBO internal processes. Although the results of this study are based on 'just' 15 cases and undoubtedly

replication studies are needed, it is important to stress the unique potential of fsQCA as research method. This method allows to examine configurations of conditions in relation to a particular outcome, in a way that is not possible by means of a linear additive approach. In the instances where the interplay between conditions (i.e., the configuration) is believed to be of central importance, fsQCA offers more accurate predictions of the outcome relative to the linear additive approach.

Conflict of interest statement

The authors declare that the manuscript has not been submitted or published elsewhere. There are no other potential conflicts of interest in regard to this submission.

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APPENDIX A

Case and interviewee descriptions

Case	Types of projects	Number of projects	Personnel	Size	Founded	Interviewee
1	Support and implement social, technical and organizational change	At that moment in time 50, whereof 5 large projects (€100.000 - 500.000). Small projects start at €1000.	9	€ 1M	1999	Co-entrepreneur
2	Implementing and supporting software	At that moment in time 200 (Starting from a couple of hours technical support)	70	€ 6M	1998	Strategy director
3	Connecting, developing and accelerating organizations	100 - 150 projects a year (50 large = 2 - 3 months, 50 small = 1 day)	15	€ 3M	1985	Director
4	Independent, strategical policy research and advice on innovation	At that moment in time 40, whereof 20 active (start at €1000).	18	€ 1,9M	1998	Partner
5	Helping organizations to find solutions outside their sector	6 at a time (duration is a few months with 2 - 4 persons)	9	€ 1M	2006	Founder and CEO
6	Support organizations in their social media strategy	At that moment in time 30 projects (1 - 5 persons per project)	15	€ 1M	2011	Owner
7	Supporting business processes by implementing IT	At that moment in time 7	14	€ 1M	2013	Managing partner
8	Helping organizations change in IT area	At that moment in time 20 (€10.000 - 150.000)	12	€ 1,4M	2005	Director - Partner
9	Helping organizations change in IT area	At that moment in time 100 whereof 15 large (large = few million / 5 - 25 persons)	500	€ 80M	1992	Projects Director
10	Deliver insights in policy, strategy, human capital and improve performance	Per year 600 (average €40.000)	350	€ 50M	1938	Quality- director
11	Help organizations with challenges in 3 specific areas	At that moment in time 300 (€5000 - few million)	500	€ 48M	1992	Account manager
12	Service provider for IT	Few 100 (2 days - 1500 days)	200	€ 27M	2004	CEO / shareholder
13	Supporting organizations that aspire becoming a social enterprise	At that moment in time 30 (average €70.000)	50	€ 6M	2000	Managing partner
14	Develop growth in supply chain organizations	At that moment in time 3	4	€ 420K	2012	Partner
15	Accelerate change by empowering teams	At that moment in time 15 - 20 (€1000 - €50.000)	5	€ 400K	2005	Managing partner

APPENDIX B

Interview outline

I. General respondent information

1. What is your function within the organization?
2. What is your educational and professional background?
3. How long do you work at this organization?

II. General organization information

1. What is the number of employees at your organization?
2. What year was the organization founded?
3. How many projects (approximately) does the organization run at the moment?
4. How big are the projects on average? (in terms of scale)

III. Management control system

(Ferreira and Otley, 2009)

1. What is the vision and mission of the organization and how is this brought to the attention of managers and employees? What mechanisms, processes, and networks are used to convey the organization's overarching purposes and objectives to its members?
2. What are the key factors that are believed to be central to the organization's overall future success and how are they brought to the attention of managers and employees?
3. What is the organization structure and what impact does it have on the design and use of management systems? How does it influence and how is it influenced by the strategic management process?
4. What strategies and plans has the organization adopted and what are the processes and activities that it has decided will be required for it to ensure its success. How are strategies and plans adapted, generated and communicated to managers and employees?
5. What are the organization's key performance measures deriving from its objectives, key success factors, and strategies and plans? How are these specified and communicated and what role do they play in performance evaluation?
6. What level of performance does the organization need to achieve for each of its key performance measures (identified in the above question), how does it go about setting appropriate performance targets for them, and how challenging are those performance targets?
7. What processes, if any, does the organization follow for evaluating individual, group, and organizational performance? Are performance evaluations primarily objective, subjective or mixed and how important are formal and informal information and controls in these processes?
8. What rewards — financial and/or non-financial — will managers and other employees gain by achieving performance targets or other assessed aspects of performance(or, conversely, what penalties will they suffer by failing to achieve them)?

IV. Perceived environmental uncertainty

(Adapted from Miller, 1993)

In this section, we would like you to describe the environment in which your company operates. In the primary industry and country where you work, evaluate the aspects of your environment. Indicate if the factors are easy or difficult to predict. 1 -Easy to predict, 7-Unpredictable

1. How predictable are the resources and services used by your company? So the availability of trained labor, problems with labor and union problems, the quality of inputs, raw material and components, the prices of inputs, and raw materials and components.
2. How predictable are the product market and demand? Keep in mind the predictability of client preferences, product demand, availability of substitute products and the availability of complementary products.
3. How predictable is the competition? Take in to consideration the predictability of changes in competitors' prices, changes in the markets served by competitors, changes in competitors' strategies, entry of new firms into the market and domestic and foreign competitors.
4. How predictable is the technology in your industry? Think about the predictability of product changes, changes in product quality, new product introductions and changes in the production process?

V. Strategy: exploratory versus exploitative

(Adapted from Jansen et al., 2006)

In this section, we would like you to describe the strategy your company pursues. Indicate if the statements are applicable to your organization.

1. How much does your organization focus on exploratory innovation? So does your organization accept demands that go beyond existing products and services, invent new products and services, experiment and commercialize completely new products or services, and frequently use new opportunities in new markets or new distribution channels?

   1 –Never , 7- All innovation

2. How much does your organization focus on exploitative innovation? Think about if your organization frequently refines the provision of existing products and services, implements small adaptations, introduces improved but existing product and services, improves the provision's efficiency of products and services, increases economies of scale in existing markets and expands services for existing clients.

   1 –Never , 7- All innovation

3. Is your organization more focused on exploitative or explorative innovation?

   1 – Exploitative, 7- Explorative

VI. Strategy: Deterministic versus voluntaristic

(Naman and Slevin, 1993)

In this section we would like to ask you describe the strategy of your company. Please indicate to which statement you agree more. 1 – first statement, 7 second statement

1. In the past 5 years…

Did your organization not market new products or services, change only the products and services incrementally and have a strong emphasis on marketing on tried and true products or services.	Did your organization market many new lines of products or services, change product or service lines dramatically or have a strong emphasis on R&D, technological leadership and innovations?

2. How does your organization deal with competition?

Do you generally respond to competitors, almost never introduce innovations and avoid competitive clashes?	Or do you typically initiate actions to which competitors respond, often introduce innovations first and prefer to enter the competition?

3. In general…

This organization has strong proclivity for low risk projects, believes it is best to explore projects gradually via cautious, incremental behavior and typically adopts a cautious, "wait and see" posture in order to minimize the probability of making costly decisions.	A strong proclivity for high risk projects, believes bold and wide-ranging acts are necessary to achieve the firm's objectives and typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.

APPENDIX C

Illustrative cases with *low* or *high* scores on PMS design and on the contingency factors

***Organic* performance management system:** **Case 7 uses a 90.5% organic PMS (19 organic controls versus 2 mechanistic controls) with a strong focus on communicating the central vision, strategy and the competences of the professionals.**	***Mechanistic* performance management system:** **Case 15 uses an 80% mechanistic PMS primarily built around accounting controls such as financial reports.**
***Low* perceived environmental uncertainty:** **Case 5 perceives the environment as very predictable. According to this PBO, everything can be planned and the customers and demands are highly similar.**	***High* perceived environmental uncertainty**: Case 15 argues that customer demands and resources availability are highly unpredictable in this PBO's environment.
***Small* organizational size:** **Case 14 has a turnover of € 420K**	***Large* organizational size:** Case 9 has a turnover of € 80M.
***Exploitative* innovation strategy:** **Case 7 follows the product changes of their supplier and only incrementally adapts the products to customer needs.**	***Explorative* innovation strategy:** Case 5 is always concerned with combining different markets in order to make a new product. This PBO claims not to do small improvements, but only radical changes.
***Deterministic* opportunity strategy:** **Case 6 barely introduces new services and products and does not take risks. The only voluntaristic element in its strategy results from its attempts to stay relatively ahead of its competition.**	***Voluntaristic* opportunity strategy:** Case 1 applies a voluntaristic strategy, drastically changing its business model, every few years. The strategy is in line with this PBO's core business: helping other organizations to change radically.

APPENDIX D

Additional analysis: Systems approach versus package approach

This study takes a systems approach to PMS where PBOs' design choices take into account *inter*dependencies between controls, instead of assuming *in*dependence between controls (package approach). While it might seem safer to assume a package approach, Grabner and Moers (2013) argue that the package approach is ill-suited if interdependence *is* in fact present between different controls. The systems versus package approach was not explicitly questioned during the interviews, which is obviously a limitation of this study. Nevertheless, 14 out of 15 respondents made explicit whether or not they considered interdependencies between controls while designing their PMS. 9 respondents did, applying the systems approach, while 5 respondents rather applied the package approach, and for 1 PBO it remained undefined.

To examine whether the used approach might have biased the findings of this study, fsQCA subset analysis was used with the regular consistency threshold set at 75%. First, the results did not point towards any bias regarding the outcome variable, meaning that organic and mechanistic PMSs were both used by respondents with a systems approach and by respondents with a package approach. Second, both respondents with a systems approach and with a package approach cover solution terms 1 and 4, while solution term 2 and 3 are consistently related to the *systems* approach. To test the robustness of the solution terms when assuming a package approach, the number of organic controls and mechanistic controls were examined as two separate outcome variables (see Ylinen and Gullkvist, 2014). The analysis revealed that solution 1, 2 and 4 lead to consistent findings, both under the systems approach and the package approach, while solution term 3 only holds under the systems approach. The latter makes sense because PBOs that cover this solution term consistently apply the systems approach. Hence, the additional analysis confirms the robustness of the findings of this study.