



# Exploring the dynamics of project management office and portfolio management co-evolution: A routine lens

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## Abstract

This paper addresses a recurrent topic of organizational project management (OPM) research: Project Management Offices (PMOs) are perceived to be instrumental in implementing strategy through portfolios of projects, but empirical evidence also shows that PMOs are often short-lived and their value is hard to quantify. We argue that an explanation may lie in the processes of co-evolution that PMOs undergo over time in interaction with organizational capabilities and context. We adopt an innovative research frame in the context of OPM research, using process theories of change and routines as a lens to investigate the co-evolution of PMO and Portfolio Management. A conceptual framework is suggested and we use an empirical case study to test and refine it. We discuss the theoretical implications of the findings and highlight the contributions made in supporting, adding, articulating and contrasting extant literature. We conclude the paper underlining paths for further researches.

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## 1. Executive summary

Project management offices (PMOs) are an organizational innovation initiated to assist project-based organizations better manage and coordinate portfolios of projects. However, research to date has found it difficult to reliably measure the value created by PMOs, which have been widely observed to be unstable, changing or closing rapidly. Some general factors of influence have been identified, but no stable patterns have been found.

This paper argues that our understanding of PMO evolution would be improved by taking into consideration the broader organizational context. We propose that the analytical lens of organizational routines provides an innovative approach to map the

processes of interaction between the PMO and the organization, and document patterns of change. As routines are decomposed into their performative (actions undertaken), ostensive (rationales invoked) and artefact (material instantiation) elements, this lens enables to capture micro-foundations of change.

We establish our conceptual process model in three steps: portfolio management (PfM) is conceptualized as a collection of routines forming an organizational capability; PMO is conceptualized as an organizational meta-artefact, an organizational sub-system designed to provide a solution to a type of problem (in this case PfM); the relationships between the PMO, PfM and the broader organization are then mapped onto a process model of routine (re-)creation.

We use Proteus, a case study of a project-based organization to test, refine, and validate our process model. Data collection used interviews, observations, and documents. The analysis of empirical data revealed a more intricate pattern of influence between PMO, PfM and the organizational context than anticipated, leading to revise our process model.

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The research leads to formulate six propositions, two conceptual (P1, 4) and four theoretical (P2, 3, 5, 6), related to patterns of change in PMOs:

- P1: The PMO, as an organizational sub-system, can be conceptualized as a meta-artefact;
- P2: Changes of artefact element of PMO routines impact PfM through influencing the artefact element of PfM routine.
- P3: Changes in the performative element of PMO routines impact PfM through influencing the performative element of PfM routine.
- P4: PfM, as an organizational capability, can be conceptualized as a collection of routines;
- P5: Changes in the ostensive elements of PfM routines impact the PMO through influencing the ostensive or performative elements of PMO routines.
- P6: Changes in the performative elements of PfM routines impact the PMO through influencing the ostensive or performative elements of PMO routines.

The paper supports extant literature on the dynamic evolutionary nature of PMOs. It adds to the literature through the analytical lens of routines which enrich our conceptualisation of PMO and PfM (P1, P4), and through a conceptualisation of evolutionary change that makes room for unintended or unplanned evolutions in PMOs. It contrasts prior research in two ways: it suggests that focusing away from types of PMOs to look for types of change patterns between PMOs and organizational context may yield more valuable insights, and it suggests that a dynamic view of evolution – rather than a linear conceptualisation – may better capture the changes observed empirically.

Finally, the paper offers insights for practitioners. The process change model suggests that managerial interventions may trigger multiple changes, some of which may not be intended. It reinforces the value of managerial reflectiveness and the need for organizational learning and knowledge management to capitalize on beneficiary evolutions.

## 2. Introduction: understanding change in project management offices

This paper addresses a recurrent topic of organizational project management research: in principle, project management offices (PMOs) are perceived to be instrumental in implementing strategy through portfolios of projects, but empirical evidence also shows that PMOs are often short-lived and their value is hard to quantify. We argue that an explanation may lie in the processes of co-evolution that PMOs undergo over time in interaction with organizational capabilities and context.

### 2.1. PMOs as support to portfolio management

Projects are often considered as a means of leading strategic change (Ward and Daniel, 2012). Morris and Jamieson (2005) and Loch (2008) demonstrate that cascading business strategy down to projects is associated with better organizational

outcomes. When the number and scope of projects increase, managing scarce resources becomes more complex (Gustavsson and Jerbrant, 2012; Martinsuo and Lehtonen, 2007). portfolio management (PfM), “a dynamic decision process where a list of active projects is constantly updated and revised” (Müller et al., 2008, p. 28), helps executives to have a holistic project-oriented perspective (Jerbrant and Gustavsson, 2013; Sanchez et al., 2009). Former studies (Dietrich and Lehtonen, 2005; Shenhar et al., 2001) state that PfM is a building block of strategy implementation as it assists in translating strategic vision down to the project level. Prioritizing shared resources, reducing uncertainty and coordinating interfaces are mentioned to be goals of PfM (Martinsuo and Lehtonen, 2007; Müller et al., 2008).

Although PfM is supposed to help deliver the projects’ expected value (PMI, 2013b); managing portfolios of projects can be quite challenging. Resource balancing, prioritizing projects and poor information management are common challenges that portfolio managers face (Elonen and Arto, 2003). The complexity of managing portfolios of projects and the need for improved coordination and rationalization resulted in the establishment of project management offices (PMOs) (Arto et al., 2011; Singh et al., 2009). For the purposes of this paper, and following researchers such as Aubry et al. (2007), we adopt PMI’s definition of the PMO:

*“PMO refers to a project, program, or portfolio management office [...]. The PMO in an organization is the entity that defines and maintains the process standards generally related to project, program, or portfolio management. [...] It provides guidance on the practice of portfolio or program or project management within the organization. [...] Depending on the organizational structure, the PMO either functions on an enterprise-wide level, or as one of many departmental PMOs that manage projects from different departments or divisions within an organization. [...] The specific form, function, and structure of a PMO are dependent upon the needs of the organization and the stakeholders.” (PMI, 2013a, p. 16).*

PMOs aim to systematically coordinate project-related tasks (Andersen et al., 2007). Prior research has shown that an increasing number of organizations were establishing PMOs (Hobbs and Aubry, 2007, 2008) as PMOs were assumed to be an effective means of addressing the challenges of portfolio management (Aubry and Hobbs, 2011).

It follows that in order to better leading strategic change and strategy implementation, practitioners require a detailed understanding of the interactions between PMOs and PfM.

### 2.2. The dynamic nature of PMOs: well observed, not well understood

The main goal of a PMO is to improve the efficiency of project management (Stanleigh, 2006). Research demonstrates that PMOs have a positive influence on the success of PfM (Turner, 2014). However, despite the growing popularity of

PMOs as a means of improving the performance of projects (doValle et al., 2008), three-fourths of PMOs shut down in the first three years of their establishment and fail to produce convincing business value (Singh et al., 2009), and “*PMO life expectancy is approximately two years*” (Aubry et al., 2010a, p. 30).

Exploring the causes of the short life span of PMOs Stanleigh (2006) found that in the IS domain 75% of PMOs were shut down within three years because they could not demonstrate their value. Other research (Aubry et al., 2010b) states that the frequent reconfiguration or early shut down of PMOs may be a result of organizational policies or power systems. Aubry and Hobbs (2011, p. 60) state that the short life span of PMOs is associated with their unsatisfactory performance.

Based on these observations, to better understand the evolutionary nature of PMOs and the underlying reasons leading to their evolution, researchers have explored the characteristics of PMOs (Hobbs and Aubry, 2007), PMO forms (Aubry et al., 2007), their contribution to organizational performance (Aubry and Hobbs, 2011) and their transformative nature (Aubry et al., 2010b; Hurt and Thomas, 2009; Pellegrinelli and Garagna, 2009). These contributions reveal that PMOs present various structures and typologies (Hobbs and Aubry, 2006, 2007, 2008), and that PMO forms are unstable and change frequently (Aubry et al., 2010a, 2010b). Pellegrinelli and Garagna (2009, p. 649) state that PMOs reconfigure frequently because they have been established to answer a need; when the need is addressed, the value of PMO decreases; therefore, PMO leaders will redefine the purpose of PMO and seek to obtain new benefits. PMOs “*accompany organisational changes leading toward strategic objectives*” (Aubry and Hobbs, 2011, p. 60).

The dynamic nature of PMOs is well documented (Dai and Wells, 2004; Hobbs and Aubry, 2006, 2007, 2010; Turner and Keegan, 2001), however this paper argues that considering PMOs in isolation is not sufficient. Investigating “*the creation and reconfiguration of PMOs as an organisational innovation*” (Hobbs & Aubry, 2008, p. 547), Hobbs et al. take a “*co-evolution*” lens rooted in evolutionary theory to uncover the dynamic interplay between PMOs and the organizational context (Hobbs et al., 2008, p. 548). Their research emphasized the unstable nature of organizational structures and the difficulty to uncover any patterns of evolution, and highlighted five organizational tensions contributing to make sense of the new PMOs structure (“*economic, political, customer relationship, standardisation versus flexibility and controlling the project machine*”) (Hobbs et al., 2008, p. 551). This paper builds on this foundation and offers a new way to investigate the processes of PMO evolution through the lens of organizational routines.

### 2.3. Routines as a research frame and unit of analysis to investigate the co-evolution of PMOs

While Hobbs et al. (2008) provide a valuable foundation to understanding the (co-) evolution of PMOs, we argue that further insights can be gained by adopting an innovative research frame in the context of organizational project management research: the evolutionary theory of organizational routines (Pentland and

Feldman, 2005). Investigating the co-evolution of PMOs through the lens of routines, using routines as the unit of analysis, enables to investigate the dynamics at stake between multiple levels of organizing, linking micro and macro perspectives (organizational routines, capabilities and organizational structure) to reveal the critical role of the interrelationships between organizational routines and capabilities (Salvato and Rerup, 2011). In our view, routines as the unit of analysis (Pentland and Feldman, 2005) provide the explicative micro-foundations (Felin and Foss, 2009) of the dynamics under consideration as “*an analysis of micro-foundations considers both initial conditions and evolutionary processes*” (Felin et al., 2012, p. 1353).

Our purpose is to study how PMOs as organizational entities and PfM as an organizational capability (Tootoonchy et al., 2015) co-evolve over time, through theoretical insights drawn from a routine lens and an empirical case study. Prior studies have investigated the contribution of PMOs to the success of PfM processes (Aubry et al., 2007, 2010b; Hobbs and Aubry, 2008; Unger et al., 2012a, 2012b) but there is no research to date that offers a dynamic view of the co-evolution between PMOs and PfM.

We contribute to the literature in three ways. First, our findings accounts for the ongoing transformative nature of PMOs, supporting extant literature. Second, with its grounding in a routine perspective, our conceptual framework enriches existing research, showing that our conceptualisation of both PMO, as an entity, and PfM, as an organizational capability, can be enriched using a routine perspective, and that PMO and PfM co-evolve over time to adapt to new processes or structures. Third, we extend and contrast existing studies suggesting to shift our attention away from the design of PMO typologies toward the development of middle-range theories focused on the dynamic interplay between PMO and PfM and the identification of patterns of adaptation or co-evolution as a relevant ground for theory building.

The paper is organized as follows. Following this introduction, we first draw from the literature to develop a conceptual framework of PMO and PfM co-evolution from a routine perspective. Second, we outline the case-based research strategy for the paper. Third, we present the key findings from the case study, which lead to refine our conceptual framework. Fourth, we discuss the implications from the empirical results, develop theory propositions, and highlight the contributions made. Finally, we conclude the paper underlining paths for further research.

## 3. Routines as a lens to investigate the co-evolution of PMO and PfM

### 3.1. Organizational becoming and process theories of change

In order to understand the co-evolution between PMO and PfM through a dynamic process of change (Hernes & Bakken, 2003, p. 1524; Packendorff et al., 2014) we adopt a stance of “*organizational becoming*” (Sergi, 2012; Tsoukas and Chia, 2002, p. 573). This assumption is supported by a “*process and*

temporality” view focusing on “change and becoming” (Langley et al., 2013, p. 4).

Furthermore, we do not view change as a linear stable pace process but as a changing pace process of evolution and adaptation, where periods of slow change, during which an organizational system keeps its “stable integrity” (Gersick, 1991, p. 16), are followed by “revolutionary periods” of change that alter the deep structure of the organizational system (Gersick, 1991, p. 19). During the long periods of slow evolutionary change, organizational members try to select different processes to elaborate the systems and manage the resources (continuous adaptation and incremental change). These long periods are discontinued by creative actions of executive/top leaders to transform strategies, system or structures, and/or abrupt external changes (Tushman et al., 1986). Thus, an organizational becoming perspective is an appropriate lens to examine the dynamics of co-evolution and adaptation (Hernes, 2014) as it enables to account for evolutionary change during which project managers seek to constantly improve their practices and processes, and teleological change triggered by strategic interventions from the organization’s senior leadership in response to environmental changes and/or new goals (Van de Ven, 2013).

3.2. Organizational routines as a powerful analytical frame to investigate change

In the context of process theories of change (Van de Ven, 2013), selecting a routine perspective is relevant for two main reasons. First, “Evolutionary models envisage an organisation as

a collection of routines, providing a robust micro-level unit of analysis to address adaptive processes (Nelson and Winter, 1982)” (Salvato, 2003, p. 84). Thus, routines are “a suitable vantage point to assess the interplay between” a capability and an organizational system (Salvato, 2003, p. 84; Salvato and Rerup, 2011). Second, many researchers (Becker, 2004; Feldman, 2000; Feldman and Pentland, 2003; Pentland and Feldman, 2008) recognize that routines are dynamic processes that create both stability and change. Feldman & Pentland (2003, p. 94) define routines as “repetitive, recognizable patterns of interdependent actions, carried out by multiple actors”.

Routines are best captured by their three constitutive elements: ostensive, performative and artefact (Pentland and Feldman, 2005). The ostensive element (Pentland and Feldman, 2005) or the abstract level (Pentland et al., 2012) of a routine is its general intent, like a rule that governs a specific behaviour (Becker, 2004). The performative element of a routine or its concrete level (Pentland et al., 2012) is made up of the specific actions performed by organizational members. Finally, artefacts are the “physical manifestations of the organisational routines” like the written rules, organizational records and procedures (Pentland and Feldman, 2005, p. 797). Feldman and Pentland (2003) argue that in many cases the overarching pattern of a routine may remain relatively stable while specific parts of the routine pattern may show considerable change. Miner et al. (2008) decompose routines in their constituent parts as sub-routines: while the overall pattern of a routine may remain stable, specific sub-routines may change. Also, routine actors may choose from a range of sub-routines available for the

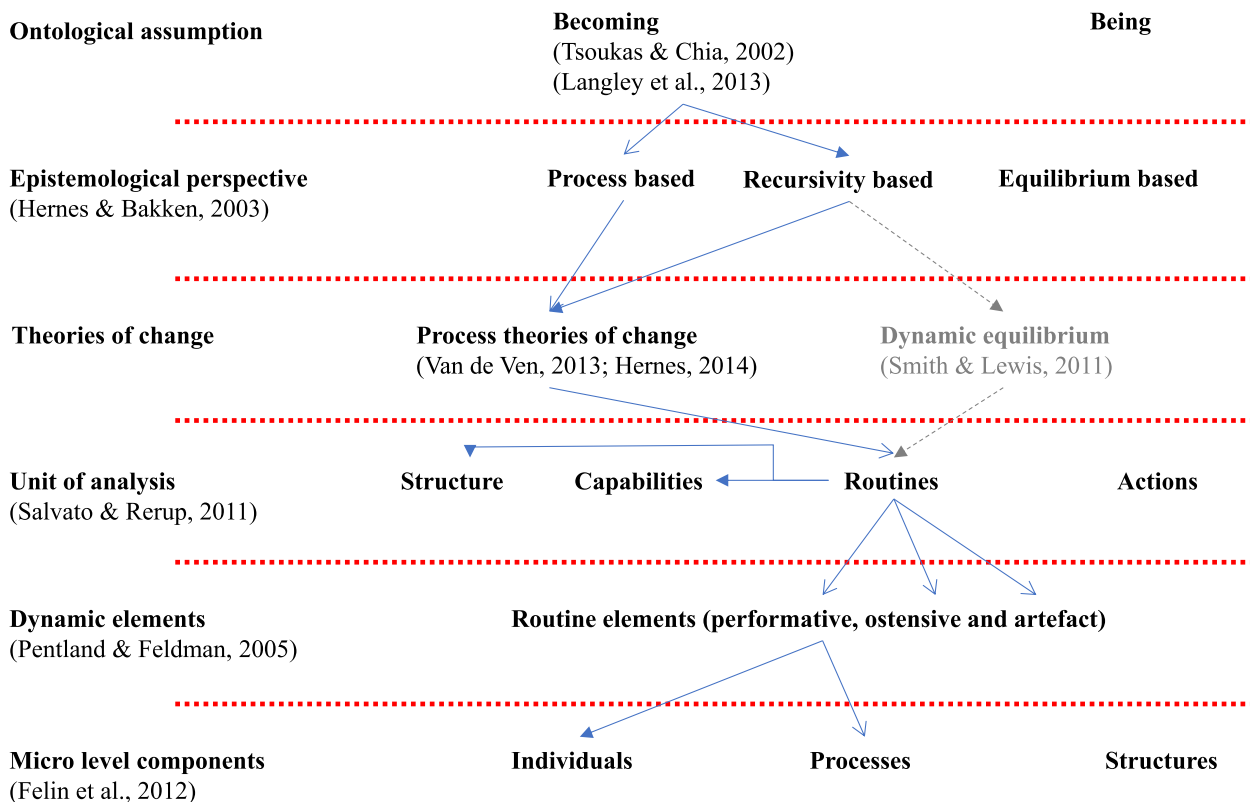


Fig. 1. Overview of the research foundations.



implementation of a given routine, giving rise to variations (Feldman, 2000). Finally, Felin et al. (2012) further highlight the role of micro-level phenomena (individuals, social processes and structures) which may provide sources of variation in routines. Together, these arguments explain the duality of routines as sources of (quasi) stability and change.

### 3.3. Overview of the research foundations

An overview of the research assumptions of this research project, including its onto-epistemological perspective, supporting change and evolutionary theories, as well as routines concepts is provided in Fig. 1, based on Saunders et al.'s research onion (2016, p. 124).

## 4. A routine-based conceptual framework for the co-evolution of PMO and PfM

To conceptualize the interplay and the resulting co-evolutionary dynamics between PfM and PMO from a routine perspective, we proceed in three steps. First, we demonstrate that PfM as an organizational capability can be conceptualized as a collection of routines. Second, we establish that PMO can be apprehended as a meta-artefact. Third, building on Dionysiou and Tsoukas' (2013) process model of (re)creation of routines, we suggest a conceptual framework for the co-evolution of PMO and PfM.

### 4.1. PfM as an organizational capability and a collection of routines

Organizational capabilities are the potential abilities of the organization to accomplish its goals against competition (Teece et al., 1997). According to Salvato and Rerup (2011), an organizational capability is a collection of routines that enable the organization to perform its activities reliably. Prior research defined PfM as an organizational capability (Killen and Hunt, 2013) whose core functions are the prioritizing shared resources, reducing project uncertainty, and coordinating interfaces between projects (Martinsuo and Lehtonen, 2007; Müller et al., 2008). Taken in isolation, each of these functions can be decomposed in a series of processes and actions that are often codified, in other words these PfM functions can be conceptualized a series of routines. It follows that PfM, as an organizational capability can be conceptualized as a collection of routines (Salvato and Rerup, 2011).

### 4.2. PMO as meta-artefact

Artefacts are the “physical manifestations of the organisational routines” (Pentland and Feldman, 2005, p. 797). The authors add: “The most obvious examples are those that deliberately attempt to capture or prescribe the routine, such as formal rules or standard operating procedure”. The purpose of the creation of a new artefact may be the creation of a new routine (March et al., 1993).

The PMO supports PfM by providing rules and procedures and recording archival data. Following prior research, we can

identify several functions performed by the PMO: it may codify PfM processes (Ward, 2000), develop historical archives (Dai and Wells, 2004), implement knowledge management (Desouza and Evaristo, 2006) or information system (Hobbs and Aubry, 2007), create standards (Dai and Wells, 2004; Kwak and Dai, 2000), and control and monitoring processes (Hobbs and Aubry, 2007). Artefacts contribute to the implementation of the PMO functions: an artefact may support the implementation of new routines through formalization (March et al., 1993), assist in recording a variation in a routine (Feldman, 2000), or fix codified rules and procedures (Pentland and Feldman, 2005). As an organizational system, the PMO itself contains a number of routines, and assists in creating, maintaining and changing PfM routines. But the PMO is not in itself a capability, not can its contribution be reduced to that of a single artefact. Borrowing from Livari (2015), we suggest that the PMO can be conceptualized as meta-artefact, defined as an organizational sub-system, a collection of artefacts, rules and procedures, providing a general solution to a defined class of problems—in this instance PfM.

### 4.3. PMO and PfM co-evolution: a routine-based conceptual framework

Building on Feldman and Pentland's (2003) suggestion to consider the recursive relationship between the performative and ostensive aspects of organizational routines to unveil the internal dynamics of routines, Dionysiou and Tsoukas (2013, p. 188) “suggest a process model to account for the (re)creation of routines” based on the recursive interaction between the performative, ostensive and artefact elements of routines. Specifically, the authors “examine the mutual constitution of routines' constituent parts (performative and ostensive) through interaction, and [...] develop endogenous explanations of routine (re)creation grounded on the actions and understandings of mutually susceptible participants.” (Dionysiou and Tsoukas, 2013, p. 181). Their model “from within” assumes that “a small number of participants start interacting for the first time in the context of a specific joint activity” (Dionysiou and Tsoukas, 2013, p. 189).

Fig. 2 visually sums up the conceptual framework relating routine elements: PfM performative, ostensive and artefacts, PMO meta-artefact, and organizational system. In this figure “The conventional boxes and arrows of variance studies (representing concepts and causal linkages respectively) return in new forms, wherein boxes tend to represent states ...” and the arrows indicate “the relation of precedence or the processual relations or flows between states” (Langley et al., 2013, p. 8) of routine elements, enabling to build, a “sequence among events” (Van de Ven, 2013, p. 3).

We suggest four interrelated change or evolution pathways.

- Influence from the organizational context to PMO/PfM routines Any required transformation or contextual influence from the organizational level can be codified in new rules and procedures by the PMO (arrow a) to be implemented in PfM via artefacts (arrow b). Contextual influences from the

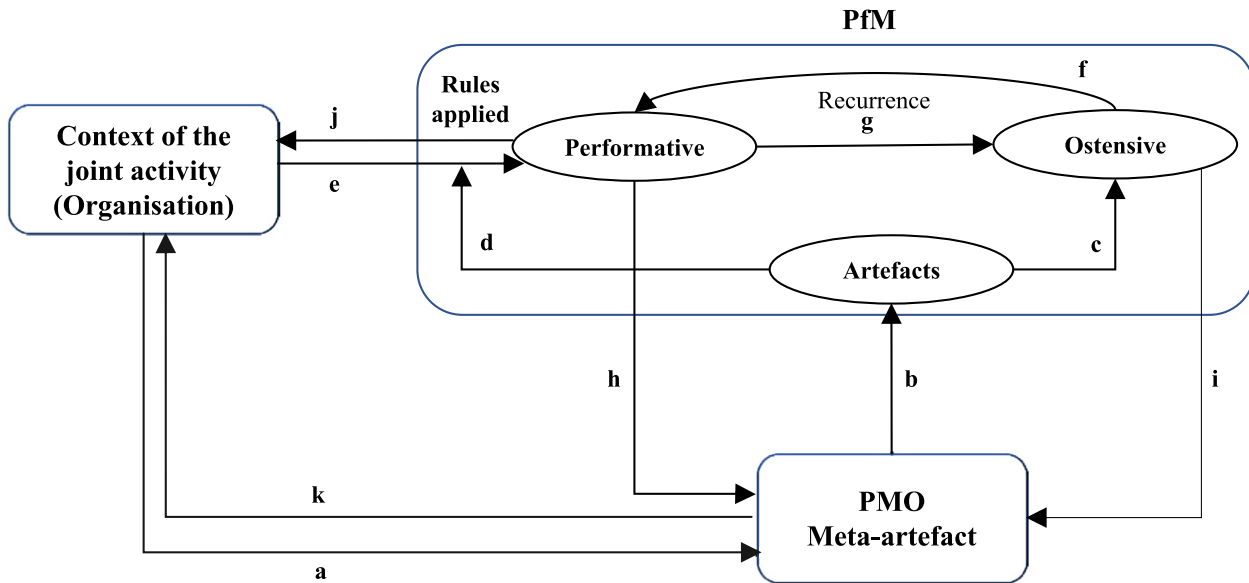


Fig. 2. PMO and PfM co-evolution conceptual framework (after Dionysiou and Tsoukas, 2013, p. 190).

organizational level to PfM routines' performative elements may be codified via artefacts/rules (arrow e).

- Influence from the PMO to PfM routines  
Any transformation at the PMO level will first transform the artefact elements of PfM routines (arrow a); the ostensive and then the performative elements will transform subsequently (arrows c and d) or directly change the performative element because the actors of the routine develop the existing rules because of previous experience (Dionysiou and Tsoukas, 2013) (arrow f). Existing ostensive elements may accommodate small changes in individuals' performative actions (Aldrich and Ruef, 2006) (arrow f).
- Influence from PfM routines to PMO  
Variations or changes in performative and ostensive elements are possibly driving transformation at the PMO level (arrows h, i). Recurrence of changes in the performative element of a PfM routine will change its ostensive element (Dionysiou and Tsoukas, 2013) (arrow g).
- Influence from PMO/PfM routines to the organizational context  
Arrows j and k denote the effects of the change and performance at the project/portfolio and PMO levels on the context of joint activity and/or organizational level at large.

The model uncovers that any change in the routines' elements can lead to changes and evolutions in patterns of actions (Becker et al., 2005; Pentland et al., 2012; Rerup and Feldman, 2011) which, in turn, can be the source of organizational transformation (Feldman, 2000; Feldman and Pentland, 2003; Hodgson, 2013a, 2013b; Hodgson and Knudsen, 2004; Knudsen, 2002). In other words, variations in routines trigger micro-level (sub-routines) and macro-level (organization) changes which explain the co-evolution of PfM as and organizational capability and of the PMO as an organizational system.

## 5. Research strategy

Following Edmondson and McManus's archetypes (2007, p. 1160), our research falls within the intermediate type as it draws from and integrates an extant body of research. Indeed, we seek to extend the emerging body of studies on PMO transformation and the dynamic interplay between PMO and the organizational context. The goal of our data analysis is to test and refine an initial conceptual framework. A single case study can be persuasive for generating and testing a theory (Eisenhardt and Graebner, 2007; Siggelkow, 2007). In addition, provisional theory building happens through the recursive relation between the early theory, case data and the extant literature (Eisenhardt, 1989). Thus, we use a single empirical case study as "a research strategy which focuses on understanding the dynamics present within single settings." Eisenhardt, 1989, p. 534).

### 5.1. Case selection and presentation

The case, Proteus,<sup>1</sup> has been chosen as it provides a rich setting to investigate the co-evolution of PMO and PfM: Proteus is a large project-based organization with an established PMO, managing a significant number of large projects. Proteus is exemplar of similar organizations in its industry, and one of the researchers had secured excellent access to the organization, allowing to make sure that it would give best information about the specific features and characteristics of the PMO/PfM routines (Bleijenbergh, 2010).

Proteus is a private company established in 1991 and it provides comprehensive services in engineering, procurement, construction and management (EPCM) of infrastructure and

<sup>1</sup> The real name of the case organization has been disguised for confidentiality purposes.

facilities, pertaining to the oil, gas and petrochemical industries worldwide. The organization had 250+ employees in Iran and Malaysia. Proteus was managing portfolios of projects and project managers could be responsible of managing one or more projects simultaneously. The number of projects in the portfolio was about 25 projects: 20 domestic and 5 international projects. Proteus' PMO (5 employees) was supporting and implementing both project management and Pm practices (11 project managers).

## 5.2. Data collection methods and sources

The recommended data collection methods to capture routine elements and their relationships are interviews, observation and document and archival data analysis (Feldman and Pentland, 2008). Table 1 summarizes the methods used for this study.

### 5.2.1. Semi-structured interviews

In order to mitigate the limitations of interviews, different knowledgeable informants from various hierarchical levels were invited for the interviews (Eisenhardt and Graebner, 2007). The number of interviews in qualitative research depends on the theoretical saturation; once the interviews are not revealing any new data, theoretical saturation has probably been reached (Bryman and Bell, 2003).

The research framework was the basis for the interviews' protocols (one for the portfolio managers, one for PMO members and other managers of the organization). The protocols were articulated around three sections to capture the recursive interaction between the performative, ostensive and artefact elements of routines and the continuous process of transformation of routines, i.e. variation–selection–retention (Feldman and Pentland, 2003): 1) variation in performative elements and answers to incidents; 2) selection of ostensive elements and artefacts; and finally 3) retention of new elements.

### 5.2.2. Observation

Observation is an important facet of qualitative research (Bailey, 2007). The appropriateness of observation for examining organizational routines has been mentioned in former research

Table 2

Proteus case study interviews and meetings.

Position of the attendees	Interview/Meeting number
Head of PMO, senior expert of PMO	Meeting 001
Senior expert of PMO	Meeting 002
PMO staff	Interview 001
Head of risk management, business & development department	Interview 002
Project manager/portfolio manager	Interview 003
Deputy director, construction & erection department	Interview 004
PMO, risk manager	Interview 005
PMO, manager responsible for recording lessons learned	Interview 006
Project/portfolio manager	Interview 007
Project/portfolio manager	Interview 008
Project/portfolio manager	Interview 009
PMO staff and project/portfolio managers	Meeting 003

(Patton, 2002), and Pentland (2003) recommends observation specially to capture the performative element of routines. Observation takes place in a situation where the consequences and the intent of the actions are clear for the observer.

In this study, the critical incidents protocol used during interviews, attendance to meetings, and scrutiny of daily activities provided observation opportunities. Observation, a source of rich data, enabled to triangulate interviews and data analysis, contributing to theoretical saturation.

### 5.2.3. Documents and archival data

Documents are an important source of information to capture the ostensive and artefacts elements of routines (Pentland, 2003). All relevant documents including minutes of meetings, annual/progress reports, procedures, different databases and job descriptions (as available) were carefully analysed.

### 5.2.4. Data collection process

Twelve interviews and meetings with project/portfolio managers, PMO staff and leaders of Proteus (Table 2) were conducted. After each interview, we reviewed the data collected, and

Table 1

Routine elements and data collection methods.

	Definition	Challenges	How to collect data
Performative	The actual performances of routines	Performances are distributed over time and space	Semi-structured interviews with the routine actors
Ostensive	The schematic form of routines	Distributed and subjective	Semi-structured interviews with the organizational managers related to the routine
Artefact	The physical manifestation of routines	Artefact can be mistaken for the whole routine or the ostensive element	Documents and archival data analysis (rules, procedures and organizational historical data)
Performative and ostensive interactions	Creation of routines is based on the reciprocal relationship of performative and ostensive	Different participants realize different starting and ending points for one routine	Selecting different enactments (performative) results in unintentional variations of ostensive elements; changes in norms (ostensive) causes intentional variations of performative elements
Artefact and performative interactions	The control of behaviour	Most artefacts do not specify particular actions	Documents and archival data (using the change management database) and semi-structured interviews (the regarding personnel)
Artefact and ostensive interactions	Alignment of formal documents with the understanding about what routine actors are doing	The physical artefact does not determine the flow of a job	Following critical incident theory to understand what made a manager change a procedure or rule

compared with observations and documents, in order to identify if new data, or new interview questions were generated. After 12 interviews, it was felt that theoretical saturation had been reached as no new insights or themes about the PMO and PFM routines were found (Strauss and Corbin, 1994). At that point, only repetitive data was being collected and we were able to provide “some direction for operationalizing” (Bowen, 2008, p. 140).

The observation of organizational daily activities and documents and archival records analysis also helped the research to capture different elements of routines. Altogether 15 PFM routines and 33 PMO and PFM procedures and guidelines were documented, observed and analysed.

PMO and PFM routines were extracted from the interviews and documents analysis. By observing the daily interactions of the Proteus’ PMO staff with project managers, we identified some of their activities (like preparing procedures, templates and guideline) had the attributes of routines. By routinizing activities, the PMO was providing project managers with a more predictable environment, allowing to manage change and reduce uncertainty.

5.3. Data analysis

The data were analysed as follows. Interviews and meetings records were analysed and coded in order to identify the organizational entities concerned (PMO, PFM, or Organizational context), the routine elements involved (performative, ostensive or artefact), and the characteristics of the relations between elements (arrows). These analyses allowed to account for processual influences and

sequences of evolution for two main situations: 1) new formal rules, guidelines and procedures, or 2) changes triggered by unplanned incidents. The interpretations arising from the interviews were compared with the observations of the daily activities and documents analysis, and differences lead to further fact checking through interviews. The combination of the findings leads to suggest an enriched conceptual framework representing the dynamic system of co-evolution between PMO and PFM. We revisited the case to see if the data confirmed this modified framework and if its use improved the understanding of the co-evolution dynamics.

6. Proteus case study

This section highlights the main findings from the case study. After a brief description of the project and portfolio management setting, we make sense of the dynamic of PMO/ PFM co-evolution at Proteus. This leads us to suggest a revised conceptual framework. Then we illustrate this dynamic through a detailed example coming from the case.

6.1. Project and portfolio management at Proteus

A relationship diagram illustrates the flow of information between the different departments of Proteus. Fig. 3 represents the relationships between different departments and how each project is spread among these departments. The arrows in Fig. 3 represent the flow of information among different departments

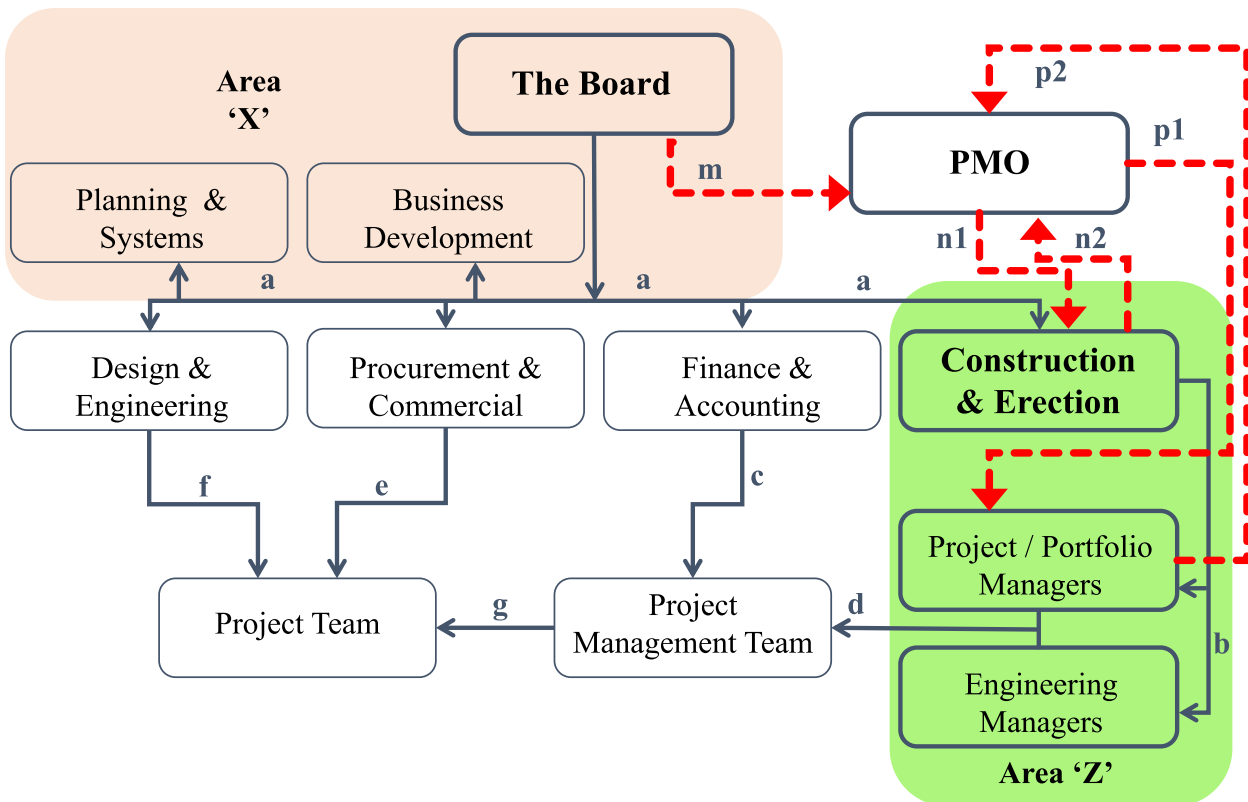


Fig. 3. Relationship diagram—the flow of information between the different departments of Proteus.



and units. The co-evolution dynamics happens between and within the boxes representing various states.

The arrow “a” collection was extracted from the top organizational chart; therefore, the ‘Construction & Erection’, ‘Planning & Systems’, ‘Procurement & Commercial’, Finance & Accounting’ and ‘Design & Engineering’ departments worked under the supervision of the Board. Arrow “a” also represents how organizational rules and formal procedures were dictated to the departments (our focus is specifically on the ‘Construction & Erection’ department as the head of this department manages the portfolio of projects).

During bids, the ‘Finance & Accounting’ and ‘Design & Engineering’ departments worked together under the supervision of the ‘Construction & Erection’ department to prepare the commercial and technical proposals.

*“‘Business Development’ and ‘Planning & Systems’ departments ask the ‘Design & Engineering’, ‘Construction & Erection’ and ‘Finance & Accounting’ departments to provide the high level plan and the estimate cost of the projects to be offered in the bids”* (Senior expert of PMO, Interview 002).

Area “X” shows where all the existing rules came from.

*“‘The Board’, Business Development’ and ‘Planning & Systems’ departments decide in which bids the organisation can participate, how the organisation shall find investors, in which sectors of the industry, and even in which industry the organisation shall work.”* (Project/Portfolio Manager, Interview 007).

Area “X” is coded as the ‘organizational context’ in data analysis. In the case of winning a bid this organization teamed up for the new project, therefore:

Arrow “b” shows that ‘Construction & Erection’ department was responsible for assigning Project Managers and Engineering Managers depending on the size of the project and the project’s specific requirements.

*“‘Construction & Erection’ department selects the Project Manager for the new project. In some projects we need a senior project manager and a few other project or engineering managers; because some projects are really huge to be managed by only one manager.”* (Project/Portfolio Manager, Interview 008).

Projects required a financial expert during the execution (Project/Portfolio Manager, Interview 007). Arrow “c” shows the ‘Finance & Accounting’ department assigned an accountant or a team to provide necessary service for the project. Arrows “c” and “d” show how the project management team was shaped.

If the project was only engineering the project team would be finalized by assigning draftsmen and engineers (arrow “f”) to the project, under the supervision of the project management team (arrow “g”). If the project would provide procurement services as well, the ‘Procurement & Commercial’ department assigned some experts to facilitate the required tasks (arrow

“e”). If the project had a construction supervision/execution section too, the project management team was responsible for selecting the sub-contractors and the whole project team would continue their services until the end of the project.

## 6.2. PMO and PFM co-evolution

The Proteus case study has enabled to investigate empirically the relationships between PMO, PFM and the organizational context at the routine level. These were extracted from interviews, reviewing the archival documents or captured from observation. All the relationships have been validated through follow-on interviews with the PMO head. The substance (Langley et al., 2013, p. 4) of the relationships is presented in Table 3 below.

In this section, we discuss key findings of the case study and we refer to key relationships using the codes from Table 3. The data shows that the Proteus PMO supported PFM by providing formal rules, guidelines and procedures; therefore, the PMO acted as a meta-artefact for PFM (relationship ‘Pa-Fa’). Relationships ‘O-Fp’ and ‘O-Pp’ illustrate the perceived uncertainty resulting from the dynamic environment (Dionysiou and Tsoukas, 2013). ‘Fp-O’ captures the effect of the project/portfolio managers’ performances on the organizational activities at large (Langley et al., 2013). ‘Pp-O’ describes the effect of the PMO members’ performances on the organizational activities at large (Langley et al., 2013). ‘Pp-Fp’ shows the processual influence at the PFM level when a unique activity from the PMO causes a change in PFM performative element(s). Therefore, the repetition of this practice (as a subroutine) is part of an existing routine.<sup>2</sup>

Overall, the empirical data from the Proteus case suggests a more sophisticated architecture of relationships between PMO, PFM and the organizational context, one where co-evolution relationships are more numerous and may operate both ways. This has led us to refine our conceptual framework to incorporate our empirical findings. Fig. 4 updates the conceptual framework by incorporating the relationships presented in Table 3.

The refined conceptual framework presents a richer, more dynamic, architecture of co-evolution relationships between PMO, PFM and organizational context, where the direction of influence flows in all directions. The routine perspective thus enables us to elicit a more detailed process of co-evolution, which involves aspects of slow incremental adaptation, but also fast paced change triggered by managerial intervention and/or unplanned events. We illustrate this process of co-evolution in the next section through one detailed example.

## 6.3. PMO and PFM co-evolution illustrated in Proteus

Aubry et al. (2010a) state that the most frequent internal drivers of PMO transformations are project management process issues, human relations issues and/or performance issues. These themes were tracked in the interviews to

<sup>2</sup> However, in some cases these events may be unique because a project faces special circumstances. Arguably, the results of the evolution and change may be used in longer time frames, even though some activities were unique due to special circumstances.

Table 3  
Proteus case—relationships between PMO, PfM and organizational context.

Relationship	From (element)	To (element)	Evidence for the relation (relations)	Examples from the Proteus case study
O-Fp	Organizational-context	PfM-performative	Perceived uncertainty	Existing project/portfolio management procedures like time, cost and resource estimation
O-Pp	Organizational-context	PMO-performative	Perceived uncertainty	Existing methodologies like investment management and portfolio management
O-Pa	Organizational-context	PMO-artefacts	(New) rules	Codification of organizational rules in PMO procedures
Fp-O	PfM-performative	Organizational-context	Performance (impact)	Long term effects of PfM performance on organizational success like the positive effect of the new execution plan procedure on the projects' success
Fp-Pp	PfM-performative	PMO-performative	Information	Changing the terms of the contracts format to manage the changes of the scope of project because of the client's request
Fp-Po	PfM-performative	PMO-ostensive	Information	Including the new changes in the contract management procedure because of changes in PMs' activities
Fo-Pp	PfM-ostensive	PMO-performative	Information	Capturing different methods of cost management to develop a unique method
Fo-Po	PfM-ostensive	PMO-ostensive	Information	Developing a new cost management procedure because of studying different methods applied by PMs
Fp-Fo	PfM-performative	PfM-ostensive	Impact	Different methods of cost management
Fo-Fp	PfM-ostensive	PfM-performative	Impact	Internal changes within the routines
Fa-Fp	PfM-artefacts	PfM-performative	Impact	Organizational formal rules like changes in PfM procedures as a matter of changes in PMO structure (customisation of procedures)
Fa-Fo	PfM-artefacts	PfM-ostensive	Manual	Internal changes within the routines
Pp-O	PMO-performative	Organizational-context	Performance (impact)	Long term effects of PMO performance on organizational success
Pa-Fa	PMO-artefact	PfM-artefact	Formal communication	Formal procedures, the official format of the execution plan
Pp-Po	PMO-performative	PMO-ostensive	Impact	Internal changes within the routines
Po-Pp	PMO-ostensive	PMO-performative	Impact	Internal changes within the routines
Pa-Pp	PMO-artefact	PMO-performative	Impact	Organizational formal rules like changing the structure of the PMO
Pa-Po	PMO-artefact	PMO-ostensive	Manual	Internal changes within the routines
Pp-Fp	PMO-performative	PfM-performative	Performance (impact)	Preparing guidelines for special cases in projects which becomes a routine after repetition

investigate the co-evolution of PMO and PfM. One important theme in the data pertains to the methods used by project managers to use and allocate resources. The analysis of this theme highlighted how the PMO staff helped project managers overcome the process of managing project resources during the execution phase. PMO staff observed successful PfM practices in individual projects and were able to codify and diffuse those practices across projects, changing PMO and PfM routines in the process.

For example, the PMO had created an artefact for controlling the resources of projects and the time that the resources should be deployed during the projects' execution phase. This artefact was called the CTR (cost-time-resource) Plan. This plan was an A3 page that showed when which resource was being used (both for equipment and human resources). The population of the associated "CTR Management Requirements" artefact at the PMO level had been the top-level procedure for preparing the cost management, time management and resource management procedures at PfM level (arrow 'Pa-Fa'). Thus, these three new procedures were defining what project/portfolio managers should do to fill the CTR Plan (arrow 'Fa-Fo'). This variation in the ostensive element of a PfM routine would result in changes in the enactment of PfM routines by project managers (arrow 'Fo-Fp'). Although all project managers were requested to fill a CTR Plan based on the three aforementioned procedures, every project manager had a different way to fill out the form (arrow 'Fa-Fp'). Some of them used the projects' work breakdown structure

(WBS) and others used excel worksheets to divide the activities and spread them on to a chart; therefore, these project managers enacted these routines in different ways (from Meeting 002). These changes did not stop at this level. Some project managers were more successful in filling the CTR Plan and used it to control their projects. Successful project managers linked the CTR Plan to the WBS of their projects so that changes in the WBS would easily be tracked in the CTR Plan. This method of using the CTR Plan became a norm among some other project managers as well (arrow 'Fp-Fo'; an unintentional variation resulting from the repetition of an action (Dionysiou and Tsoukas, 2013)). While observing the project managers' activities, one of the PMO staff recognized this best practice in the organization (linking the CTR Plan to the WBS). The PMO staff ran several meetings to share with all the project managers the best method to use the CTR Plan (arrow 'Pp-Po', the PMO staff were spreading a best practice and causing a change in the way the project managers were supported to fill the CTR Plan). After a few months, a new version of the cost management, time management and resource management procedures based on the organization's best practice was issued (arrow 'Pa-Fa').

Fig. 5 illustrates the sequence of changes with regards to the CTR Plan. Arrows 'O-Fa' and 'O-Pa' show the initial rules of the organization. The dotted arrows ('Fp-Fo', 'Pp-Po' and 'Fp-Pp') show the unintentional variations in this co-transformation. It can be concluded that the initiation of a change in a PMO artefact

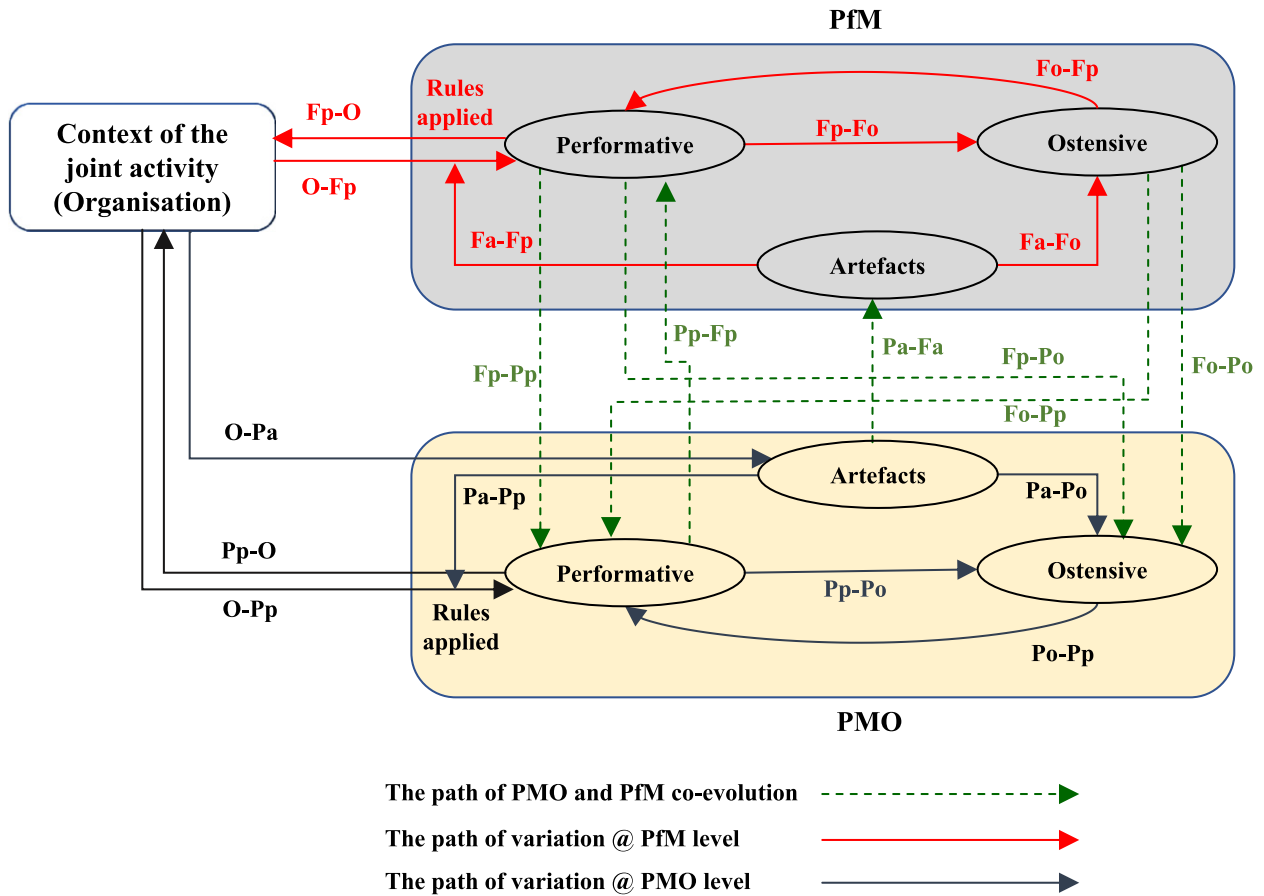


Fig. 4. Revised conceptual framework: dynamic system of co-evolution between PMO, PfM and organizational context.

caused a transformation in the PfM routines of cost/time/resource management. The changes in the PfM routines were followed by changes of PMO routine (providing the three procedures of cost, time and resource management).

**7. Discussion**

The overall aim of this paper was to unveil the dynamic co-evolution of PMO and PfM in relation to the organizational context. We focused on individual, processes and structures mechanisms (Felin et al., 2012) to facilitate a coherent theoretical advancement of our understanding of routines’ micro foundation and dynamic processes of transformations.

First, the findings of the study are compared and contrasted allowing to suggest research propositions. Then, the contributions of the research findings to theory are discussed.

*7.1. Research propositions*

*7.1.1. The PMO, as an organizational meta-artefact, has an ongoing transformative nature*

Previous literature argued that PMOs have a transformative nature (Bates, 1998; Dai and Wells, 2004; Hobbs and Aubry, 2006, 2007, 2010; Santosus, 2003; Turner and Keegan, 2001). The findings of our case studies also validate this proposition. In addition, we found that some daily activities of PMO

executives in the case study had the attributes of routines: for example preparing procedures and guidelines and writing managerial reports to the board. PMOs as meta-artefacts, organizational sub-systems aiming to provide a generic solution to PfM problems, harbour artefacts, procedures, processes and routines. Our conceptual model, illustrated by the Proteus case, shows how the interactions between the PMO, PfM, and projects, through the ostensive, performative and artefactual dimensions of routines generate variations and change over time. Therefore, the transformative nature of the PMO is ongoing. As noted before, the duality of routines as sources of stability and change (Becker, 2004, 2008; Becker et al., 2005, 2006; Feldman and Pentland, 2008; Pentland and Feldman, 2008) supports this proposition. The initial conceptual framework has been revised based on the findings of the Proteus case study. By comparing our revised conceptual model with the extant literature, we have identified knowledge gaps and new contributions, expressed as propositions:

**Proposition 1.** *The PMO, as an organizational sub-system, can be conceptualized as a meta-artefact.*

*7.1.2. Changes at the level of PMO are the drivers of changes in PfM routines*

Based on Proposition 1, we investigated the relationships between the PMO and PfM routine elements and in the context

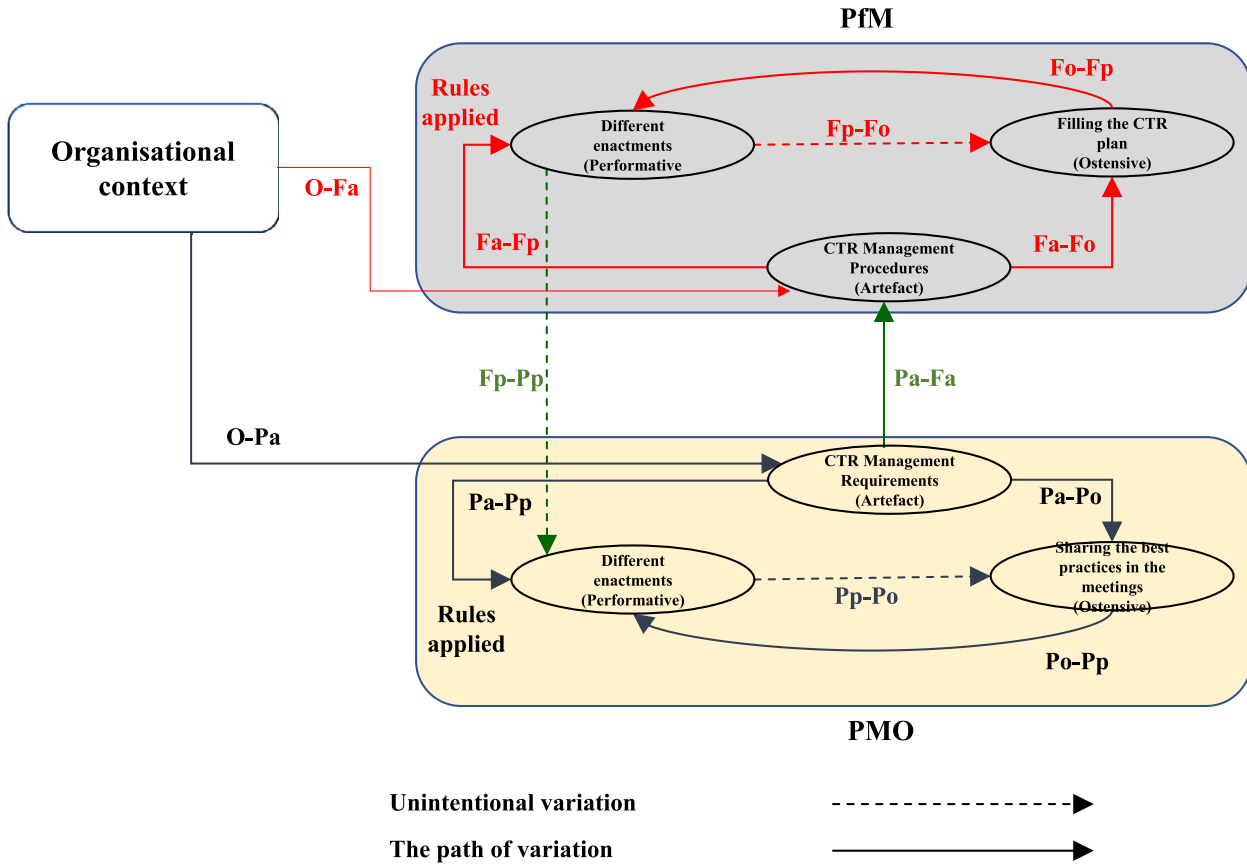


Fig. 5. The co-evolution of PMO and PfM illustrated by the CTR plan at Proteus.

of the organizational environment. The findings of the Proteus case study reveal how changes in the PMO artefacts and performative elements caused changes in PfM routines. Fig. 4 highlights the relations between PMO and PfM routine elements. Therefore, the findings of our research are seen to be articulating the assumptions underlying the extant literature.

**Proposition 2.** *Changes of artefact element of PMO routines impact PfM through influencing the artefact element of PfM routine.*

**Proposition 3.** *Changes in the performative element of PMO routines impact PfM through influencing the performative element of PfM routine.*

7.1.3. *PfM, as an organizational capability, is a collection of routines*

Based on the definitions of organizational capabilities (Teece et al., 1997; Winter, 2003) we propose to conceptualize PfM as an organizational capability (and consequently a collection of routines). Our research findings support the assumptions of prior research (Crawford, 2006; Killen and Hunt, 2013; Killen et al., 2008) about PfM being an organizational capability. Adopting a routines perspective adds further empirical and theoretical evidence to the theorizing of PfM.

**Proposition 4.** *PfM, as an organizational capability, can be conceptualized as a collection of routines.*

7.1.4. *PfM routine elements impact PMO routine elements*

Our purpose is to gain further understanding of the co-evolution of the PMO (as a meta-artefact) and PfM (as an organizational capability). As discussed we use the routine perspective (Salvato and Rerup, 2011) as the micro foundation (Felin and Foss, 2009; Felin et al., 2012) to observe this system of co-evolution. The findings of the Proteus case study confirm that changes in performative or ostensive elements of PfM routines are the cause of change in performative or ostensive elements of PMO routines. Fig. 4 represent the direction of change from the ostensive element of PfM routines to the performative or ostensive elements of PMO routines. Also, it reveals the direction of change from the performative element of PfM routine to the performative or ostensive elements of PMO routines. Therefore, the assumptions of former literature are articulated and the relations between PMO and PfM routines' elements are unveiled.

**Proposition 5.** *Changes in the ostensive elements of PfM routines impact the PMO through influencing the ostensive or performative elements of PMO routines.*

**Proposition 6.** *Changes in the performative elements of PfM routines impact the PMO through influencing the ostensive or performative elements of PMO routines.*

7.2. *Contributions*

Table 4 summarizes the main contributions of this study.



Table 4  
Summary of the research findings in comparison to extant literature.

	Existing literature	Our research findings
Supporting	The dynamic nature of PMO (Bates, 1998; Dai and Wells, 2004; Hobbs and Aubry, 2006, 2007, 2010; Santosus, 2003; Turner and Keegan, 2001).	PMO has an ongoing transformative nature.
Adding	PfM is a dynamic decision process (Cooper et al., 1997).	PfM, as organizational capability, can be conceptualized as a collection of routines.
Articulating and contrasting	To survive, PMOs have to act as a change agent (Pellegrinelli and Garagna, 2009).	PMO and PfM co-evolve over time to adapt to new processes or structures (i.e. routines).
	Hobbs and Aubry (2008) investigate whether it is relevant to reduce the typologies of PMOs to a reasonable number. Previous studies (Aubry et al., 2010a, 2010b; Hobbs et al., 2008) study PMOs through evolutionary theories (gradual change).	PMO dynamically reshapes itself to bring new adjustment. Dynamic equilibrium could better explain the dynamic interplay between PMO and PfM.

### 7.2.1. Supporting prior research findings

Both the extant literature (Bates, 1998; Dai and Wells, 2004; Hobbs and Aubry, 2006, 2007, 2010; Santosus, 2003; Turner and Keegan, 2001) and our research findings show that PMOs have a dynamic evolutionary nature. Conceptualizing PMOs as a meta-artefact supports the notion of dynamic evolution to the PMO phenomenon.

### 7.2.2. Adding to extant literature

First, the extant literature states that PfM is a “dynamic decision process” (Cooper et al., 1997, p. 16; Müller et al., 2008, p. 28). Our research findings reveal that PfM is an organizational capability and therefore can be conceptualized as a set of routines. The examples from the Proteus case study illustrate and explain how conceptualizing PfM as a collection of routines helps us to track the continual changes in PfM routines.

Second, Pellegrinelli and Garagna (2009) state that PMOs should act as change agents. The patterns of PMO and PfM co-evolution evidenced in our study suggest that the PMO should not be the sole agent of change in the organization; changes and the new requirements of PfM can be trigger evolutions in the PMO. Therefore, evolution has two directions: 1) When the observation of PfM enactments by PMO executives requires the structure or processes of PfM to transform (intentional variation) the PMO is the change agent. 2) When project/portfolio managers choose different enactments of routines to better fulfil their roles, the new and successful practices of project/portfolio managers lead to new routines (unintentional variation) that can trigger changes in actions, processes or structures at the level of the PMO. Overall, the PMO and PfM co-evolve; one is the change agent of the other.

### 7.2.3. Articulating and contrasting prior research findings

Prior literature investigated whether it is relevant to reduce the typologies of PMOs to a reasonable number (Hobbs and Aubry, 2008); our research findings shows that the activities of PMO executives are dependent on the organizational context and PfM enactments. The findings from the Proteus case study reveal that the organizational context may influence the enactments of PMO and PfM executives even if the enactments are not repeated enough to form a routine in shorter time frames. Therefore, we propose that instead of trying to categorize PMOs into different

typologies it is better to understand the organizational context and accept that the PMO dynamically re-shapes itself during organizational life.

Previous studies (Aubry et al., 2010a, 2010b; Hobbs et al., 2008) conceptualized PMO changes only through evolutionary theories. We have noted that evolutionary theory is not adequate to study the co-evolution of the PMO and PfM. Based on the Proteus case findings, we do not view change as a linear stable pace process but rather as a changing pace process of evolution and adaptation. Considering how the intervention of organizational leaders causes the processes and structures to evolve, and how individuals select and combine different enactments to adapt to those new changes in the processes and structures lead us to acknowledge paradoxes and possibly consider a dynamic equilibrium paradigm of organizing (embracing and accepting tensions and paradoxes in organizing dynamics) (Schad et al., 2016, p. 43; Smith and Lewis, 2011). Indeed, organizing activities involve coping with paradoxes. Paradoxes are “contradictory yet interrelated elements that exist simultaneously” (Smith and Lewis, 2011, p. 387). Paradox studies adopt a specific approach to understand and explain tensions and explore how organizations create a competing design to continuously move among paradoxical elements. Smith and Lewis (2011), for instance, presents an integrative dynamic equilibrium model of organizing suggesting responses to diverse categories of organizational paradoxes and tensions. In our research, this lens appears to be congruent with a recursivity-based view allowing to resolve an apparent duality between process-based and equilibrium-based views.

### 7.3. Limitations

Our study arguably provides strong conceptual generalization (Yin, 2013) for our model and propositions. However some limitations must be acknowledged. As noted in our introduction, this study only provides intermediate theory development and requires further validation (Edmondson and McManus, 2007). Although a single case study is adequate for conceptual generalization (Eisenhardt, 1989; Yin, 2013) further validation is called for. The Proteus case was grounded in a particular context (Engineering and Construction projects in the Oil and Gas industry) and may not fully apply in other contexts where different co-evolution dynamics may be observed (e.g. IT/IS, creative industries). Therefore the study (qualitative and/or

quantitative) of multiple case studies across multiple industries would strengthen the empirical support for our propositions.

## 8. Concluding comments

Starting from the observation of the short life-span of many PMOs and their questionable performance, we highlighted that studying the evolution of PMOs alone was not sufficient, and that considering the dynamic interplay between the PMO and the organizational context and systems seemed to be more appropriate. For the purpose of this research we investigated the co-evolution between the PMO and PFM, taking a routine perspective. Our study lead us to propose, through intermediate theory building, an initial conceptual framework of PMO and PFM co-evolution, which was tested and refined using a single empirical case study. After discussing the findings, we offered a revised conceptual framework for the co-evolution of the PMO and PFM. Based on this framework, we outlined six propositions and discussed how they may support, add, articulate and contrast extant literature.

As outlined by the research limitations, the conceptual framework and the propositions need to be strengthened. Three concomitant and complementary research projects are underway. First, a series of case studies across various industries will allow to refine the framework, and provide a broader support to the propositions. Second, a quantitative study of the co-evolution of routines has been proposed to investigate possible patterns of co-evolution. Third, a multi-level case study of the relationships between a strategic PMO and lower-level tactical PMOs will be conducted in order to better understand the dynamic impact of the various routine elements and levels on the sequences of co-evolution. Together, these studies will contribute to strengthen and generalize the conceptual framework and propositions.

Finally, we suggest that this research approach can be applied to other PMO/organizational context and systems interplay and could lead to advance our understanding of project organizing.

## Conflict of interest statement

None.

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