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RESEARCH PAPER

Navigating the Landscape of Organizational Process Mining Setups

A Taxonomy Approach

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Abstract Process mining (PM) technology evolves around the analysis, design, implementation, and ongoing improvement of business processes. While it has experienced a lot of attention and significant technological advancements, contributions to the field have mostly revolved around technical matters, neglecting managerial and organizational aspects. Thus, researchers have called for a more holistic view of the application and adoption of PM in enterprises. To address this gap, this paper presents a taxonomy for organizational PM setups. Its applicability and usefulness are shown in three exemplary cases. This study extends the descriptive knowledge at the intersection of PM and business process management governance, highlighting the unique governance requirements associated with PM that cannot be effectively addressed through traditional governance approaches. The taxonomy provides practitioners with orientation when developing an effective PM setup and helps to characterize existing setups.

Keywords Process mining · Organizational setup · BPM governance · Center of excellence · Taxonomy development

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1 Introduction

Process mining (PM) is a technology that analyzes event logs to extract valuable insights into business processes (van der Aalst and Carmona 2022). By tapping into historical records of process executions, PM has the potential to reveal process behaviors, conformance, process performance, and process improvement opportunities (vom Brocke et al. 2021a).

These PM use cases eventually yield various economic benefits, such as increased customer satisfaction and reduced costs (Grisold et al. 2021). Companies have a strong interest in realizing such benefits: in a Deloitte study, 95% of the surveyed companies stated that they had either already implemented PM or were planning pilot projects (Deloitte 2021). Thus, PM has recently experienced a significant uptake in practice, with increasing numbers of vendors and application domains (Reinkemeyer 2020) and the first-ever analysis of PM tools in the 2023 Gartner Magic Quadrant (Kerremans et al. 2023).

Laying the foundation for adoption in practice, research in PM is growing rapidly (Thiede et al. 2018; van der Aalst 2020a). Yet, related contributions have mostly revolved around technical matters such as developing and improving algorithms, neglecting the managerial and organizational perspectives on PM (vom Brocke et al. 2021a). Notably, various organizational challenges in establishing effective

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governance structures need to be addressed for successful PM adoption (Martin et al. 2021). As pointed out by vom Brocke et al. (2021a), there is an urgent need to investigate such governance structures at the organizational level. The unclear organizational anchoring of PM poses a significant challenge to practitioners as it involves the strategically aligned and operationally effective placement of PM capabilities within the organizational hierarchy (Martin et al. 2021).

So far, little effort has gone into understanding how PM can be integrated into an organization's structures. For instance, the application of PM has been investigated regarding the special demands of individual use cases (e.g., Yang and Su 2014), individual organizations (Reinkemeyer 2020), or specific industries such as healthcare (Rojas et al. 2016). However, we still lack a holistic understanding of PM application in enterprises, so many companies struggle with finding an appropriate PM setup, leaving the technology's potential untapped (Martin et al. 2021).

While research into Business Process Management (BPM) governance – which is considered a critical success factor in BPM (Kerpedzhiev et al. 2021; Rosemann and Brocke 2015) – provides a starting point for understanding the application of PM, it falls short in addressing PM's unique needs, such as its highly data-drivenness as well as its specialized techniques and methods, which differ from traditional BPM (van der Aalst et al. 2012). Thus, integrating PM into a company's organizational structure requires distinct structures, roles, and metrics, which the existing research into BPM governance and related fields cannot fully capture. Further, PM setups exhibit substantial variability owing to the diverse organizational characteristics and contextual factors that influence their design, implementation, and adoption (Reinkemeyer et al. 2022). As a result, there is no unified approach but rather a vast array of possible PM setups for organizations (Reinkemeyer et al. 2022). Research has not yet systematically compiled these setups, so it is unclear which factors should be considered when integrating PM into an organization's structure (Martin et al. 2021). To address this research gap and this need in practice, we respond to calls in the literature (vom Brocke et al. 2021a) for a better understanding of PM's organizational foundations and thus investigate the following research question: *What are the characteristics of organizational PM setups?*

To answer this question, we develop a taxonomy for organizational PM setups following the methods of Nickerson et al. (2013) and Kundisch et al. (2021). Taxonomies organize complex information into structured categories, enabling initial theory development (Nickerson et al. 2013) and providing a clear framework for practitioners and researchers (Fabri et al. 2023). We chose this method for its suitability in the exploratory stage of our research and its frequent use in information systems research (Kundisch et al. 2021). To develop the taxonomy, we built on a survey with 214 PM adopters, drew from justificatory knowledge in PM, BPM, and organizational science literature, and interviewed 15 practitioners. After developing the taxonomy, we evaluated it through a threefold assessment, including in-depth interviews, a survey, and three exemplary application cases.

We contribute to the descriptive knowledge of the organizational stream of PM, providing insights into PM implementation in organizations, offering a comprehensive understanding of PM setups and decision-making factors, and enabling future research to expand in various directions and build on this.

The remainder of this paper proceeds as follows. In Sect. 2, we introduce the fundamentals of PM and BPM governance and then outline our research design in Sect. 3. In Sect. 4, we present the taxonomy of organizational PM setups, followed by the application and evaluation based on real-world objects in Sect. 5. We then discuss the implications and limitations of our research in Sect. 6. Finally, we summarize our findings and provide an outlook on future research in Sect. 7.

2 Theoretical Background

2.1 Process Mining

PM technology has emerged at the intersection of process science and data science (van der Aalst 2016; vom Brocke et al. 2021b). It leverages digital footprints left by process steps in event logs within an organization's IT systems (van der Aalst et al. 2012). The technology analyzes event logs both retrospectively (e.g., to identify bottlenecks in the process) and predictively (e.g., to forecast the remaining duration of a process instance during execution) (van der Aalst and Carmona 2022). PM is strongly intertwined with other advanced process technologies. For instance, *robotic process automation* (RPA) is used to automate tasks and close execution gaps based on insights gained from PM (Hofmann et al. 2020; van der Aalst et al. 2018). *Task mining* can be understood as PM based on user interaction data with digital systems, including mouse clicks and screen activities (van der Aalst et al. 2020b). As such, we understand PM as an umbrella term for a set of advanced technologies leveraging event data, thus enabling insights into the various operations of companies, ranging from end-to-end processes to individual activities (Hofmann et al. 2020; van der Aalst 2016, 2020b; van der Aalst et al. 2018). The insights enabled by PM are valuable since they help identify process deviations, uncover wasteful resource utilization (e.g., time, costs, or personnel), or identify

process inefficiencies (Martin 2021). These findings allow for targeted process improvements with various economic benefits such as cost reductions, time savings, and increased customer satisfaction (Grisold et al. 2021; van Dun et al. 2023).

Research on the managerial and organizational aspects of PM has mainly relied on case studies (Martin et al. 2021). For instance, Andrews et al. (2020) explored PM's use in analyzing patient transport pathways after traffic accidents, highlighting key findings and lessons learned. Reinkemeyer (2020) compiled 12 successful PM implementations, detailing their impact on specific processes and organizational implications. Case studies have also been analyzed to understand PM applications on an industry level. Rojas et al. (2016) analyzed 74 case studies in healthcare, highlighting the necessity of adapting PM to the specific industry context, suggesting integration into process-aware hospital information systems as one strategy.

Besides case study research, there is a body of literature on PM's application in various organizational settings. Grisold et al. (2021) conducted a focus group study on practitioners' requirements and expectations of PM, highlighting the importance of considering organizational and managerial implications, as well as leadership and governance factors. Similarly, Martin et al. (2021) conducted a Delphi study, identifying challenges and opportunities for PM in organizations that require future research, such as a lack of clear guidance and organizational alignment in PM implementation efforts (Martin et al. 2021).

In practice, *centers of excellence* (CoEs) are commonly used to describe PM setups (Reinkemeyer et al. 2022). They oversee the organization-wide integration of PM, providing services like steering use cases and offering data expertise (Lillig 2020). Despite being a frequently applied organizational setup (Balint et al. 2020; Lechner 2020; Lillig 2020; Reinkemeyer et al. 2022), CoEs are just one possible PM setup and are not clearly defined (Reinkemeyer et al. 2022). Given the lack of a universal definition and understanding of a CoE, we introduce the concept of a *PM unit* as a broad term to describe the range of all possible PM setups, including a CoE. A PM unit is the organizational entity responsible for conducting PM services, allowing for various organizational characteristics and structures tailored to a firm's specific needs and context. The PM unit may span different teams or business units, depending on where the individuals in the PM unit are located in the organization. It enables the organization to leverage PM techniques and tools effectively, driving insights, process improvement, and informed decision-making.

2.2 Business Process Management Governance

To integrate PM into an organization's structure, we draw on knowledge from BPM governance since PM augments from BPM as a technology that requires reliable event logs for analysis (van der Aalst 2016). BPM governance, as part of BPM, refers to the introduction of roles, structures, and metrics. It is considered a BPM success factor, as the introduction of BPM governance elements is a necessary foundation for the execution of BPM activities (Kerpedzhiev et al. 2021; Rosemann and Brocke 2015; Spanyi 2015). BPM governance enables organizations to properly define an organizational setup for BPM, which helps to clarify responsibilities such as business process owners who are accountable for a whole business process, covering areas such as planning, process performance management, and stakeholder management (Danilova 2019). Governance in BPM can be implemented at the process level (Markus and Jacobson 2015) or the organizational level (Rosemann and Brocke 2015).

The introduction of PM in an organization affects governance structures and challenges existing governance models in BPM (vom Brocke et al. 2021a). PM transforms the work on processes by shifting the focus from traditional tasks such as process modeling to real-time knowledge generation and decision-making for process improvement (vom Brocke et al. 2021a). This transformation also affects the roles and responsibilities in a PM unit. Since existing BPM governance models and approaches focus on tasks of the traditional BPM activities lifecycle (de Boer et al. 2015), they do not address the changes in structures and roles that arise with the introduction of PM. First approaches in the BPM literature have covered single elements of governance in PM, such as data governance (Goel et al. 2021), or case studies that described organizational anchoring, such as the introduction of CoEs (Balint et al. 2020; Lillig 2020), but have not yet taken a holistic perspective on the governance structures in PM. One of the pressing issues in PM is to investigate these governance structures at an organizational level (vom Brocke et al. 2021a). A well-defined governance structure is essential for PM since it properly attributes responsibilities among units and teams, ensuring efficient collaboration between the PM team and, for instance, operations management (Jansen 2020).

Owing to the lack of a comprehensive conceptualization of governance structures in PM, we draw on justificatory knowledge of BPM governance (cf. Section 3 and Appendix B; appendices are available via http://link.springer.com). In the following, we acknowledge seminal contributions from the BPM governance literature that have shaped our taxonomy. While not all concepts were adopted verbatim, each contributed valuable insights that

informed our discussions. For instance, Rosemann (2015) describes fifteen distinct services of a BPM CoE, including activities such as change management or governance. Fischer et al. (2020) report on adopting BPM in the context of digital transformation and highlight the impact of (de)-centralization on company operations. Nqampoyi et al. (2016) investigate the factors influencing the effectiveness of BPM CoEs. For instance, they provide insights on team structures, reporting lines, and role allocation. Harmon (2016) showcases the heterogeneity of organizational anchoring while demonstrating the widespread support from external parties in BPM. Studies by Santana et al. (2011) and Valença et al. (2013) underscore the importance of internal leadership and executive sponsorship by investigating BPM governance in the context of public organizations. The planning model proposed by Lehnert et al. (2016) provides a systematic approach to project prioritization. For instance, they state that funding for BPM projects can originate from multiple budgets. Lastly, the BPM capability framework by Kerpedzhiev et al. (2021) showcases the relevance of process data governance, such as data ownership structures. Similarly, their updated capabilities on methods and IT illustrate the importance of tool ownership in BPM.

3 Research Design

3.1 Taxonomy Development

To compile organizational characteristics for PM setups, we developed and evaluated a taxonomy over four iterations, drawing on the taxonomy development methods of Nickerson et al. (2013) and the updated version as per Kundisch et al. (2021). As a system "[…] of groupings that are derived conceptually or empirically" (Nickerson et al. 2013, p. 338), a taxonomy allows one to conceptualize a phenomenon in terms of dimensions and characteristics and serves as a theory for analyzing (Gregor 2006; Kundisch et al. 2021). As part of theory-building, some studies view taxonomy development from the perspective of theories such as configuration theory (El Sawy et al. 2010; Meyer et al. 1993). Configuration theory applies a holistic and systemic perspective that views phenomena in organizations as falling into coherent patterns as part of a collection of possible configurations (Fiss 2007; Meyer et al. 1993). Studies that apply configuration theory in BPM, for instance, measure a configuration's specific outcome, such as the degree of *business process orientation*, and develop archetypes based on the developed taxonomy (van Looy et al. 2022). While configuration theory provides a valid perspective on organizational PM setups as the phenomenon studied in this work, we developed our taxonomy without applying the configuration perspective since we focused on an initial exploration of organizational PM setups instead of empirically derived archetypes. Nonetheless, we refer to configuration theory as a foundation for future research in our theoretical implications.

In IS research, Nickerson et al.'s (2013) taxonomy development is a fundamental method widely applied in the literature (Kundisch et al. 2021). Kundisch et al. (2021) integrated and extended Nickerson et al.'s (2013) method by adding structured guidance between steps and additional phases for evaluation. Figure 1 presents the taxonomy development approach and how we applied it.

Following Kundisch et al. (2021), we first defined the taxonomy's target group and its intended purpose. As stated, we investigate organizational PM setups to lay a theoretical groundwork in the organizational domain for PM and provide practitioners with an overview of and orientation regarding possible PM setups. As for contextual factors from an organizational perspective (vom Brocke et al. 2015), the taxonomy targets large organizations at any level of PM maturity. Its application transcends specific industries. We expect the taxonomy to be applied by individuals responsible for overseeing PM initiatives, such as Heads of PM.

For the development of a taxonomy, a meta-characteristic serves as a basis to determine the inclusion of characteristics, each logically derived from the meta-characteristic (Nickerson et al. 2013). In our study, we define *characteristics of organizational PM setups* as meta-characteristic. Regarding the subjective ending conditions of the taxonomy development process, we followed Nickerson et al.'s (2013) recommendation and opted for concise, robust, comprehensive, extendible, and explanatory as these characteristics form the necessary conditions for a taxonomy to be useful by providing a strong foundation for descriptive evaluations. Concerning the objective ending conditions of the taxonomy development process, we opted for three (Nickerson et al. 2013): every dimension is unique and not repeated; every characteristic is unique in its dimension; no new dimensions or characteristics were added in the last iteration. These were chosen to ensure uniqueness and stability within the taxonomy structure. By specifying that each dimension must be unique and non-repetitive, we wanted to avoid redundancy and maintain a clear conceptual distinction between the different aspects of the taxonomy. Ensuring that each characteristic is unique within its dimension further reinforces this by preventing overlap within the dimensions. Finally, the condition that no new dimensions or characteristics were added in the last iteration indicates the taxonomy's maturity and completeness, suggesting that it has reached a point of sufficient depth and detail to represent the domain in question comprehensively.

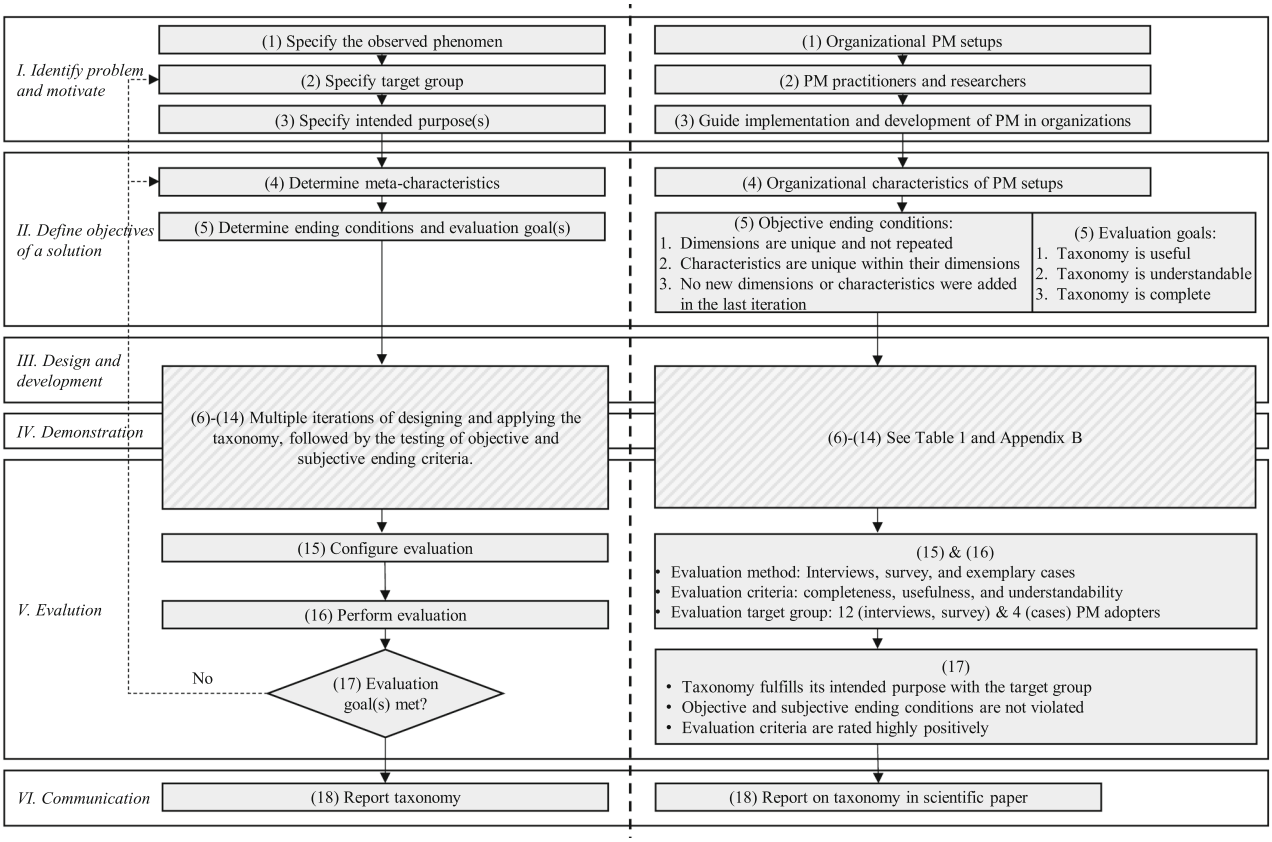

Fig. 1 Taxonomy development approach according to Kundisch et al. (2021)

We opted for an E2C (empirical-to-conceptual) iteration as the starting point of taxonomy development. While we initially reviewed the literature on governance in PM, owing to limited conceptual knowledge and very few approaches that specifically address governance structures for PM, we followed Nickerson et al.'s (2013) recommendation to start with an E2C iteration. E2C iterations are characterized by starting with empirical evidence, identifying patterns, and abstracting them into broader concepts, hence creating a conceptual understanding based on real-world objects. An overview of all taxonomy development iterations can be found in Table 1.

For the first set of dimensions and characteristics in **iteration 1 (E2C)**, we drew on knowledge from an international study of PM CoEs conducted among 214 organizations from multiple industries and regions with different approaches and maturity levels in their PM journeys (Reinkemeyer et al. 2022). Thus, we analyzed organizational aspects such as the operating models, organizational setups, roles, responsibilities, value propositions, and budgeting. Although these insights were mainly based on CoEs as one possible organizational PM setup, these findings gave us valuable guidance on which dimensions to consider when introducing a PM setup. With the first version of our taxonomy, we assessed the objective ending conditions of our taxonomy development. Since new dimensions and characteristics were added in this iteration, we continued our taxonomy development.

In **iteration 2 (E2C)**, we continued with another E2C iteration since we sought to gain more empirical insights into PM setups after developing a meaningful set of dimensions that can serve as a basis for interviews. We conducted 15 semi-structured interviews (Myers and Newman 2007). Table 2 provides an overview of our interview partners. We opted for purposive sampling (Etikan 2016) of PM experts in our professional networks, choosing organizations that reflect various industries and PM adoption levels to gain insights from adopters, vendors, and consultants to capture the various available PM setups. Thus, we ensured comprehensive and in-depth observation of PM setups in organizations. We developed a questionnaire (cf. Appendix D) based on version 1 of our taxonomy. At least two authors were present in every interview. On average, each interview lasted around 45 min. All interviews were conducted online via Microsoft Teams. Following Myers and Newman (2007), we started each interview by outlining our research topic and objective. We then followed our questionnaire (Appendix D), asking the interviewees about their current PM setups and how specific components, such as roles, are determined. Since

Table 1 Overview of iterations

It	C2E/ E2C	Real-world objects	Major activities	Major changes	Violated ending conditions
1	E2C	214	Analysis of international study of PM CoEs (Reinkemeyer et al. 2022)	Development of first dimensions and characteristics	Objective ending condition violated: dimensions and characteristics were added in the last iteration
2	E2C	15 objects derived through interviews	Semi-structured interviews with PM consultants, vendors, and adopters	Merging of dimensions	Objective ending condition violated: dimensions and characteristics were added in the last iteration
3	C2E	15 objects used for re-evaluation	Literature review	Added layers and consistency checks of the characteristics and dimensions	Subjective ending condition violated: robustness
4	E2C	Eight objects used for re-evaluation; four new objects used for evaluation	Semi-structured interviews and survey with PM consultants, vendors, and adopters	Restructured layers and adjusted characters and guiding questions for improved clarity	–

we conducted semi-structured interviews, we allowed for additional questions to be asked if, for instance, an interviewee raised a topic not included in the interview questionnaire. After all 15 interviews, selective coding was used (Wolfswinkel et al. 2013) to aggregate our findings at the levels of characteristics and dimensions. We then discussed our findings and compared them to our initial taxonomy version. After this iteration, we added dimensions, such as the external perspective for organizations (e.g., external support). A third iteration was needed since we had added dimensions and characteristics in iteration 2, violating an objective ending condition. As we repeatedly found similar themes and no new conceptual categories emerged from the interview data after a certain point indicating theoretical saturation (Corbin and Strauss 2008), we pursued a C2E (conceptual-to-empirical) iteration. In C2E iterations, concepts are proposed without examining actual objects but using existing scientific foundations and personal experiences. Afterwards, the proposed concepts are applied to real-world observations to assess their appropriateness.123456

In **iteration 3 (C2E)**, we conducted a literature review to substantiate further and, if necessary, extend our current taxonomy version. For this review, we drew on the PM and BPM governance literature and selected studies from organizational science (Vithayathil and Choudhary 2022). We added layers and guiding questions, enriching certain dimensions with further references. Although no dimensions and characteristics were added in this iteration, and thus no further objective ending condition was violated (Kundisch et al. 2021), we considered the subjective ending conditions *comprehensiveness* and *robustness* to be violated, thus requiring a fourth iteration. According to Nickerson et al. (2013), a *comprehensive* and *robust* taxonomy can classify all known objects and can clearly differentiate between the objects of interest. We noticed ambiguity in the naming of characteristics, which caused discussions among the authors. Thus, it would likely also hinder users from correctly classifying their PM setup and consequently have a negative effect on the perceived usefulness. Hence, we concluded that the taxonomy was not *comprehensive* and *robust* enough, thereby violating two subjective ending conditions and necessitating another iteration of taxonomy development.

In **iteration 4 (E2C)**, we conducted 15 evaluation interviews, held a workshop among all authors and validated our improvement suggestions per the feedback received. Thereby, we drew back on our findings from all previous iterations to check our taxonomy for robustness. We found that some terms for characteristics needed to be adjusted to better reflect practitioners' day-to-day work and terminology. As applicability by organizations was a key goal, we revised the taxonomy to make it easy to apply by both researchers and practitioners. Given the addition of one characteristic as part of this, another iteration would have been required. However, since we had adjusted the taxonomy only slightly, we instead decided to share the refined version with the experts, highlighting the modifications. As all experts unanimously approved this revised version, with no further requested changes, the authors agreed that all objective and subjective ending conditions were practically met, and that the taxonomy development was complete. In Appendix B, we provide detailed insights into the individual adjustments, the rationale for our design decisions, the data basis, and preliminary versions of our taxonomy for all iterations.

3.2 Evaluation and Application

After the taxonomy was developed, we evaluated it to ensure the transferability and applicability of our results (Kundisch et al. 2021). Our evaluation activities were

Table 2 Experts involved in the taxonomy development and evaluation

ID	Sector	Role	PM experience *(years)*	Company size *(rounded)*	Geographicallocation**	Industry	Involved in			
							Iteration 2	Eval 1	Eval 2	Eval 3
I1	Consultancy	Manager	6	350,000	United States	Not specialized*	✔			
I2	Consultancy	Head of Delivery	5	50	Europe	Not specialized*	✔	✔	✔	
I3	Adopter	Head of PM	9	105,000	Denmark	Logistics	✔	✔	✔	
I4	Adopter	Head of PM	2	1,000	Germany	Utilities	✔			
I5	Adopter	PM Lead Expert	6	60,000	Germany	Pharma	✔			
I6	Vendor	Senior Manager	8	3,000	Europe	Banking, Insurance	✔	✔	✔	
I7	Vendor	Senior Consultant	6	100,000	Europe	Not specialized*	✔	✔	✔	
I8	Adopter	Manager	5	110,000	Europe	Logistics	✔			
I9	Consultancy	Manager	6	2,500	Europe	Not specialized*	✔			
I10	Consultancy	Senior Consultant	4	300,000	Germany	Manufacturing	✔	✔	✔	
I11	Vendor	Director	8	3,000	Europe	Logistics	✔			
I12	Vendor	Director	4	3,000	United Statues	Life sciences	✔	✔	✔	
I13	Vendor	Head of Customer Success	4	100,000	Europe	Not specialized*	✔	✔	✔	
I14	Vendor	Senior Director	6	3,000	United States	Not specialized*	✔			
I15	Adopter	Manager	7	100,000	Europe	Manufacturing	✔	✔	✔	
I16	Vendor	Head of Org. Transformation	17	3,000	International	Not specialized*		✔	✔	
I17	Adopter	Lead Digitalization	3	35,000	Germany	Logistics		✔	✔	
I18	Adopter	Head of Process Intelligence	9	8,000	Germany	Pharma		✔	✔	
I19	Adopter	Lead Consultant	7	160,000	International	Insurance		✔	✔	
I20	Adopter	Head of PM	2	25,000	Spain	Oil & Gas				✔
I21	Adopter	Senior Manager	6	100,000	Europe	Logistics				✔
I22	Adopter	Head of CoE	6	2,500	Germany	Utilities				✔
I23	Adopter	Manager	2	2,500	Germany	Utilities				✔
Average / Sum			∅ **11.5**				**Σ15**	**Σ12**	**Σ12**	**Σ4**

Eval 1: Evaluation interviews; Eval 2: Evaluation survey; Eval 3: Additional in-depth interviews that serve as the foundation for three exemplary cases we present later. I22 and I23 are from the same organization (i.e., one case)

*Not specialized indicates that the individual may work with clients from various industries

**For consultants and experts working at vendors, we included the geographical location of their respective clients

threefold: First, we conducted semi-structured interviews (Myers and Newman 2007) with twelve experts for in-depth qualitative feedback. Additionally, we carried out an anonymous online survey with the same experts for supplementary quantitative insights. As for applying our taxonomy, we conducted four additional in-depth interviews with PM adopters. All three activities are considered

relevant evaluation methods for taxonomies (Szopinski et al. 2019).

For the evaluation interviews, we contacted the 15 interviewees from iteration 2, ensuring accurate reflection of their insights into the taxonomy. Out of these, eight experts agreed to participate in the evaluation interviews (I2, I3, I6, I7, I10, I12, I13, I15). The remaining seven either did not respond, were unavailable during the interview timeframe, or were no longer engaged with PM. Following Kundisch et al.'s (2021) recommendation, we also introduced four new interview partners (I16-I20) who were not part of the initial taxonomy development. After conducting twelve interviews overall, we concluded the evaluation, as the last three interviews did not yield new insights, indicating saturation (Saunders et al. 2018). In line with the expert selection in iteration 2, our sample selection aimed for diversity, encompassing adopters, consultants, and vendors (cf. Table 2). Each 30 min interview began with an explanation of the research method, emphasizing its descriptive character, purpose, and the concept of a PM unit. We clarified that we envisioned the taxonomy application for each PM unit separately and outlined its overarching structure with layers, dimensions, characteristics, guiding questions, and the meaning of exclusive and non-exclusive dimensions. Dimension by dimension, we then outlined each characteristic with examples, encouraging experts to identify ambiguities, omissions, or elements they deemed important or relevant. Most experts assessed their own setups (adopters) or their customers' setups (vendors, consultants) to evaluate these aspects and the taxonomy's applicability. All interviews were recorded and transcribed for analysis.

Following the interviews, all twelve experts also participated in an anonymous survey, rating the taxonomy for understandability, completeness, and usefulness (for definitions of these terms, we refer to Fig. 2). The survey aimed to complement the qualitative insights gathered dimension-by-dimension with an overall quantitative rating. Based on the input from the interviews and the survey, the taxonomy underwent refinement (cf. Appendix A), resulting in our final taxonomy for organizational PM setups.

To further substantiate our findings, we conducted four semi-structured in-depth interviews with adopters (I20-I23) who did not participate in the initial iteration 2 interviews or the evaluation interviews. These interviews provided initial insights into the application of the taxonomy and are presented as three individual exemplary cases (two participants are from the same organization, i.e., one case) in Sect. 5.2 (Kundisch et al. 2021; Limaj and Bernroider 2022).

4 Taxonomy of Organizational Process Mining Setups

We now present our multilayer taxonomy of organizational PM setups based on the meta-characteristic *organizational characteristics of PM setups* with its layers, dimensions, and characteristics (cf. Table 3). The taxonomy features 12 dimensions with related characteristics structured along the layers: *governance and structure*, *operationalization and scope, funding and planning*, and *roles and responsibilities*. The layers were chosen by the authors, backed by existing concepts from the literature, none of which we deemed suitable for direct mapping (Anagnoste 2018; Fuchs et al. 2019; Rosemann and Brocke 2015). Table 3 indicates whether a dimension is exclusive (*E*) or non-exclusive (*N*), with E requiring the selection of a single characteristic and N allowing for selecting multiple characteristics when instantiating the taxonomy through the description of a specific PM setup. To support our taxonomy's evaluation goal of understandability, we complemented each dimension with a guiding question. The taxonomy should be applied to each PM unit individually, especially in large organizations with complex or partially independent PM setups across different parts of the organization. Additionally, each layer should be evaluated independently, and all dimensions are meant to be assessed at the PM unit level rather than on a project-specific basis. In the following, we present the characteristics and dimensions in detail, with justificatory references and exemplary quotes from the interviews.

5 Governance and Structure

The *governance and structure* layer (cf., Table 4) includes three dimensions that determine *where* and *how* a PM unit is located and organized in a company: the *degree of centralization*, *organizational anchoring*, and *institutionalization* of PM activities. By considering the dimensions within this layer, organizations can establish a setup that fits their organizational structures and requirements.

The *degree of centralization* refers to how the team engaged in PM is distributed across the organization. A *centralized* structure indicates that all PM-related activities are gathered under one central team or department. In a *decentralized* structure, PM responsibilities are fully distributed across departments or teams without a central unit. A *hybrid* structure combines a central unit with several decentralized teams. For instance, this might involve one centralized team focusing on overarching strategic topics alongside smaller teams or hubs within different business units closely aligned with related business teams and processes.

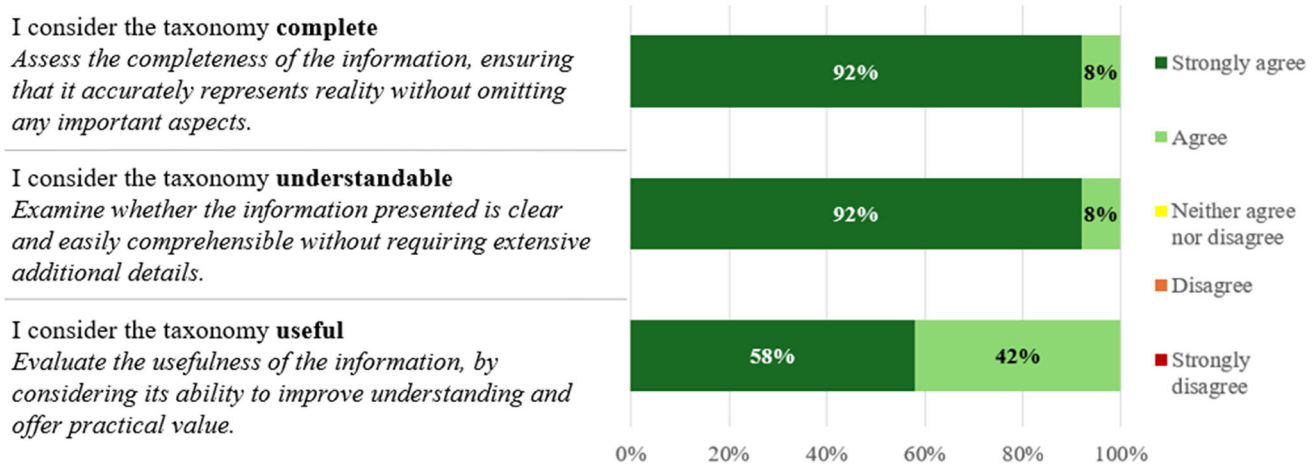

Fig. 2 Results of taxonomy evaluation by process mining experts for completeness, usefulness, and comprehensibility

Anchoring describes where the PM unit is located in the organization. While an *IT*-anchored design anchors the PM team in the IT department, a *business*-anchored design anchors it in a business department. In a *shared services*-anchored structure, the PM team is situated in a shared services department or division, such as Operations. An *executive-level*-anchored structure anchors the PM team at the executive level.

Institutionalization describes how the group of persons primarily practicing and engaging in PM is organized. This may include the creation of a *standalone CoE or department*, such as a PM CoE (Rosemann 2015), the integration of PM experts *within an existing department* (e.g., process management department) (e.g., Harmon 2016), the *integration within an existing CoE* that comprises several technologies (e.g., an RPA or automation CoE) or the distribution *across different functions and teams*.

6 Operationalization and Scope

The *operationalization and scope* layer (cf., Table 5) consists of two dimensions crucial for shaping the value proposition of the PM unit and its operationalization. These dimensions influence the scope of PM activities and address how PM projects are prioritized to maximize value creation. By determining these dimensions, the PM unit can streamline operations and facilitate recruiting personnel tailored to the activities.

Key activities describe the scope of activities that can form part of the value proposition of a PM unit and closely align with the stages of the PM project methodology by van Eck et al. (2015). *Demand generation and assessment* aims to increase PM awareness within an organization by hosting roadshows to showcase the technology and identify new potential use cases, including assessing their suitability for PM. *Data science and engineering* involve tasks such as identifying source systems, extracting and cleaning data, building data models, and creating and analyzing process models in PM software to identify process improvement potentials. *Project management* entails the management of PM projects from initiation over implementation to value creation and scaling. *Governance and steering* encompass defining and evolving the organizational setup and strategic direction of the PM unit, establishing a standardized PM methodology framework, engaging with senior management to report on KPIs, and securing a budget for PM activities. *Change and community management* involves providing training and enablement within and outside the PM unit, as well as building an internal PM community for support and knowledge exchange, facilitated through activities like Lunch & Learn sessions or PM days with presentations. Lastly, *value management and scaling* entails establishing a shared understanding and definition of value (Badakhshan et al. 2022), implementing process improvements to realize value, measuring value, and scaling PM projects to similar processes in other business units or expanding to upstream and downstream processes. In addition to deciding which activities to involve in the value proposition of the PM unit, a RACI-Matrix can help to determine the level of responsibility, e.g., classifying activities as leading or supporting activities (I3).

Prioritization of projects involves assessing and ranking upcoming or potential projects, mainly when competing for resources. In less structured instances, prioritization tends to be *short-term and* ad hoc. In more structured settings with a *mid-term pipeline*, projects are organized sequentially and dynamically, allowing for flexibility in prioritization as new projects emerge or circumstances change while still maintaining a structured framework for planning and execution. *Long-term roadmaps* plan projects far in

Table 3 Taxonomy of organizational process mining structures

Layer	Dimension	Characteristic						E/N*	Guiding questions
Governance and structure	*Degree of centralization*	Centralized	Hybrid		Decentralized			E	What is your PM unit's degree of centralization?
	Anchoring	IT	Business	Shared services	Executive level			N	Where in the organization is your PM unit anchored?
	Institution-alization	Integrated in a (business) department	Integrated in a CoE	Cross-functional organization	Standalone department / CoE			N	How is your PM unit institutionalized?
Operationalization and scope	*Key activities*	Demand generation and assessment	Data science and engineering	Project management	Governance and steering	Change and community management	Value management and scaling	N	Which activities are part of your PM unit's value proposition?
	Prioritization of projects	Long-term roadmap		Mid-term pipeline		Short-term ad hoc		N	How are incoming projects prioritized by your PM unit?
Funding and Planning	*Budgeting*	Global		Project-based	Process-based	Per department		N	Where does the financial budget for PM activities originate?
	Internal cost management	Profit center		Hybrid		Cost center		E	What is your PM unit's financial setup?
Roles and responsibilities	*Role allocation*	Based on (business) department		Based on key activities	Based on end-to-end processes	Flexible		N	How are the roles in/of the PM unit allocated?
	Internal leadership	PM lead		Executive sponsor		Champion		N	Which PM leadership roles exist in your organization?
	*External support***	Vendor		Consultancy		None		N	Which external parties provide services for your PM activities?
	Data ownership	IT		Business		PM unit		N	Who has primary ownership of the source data used in PM activities?
	Tool ownership	IT		Business		PM unit		N	Who has primary ownership of the tools used in PM activities?

*E = exclusive, N = non-exclusive

**Selecting both "None" and another option simultaneously is not applicable

Table 4 Quotes, interviews, and justificatory references for the governance and structure layer

Dimension	Exemplary quotes	Interview references	Justificatory references
Degree of centralization	*"There is a central department that is responsible for everything to do with process mining […] and then there are […] individual people in the business departments."* **(I8)**	I1, I2, I3, I4, I6, I7, I8, I9, I10, I11, I12; I13	Christensen and Knudsen (2010); Joseph, Baumann, Burton, and Srikanth (2018)
Anchoring	*"[The process mining unit] is directly at the C-level. Our boss is the Chief Transformation Officer […], so there's basically only the board above."* **(I3)**	I3, I5, I6, I7, I8, I9, I11, I12, I13, I14, I15	de Boer et al. (2015); vom Brocke et al. (2014)
Institutionalization	*"Most of our customers already have a CoE, and it is usually in a separate department."* **(I9)**	I2, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13, I14	Harmon (2016); Rosemann (2015)

Table 5 Quotes, interviews, and justificatory references for the strategy and scope layer

Dimension	Exemplary quotes	Interview references	Justificatory references
Key activities	*"We carry out process mining projects across the entire spectrum, from identifying candidates to continuous monitoring."* **(I4)**	I1, I2, I3, I4, I5, I6, I7, I8, I9, I11, I13, I14, I15	Reinkemeyer (2020); Rosemann and vom Brocke (2015); (van Eck et al. 2015)
	"We start with detecting needs […]. Then we go from piloting to enriching these needs a little, and then again to the entire deliveries. […] We also do data analysis […], data validation, […] and value generation. **(I6)**		
Prioritization of projects	*"I would love to say that there are roadmaps, but there usually aren't. For us, at least, it's usually more demand driven."* **(I2)**	I1, I2, I3, I4, I5, I8, I11, I12	Archer and Ghasemzadeh (1999); Stettina and Hörz (2015); Jafarzadeh et al. (2022)
	"We have an internal process with […] a weekly or bi-weekly prioritization meeting […], where the backlog that comes in from the business is looked at. And then the team prioritizes what will be implemented in the next few weeks." **(I1)**		

advance, with limited flexibility. Combinations of these characteristics, such as planning with a long-term roadmap while keeping limited resources available to address short-term ad hoc needs flexibly, are possible. In a unique case reported by one expert (I3), the roadmap and prioritization were solely defined by the respective business team, with the PM unit providing support solely for the technical implementation.

7 Funding and planning

The *funding and planning* layer (cf., Table 6) comprises two dimensions, defining the financial funding and allocation of costs for PM activities within an organization. Organizations can ensure effective budgeting and financing of their PM activities by addressing these dimensions.

Budgeting describes the origin of the financial budget for PM. A *global budget* is a comprehensive budget for all PM projects, providing flexibility in financial planning and control. A *project-based* budget pertains to larger projects (e.g., entailing the roll-out of PM to several processes typically in the same business area) or specific initiatives (e.g., operational excellence or digitalization) (I3, I6, I12). *Process-based* budgets are requested and allocated for each new process being analyzed (e.g., Purchase-to-Pay). *Departmental* budgets are assigned to specific departments, allowing them to decide how to distribute budgets among their processes and projects. In a unique case reported by an expert (I10), an individual reallocated budgets from various other projects to fund PM activities without having a dedicated budget.

Internal cost management involves choosing between a *profit center*, *a cost center,* or a *hybrid* structure (Vithayathil and Choudhary 2022); Acemoglu et al. (2007). If the PM unit operates as a *profit center*, costs (e.g., personnel) related to services provided by the PM unit (e.g., setting up a data model) are allocated and charged to the corresponding departments or divisions. In the case of a *cost center,* the PM unit is not responsible for generating revenue and provides services to (internal) departments without formal invoicing. The PM unit may cover PM

Table 6 Quotes, interviews, and justificatory references for the funding and planning layer

Dimension	Exemplary quotes	Interview references	Justificatory references
Budgeting	*"[…] we have one big pot […] for the complete [process mining] initiative."* **(I5)** *"I have mostly seen […] where new budgets are approved project by project."* **(I1)**	I1, I2, I3, I4, I5, I6, I7, I9, I10, I13, I14, I15	Kirchmer et al. (2013); Lehnert et al. (2016)
Internal cost management	*"You always have to consider who is a cost center and who is a profit center."* **(I6)**	I6, I10	Vithayathil and Choudhary (2022); Acemoglu et al. (2007)

license costs in a *hybrid* structure while consulting services are charged to the business teams (I17). Experts (I3, I16) also noted the possibility of an incubation period, where a PM unit starts as a *cost center* with seed funding, to help establish PM. After a certain period, it transitions into a *profit center* and must self-finance.

8 Roles and Responsibilities

The *roles and responsibilities layer* comprises five dimensions (cf., Table 7), focusing on assigning individuals and teams to specific PM key activities, exploring various leadership roles and support structures, as well as discussing ownership aspects related to source data and the PM tool. This layer facilitates a clear and optimal allocation of roles, responsibilities, and ownership while ensuring support and advocacy for the PM initiative.

Role allocation refers to the assignment of responsibilities for PM activities. This can be done based on various factors, such as specific *departments*, *PM activities*, *end-to-end processes*, or *flexibility*, which is usually demand-driven. Organizations can, for instance, allocate roles focusing on a particular department or a specific PM activity (e.g., process analysis) (Valença et al. 2013). The organization may also choose to allocate roles per end-to-end processes or opt for a flexible allocation approach based on the process type or business unit.

The *internal leadership* dimension describes three internal leadership roles relating to PM adoption: the *PM lead*, typically with managerial responsibilities for a PM unit; the *executive sponsor*, a high-level executive providing strategic guidance and allocating the budget; and the *champion*, a vocal advocate of the technology in a department that often has direct responsibility or even accountability for revenue generation within their areas of responsibility. Multiple individuals can fulfill the roles at the same time, especially the champion. *External support* refers to the nature and extent of external parties that offer services relevant to PM activities, primarily professional services and training. *Vendor* commonly denotes the software licensing entity, while *consultancy* may encompass services provided by organizations or freelancers. In rare cases, organizations collaborate with academia on research projects, particularly when exploring new technological capabilities (I7, I17) or participating in cross-organizational PM communities established for mutual exchange (I13).

Data ownership is a dimension of a PM capability area (Kerpedzhiev et al. 2021), referring to the source data extracted during the execution of a process (e.g., process log files), and describes the locus of ownership in an organization in *IT*, a *business* department, or the *PM unit*.

Similarly, *tool ownership* refers to allocating responsibility for the PM software tool (e.g., contractual negotiations with vendors or user license allocation). It differentiates between *IT*, a *business* function, and the *PM unit*.

9 Evaluation and Application

9.1 Evaluation

We conducted twelve 30 min evaluation interviews to evaluate the taxonomy and collect qualitative feedback on a dimension-by-dimension basis. The feedback we received was largely positive. Participants found the taxonomy helpful, as it allowed them to view organizational PM setups from a broad perspective. They appreciated the clarity and comprehensiveness of the taxonomy as well as its practical applicability. Some suggestions for improvement and enhancement included the need for additional clarification of certain characteristics, exploring the reasons behind different organizational setups, and considering the potential for further research based on the taxonomy. A summary of the comments from the interviews is provided in Table 8. Please refer to Appendix A for a comprehensive list of the experts' suggestions on a dimension-by-dimension basis and their incorporation into the taxonomy.

Following the interviews, we conducted an anonymous online survey among the interviewees to gather additional

Table 7 Quotes, interviews, and justificatory references for the roles and responsibilities layer

Dimension	Exemplary quote	Interview references	Justificatory references
Role allocation	*"[The process experts] are assigned to the […] processes, so they each focus on a global process."* **(I3)**	I1, I2, I3, I4, I5, I6, I13, I14, I15	Santana et al. (2011); Valença et al. (2013)
Internal leadership	*"The most important thing […] is that in addition to pure sponsorship […], someone is needed who actively promotes this topic […]."* **(I8)**	I2, I4, I5, I8, I10, I11, I12, I13, I14, I15	Reinkemeyer (2020); Luftman (2003); Kloppenborg and Tesch (2015)
External support	*"So far, I've seen that support has been sourced externally, […] Either professional service days are bought from the software vendor, or consulting companies deliver the whole thing directly."* **(I7)**	I1, I2, I3, I4, I6, I7, I8, I9, I10, I13, I15	Thong et al. (1994); Ifinedo (2008); Barth and Koch (2019)
Data ownership	*"Ownership generally tends to stay in an extended IT group […] It's very rare that one of the business groups owns it. I've seen some of these instances, but usually it just stays with an extended IT group […] or corporate IT."* **(I12)**	I1, I2, I3, I4, I5, I6, I7, I8, I9, I12, I15	Kerpedzhiev et al. (2021); Martin et al. (2021)
Tool ownership	*"[The tool owner is] usually the business unit that starts with the implementation […] But I've also seen that the tool was operated by an IT department, and then they serve it as a service on demand for the company."* **(I2)**	I2, I3, I4, I6, I9, I10, I11, I12, I13, I15	Kerpedzhiev et al. (2021); Martin et al. (2021)

quantitative feedback. The survey showed the taxonomy and outlined three evaluation criteria: completeness, understandability, and usefulness (Kundisch et al. 2021), each accompanied by a definition to ensure comparability between individual ratings. Participants were asked to assess the taxonomy against these criteria using a five-point Likert scale (from *strongly agree* to *strongly disagree*). The survey results, illustrated in Fig. 2, revealed strong ratings for all criteria. The vast majority rated completeness and understandability as *strongly agree* (92%), with only one expert rating these as *agree* (8%). Usefulness was rated with either *strongly agree* (58%) or *agree* (42%). No responses fell under *neither agree or disagree*, *disagree,* or *strongly disagree*. The slightly lower ratings for usefulness were attributed to the partially generic naming of characteristics in the dimension *key activities*, which, however, was a deliberate design decision to ensure the taxonomy's broad applicability. In response to the feedback, we slightly refined and enhanced the naming where reasonable (cf. Appendix A, Appendix B, Iteration 4). Additionally, one expert (I15) noted that achieving completeness is challenging given the diverse nature of organizational structures and their constant evolution.

Table 8 Summary of comments from the evaluation interviews

Positive remarks	Suggestions for improvement and enhancement
• "Even though it´s purely descriptive, it's a helpful tool for practitioners to view organizational PM setups from a bird-eye perspective and assess their own setup" (I10) • "The taxonomy outlines the landscape very well; I have the feeling that I can categorize all my customer projects very well according to the framework" (I10) • "If I do this for every client that we have and start connecting the dots, I can see some really nice kind of map forming" (I12) • "I have tried to map my customer accounts into it, and it works quite well" (I15) • "It can be very helpful for new Customer Success Managers […] to just see this on a piece of paper and think about what it means for their customers" (I13) • "Having a frame like this helps to not start completely from scratch" (I3)	• "It is probably difficult to integrate everything into this framework. You probably have to go through the framework several times." (I3) • "What would be interesting is to understand why organizations decide for a certain setup and how this relates to company size or a specific industry." (I16) • "I think it will never be complete, but I could work with it." (I15) • At first sight, there was some ambiguity in the "Roles & Responsibilities" Section, e.g., it was unclear what is meant by "Champion" and what "data ownership" refers to. This can, however, easily be clarified with some additional information in the text. (I12)

9.2 Exemplary Cases

In addition to the quantitative assessment, the experts had the opportunity to provide free text comments. They highlighted the taxonomy's understandability and usefulness positively, with one anonymous expert stating, *"The taxonomy is very easy to understand and also very helpful in practice apart from the minor additions (e.g., the addition to demand generation) that I mentioned in the interview."* (*anonymous*). Furthermore, they emphasized its practical use, noting, "*One thing this framework will proactively do is push the PM team to understand the client's org structure, as it is a crucial and important thing to 'know your client.'" (anonymous).* Experts also suggested leveraging the taxonomy as a foundation for future research, stating, *"I can very well imagine that it is an excellent basis for further research questions, e.g., how the degree of maturity of a process mining initiative/CoE affects the classification in the taxonomy. Do we see certain patterns over time?" (anonymous).*

Following the evaluation of the taxonomy, we applied it in three exemplary cases (Kundisch et al. 2021; Limaj and Bernroider 2022). Thus, we sought to showcase the taxonomy's applicability to PM setups in diverse organizational contexts as well as to demonstrate the taxonomy's ability to guide discussions on the rationales for specific PM setups. Drawing on inputs from the interviews during the taxonomy development process (I1, I6, I7, I8, I9, I10, I11, I13, I14), it appeared that organizational PM setups evolve with more processes being analyzed and PM being adopted more broadly in an organization. Thus, we selected three organizations with varying degrees of experience in terms of time since introducing PM, the number of analyzed processes, and the number of active users of the PM tool (cf., Table 9). While not explicitly referring to maturity levels such as those known from process or BPM maturity models (Röglinger et al. 2012), we classified the three organizations according to the abovementioned criteria as beginner, intermediate, or experienced. The *beginner* company has analyzed two processes since introducing PM a year before, with just over ten regular users. The *intermediate* company characterized itself as being in the middle of the adoption spectrum, with five analyzed processes and slightly less than 50 active users. (*"I would say we're in the middle. We're not at the beginning. [But] there are other companies that […] have more maturity than us.")* (I22). The *experienced* company was an early adopter of PM, with more than five years of experience, five analyzed processes, and more than 100 active PM users. We will provide a detailed account of the rationale behind the choice of its organizational PM setup for each of these companies.

9.2.1 Case 1: The Beginner Company

The beginner company is a utility company headquartered in Germany with presences across Europe. Owing to the nature of its services, it generates a large volume of invoices and operates multiple business processes. In response to inefficiencies identified in its processes, it adopted PM in 2022: *"We found that we had a huge amount of manual work and hoped that process mining would help us reduce throughput times and would show where we can shorten or improve process paths."* (I22). It started with a pilot project to improve its accounts payable (AP) process by implementing three use cases, including enhancing discount rates. In 2023, the company expanded its PM adoption to include a pilot project for the purchase-to-pay (P2P) process. Given that the current team operates PM alongside its regular tasks, it plans to professionalize and enlarge its existing PM unit. Further, it intends to extend the application of PM to its country subsidiaries in addition to its Germany headquarters by adding further use cases and expanding existing ones.

Regarding **governance and structure**, the organization currently operates PM through a decentralized setup. The team comprises four individuals who all perform their PM-related tasks in addition to their regular responsibilities in their various teams. The individuals operate cross-functionally and are located and anchored in multiple departments, including IT, purchasing, and the executive level.

Regarding **operationalization and scope**, the decentralized team actively focuses on performing data science and engineering, governance and steering, change and community management, and value management and scaling activities. Although it acknowledges that demand generation and assessment are important tasks, this activity is currently neglected since limited resources prevent the rollout of additional use cases. The PM lead oversees governance and steering as well as change and community management, while one person in the IT organization provides support for data engineering tasks. Two additional people – anchored in IT and the executive level – conduct data science and value management and scaling activities. Process owners in the business departments support the team outside the PM unit's scope by providing process expertise and helping to identify use cases. The team prioritizes upcoming projects based on strategic fit, available resources for implementation, and value realization in a mid-term pipeline.

Regarding **funding and planning**, the team started with a global budget to kickstart and now has a fixed IT budget for software maintenance and licenses for the Germany platform. Personal expenses are sponsored by non-PM budgets, such as a central budget for various IT projects.

Table 9 Information on exemplary process mining adopters

	***Beginner* company**	***Intermediate* company**	***Experienced* company**
Industry	Utilities	Oil and gas	Logistics
Experience with PM (years)	1 year	2 years	6 years
Number of analyzed processes	2	5	5 +
Number of active PM users	10 to 19	30 to 49	> 100
Revenue in 2022	> 2 billion	> 5 billion	> 5 billion
Employees in 2022	~ 2500	~ 25,000	~ 100,000

As a cost center, the team does not charge the business departments for expenses such as personnel.

Regarding **roles and responsibilities**, the team allocates roles based on key activities and end-to-end processes, resulting in specialized individuals for specific tasks within different processes. For instance, one data analyst is dedicated to the AP process and another to the P2P process. Despite its decentralized structure, the team has an official PM lead who resides in the IT organization: *"[Anonymized name] is officially the PM lead, but we act as equals because we are all employees without personnel responsibilities, but with different roles, and there is no official organizational unit such as a PM CoE."* (I23). The CEO is the executive sponsor, and his executive assistant is also a member of the CoE, albeit with limited capacity. The head of purchasing is a business sponsor and has a significant role in supporting the PM technology's further rollout in the purchasing department. Given the current team's limited capacity, it has opted for support from an external consultancy. Ownership of data and tools lies with the IT department. Table 10 illustrates the categorization of the *beginner company* within the taxonomy.

9.2.2 Case 2: The Intermediate Company

The intermediate company is a global player in oil and gas, where firms strive for ongoing operational excellence to maintain their competitive advantage. It adopted PM two years ago by optimizing the management of processes to offer a better, faster, and more efficient service. It started by optimizing its source-to-pay (S2P) process, which has since led to the deployment of four other processes. Despite lacking prior experience in PM technology, the organization had extensive knowledge of the organizational structure of a CoE, having established several other CoEs in previous years: *"We had a lot of experience setting up a CoE, […] because we have nine other CoEs for nine different technologies."* (I20). Its initial approach was to replicate existing setups, with the CoE anchored in IT and a strong emphasis on technology. The organization will extend its PM application to additional processes and business areas in the following years while leveraging the software vendors' latest and advanced capabilities.

Regarding **governance and structure**, the organization has a centralized standalone CoE to manage its PM activities. This approach aligns with its experience in establishing CoEs for other technologies. Initially situated in the IT organization, replicating its experience from different technologies, the CoE was recently shifted to the Shared Services organization, and a new role was created for value realization and framing: *"We thought it would be an improvement to include the value architect role within the CoE […] to expand it with people who think about value and value capture."* (I20). This realignment was a response to the organization's recognition of the need for enhanced support for value framing and realization in its business departments. By relocating the CoE to Shared Services and away from its former technological focus and by creating this new role, the organization ensured that it is closer to the business units and, therefore, better positioned to comprehensively support these departments' value creation and realization objectives.

Regarding **operationalization and scope**, the CoE is responsible for various activities, including demand generation and assessment, data science and engineering, governance and steering, and value management and scaling. In contrast, project management and change and community management typically fall under the responsibility of relevant business departments. Despite the CoE's deployment of several processes, there is currently no defined project prioritization mechanism. The CoE uses a short-term, ad hoc approach to ensure agility and the ability to respond to requests swiftly. Nonetheless, the organization is aware of the need for a clear project prioritization process to optimize PM deployment and align it with the organization's strategic objectives.

Regarding **funding and planning**, the CoE has a global budget for software and licensing and must request a project-based budget for every new PM initiative. As a cost center, the CoE's operations align with the Shared Services organization's overarching strategy.

Regarding **roles and responsibilities**, the CoE assigns roles within the team based solely on key activities (hereby referring to the key activities outlined in the operationalization and scope layer). This approach enables the team to maintain agility by reallocating resources to different

Table 10 Characteristics of the organizational process mining setup of the *beginner company*

Layer	Dimension	Characteristic					
Governance and structure	*Degree of centralization*	Centralized		Hybrid		**Decentralized**	
	Anchoring	**IT**	**Business**	Shared services		**Executive level**	
	Institutionalization	Integrated in a (business) department	Integrated in a CoE	**Cross-functional organization**		Standalone department/CoE	
Operationalization and scope	*Key activities*	Demand generation and assessment	**Data science and engineering**	Project management	**Governance and steering**	**Change and community management**	**Value management and scaling**
	Prioritization of projects	Long-term roadmap		**Mid-term pipeline**		Short-term ad hoc	
Funding and planning	*Internal cost management*	Profit center		Hybrid		**Cost center**	
	Budgeting	Global	**Project-based**		Process-based	Per department	
Roles and responsibilities	*Role allocation*	Based on (business) department	**Based on key activities**		**Based on end-to-end processes**		Flexible
	Internal leadership	**PM lead**		**Executive sponsor**		Champion	
	External support	Vendor		**Consultancy**		None	
	Data ownership	**IT**		Business		PM unit	
	Tool ownership	**IT**		Business		PM unit	

process implementations as needed. The PM lead oversees all PM-related activities and works closely with the managers responsible for other CoEs. The activities are also supported by an executive sponsor and champions in the business departments. The organization relies on its vendor for tasks relating to value management and on external support from a consultancy to cover high demand. The CoE team has full ownership of the data and tools used for PM. This organizational structure facilitates streamlined coordination and management of PM-related activities across the organization. Table 11 illustrates the categorization of the *intermediate company* within the taxonomy.

9.2.3 Case 3: The Experienced Company

The experienced company is a major global player in travel and transportation. Especially for its core processes, operational excellence is crucial to it being competitive, since it enables it to drive cost efficiency, streamline operations, enhance customer satisfaction, and improve overall performance. In recognition of PM's potential benefits, the company was an early adopter of this technology, having introduced it six years ago. The adoption of PM was initiated by a technology champion in a subsidiary's IT organization, followed by an initiative to optimize internal processes. After the successful implementation and increased usage of PM, demand across the other subsidiaries increased. This development was facilitated by the company's matrix structure, which includes centralized areas offering services across all the subsidiaries, making it more practical to centralize the PM unit. Also, the subsidiary lacked the resources and access to manage the function effectively, further emphasizing the benefits of centralization. Thus, two years ago, the PM unit was relocated from the subsidiary to the parent company. The company strives to further roll out the technology to additional subsidiaries to increase overall adoption and improve operational excellence.

Regarding **governance and structure**, the organization operates a hybrid model. It has established a standalone CoE anchored at the executive level, reporting directly to the COO (Chief Operating Officer). The CoE is responsible for coordinating PM initiatives across the organization, including those that occur outside the subsidiaries. Further, several subsidiaries have built their own competencies and smaller teams to drive PM in their areas of responsibility.

Regarding **operationalization and scope**, the central PM unit covers demand generation and assessment as well as overarching governance and steering for PM in the organization: *"Our activities are based on the entire lifecycle of a process mining use case, i.e., we take care of the demand generation, we […] help prioritize in order to then*

Table 11 Characteristics of the organizational process mining setup of the *intermediate company*

Layer	Dimension	Characteristic					
Governance and structure	*Degree of centralization*	**Centralized**		Hybrid		Decentralized	
	Anchoring	IT	Business	**Shared services**		Executive level	
	Institutionalization	Integrated in a (business) department	Integrated in a CoE	Cross-functional organization		**Standalone department/CoE**	
Operationalization and scope	*Key activities*	**Demand generation and assessment**	**Data science and engineering**	Project management	**Governance and steering**	Change and community management	**Value management and scaling**
	Prioritization of projects	Long-term roadmap		Mid-term pipeline		**Short-term ad hoc**	
Funding and planning	*Internal cost management*	Profit center		Hybrid		**Cost center**	
	Budgeting	**Global**	**Project-based**		Process-based	Per department	
Roles and responsibilities	*Role allocation*	Based on (business) department	**Based on key activities**		Based on end-to-end processes	Flexible	
	Internal leadership	**PM lead**		**Executive sponsor**		Champion	
	External support	**Vendor**		**Consultancy**		None	
	Data ownership	IT		Business		**PM unit**	
	Tool ownership	IT		Business		**PM unit**	

implement the use cases with the highest business value or with the shortest time to value […], and we provide partial support with the implementation […] and get involved again regarding value creation." (I21). Departments within the central IT organization manage the commercial topics of license and incident management. The subsidiaries handle project management, data science, engineering tasks, and change and community management. The prioritization of use cases is managed centrally based on available resources within business departments, strategic fit, volume, and value potential: *"Business departments are free to decide on their roadmap if they can lever their own resources without central PM team support. However, if support is needed, they must go through central prioritization due to limited resources available for implementation."* (I21). A mid-term pipeline is created based on these factors and is regularly reviewed and updated.

Regarding **funding and planning**, the necessary budget for the central PM team is provided on a project basis. If support is required, the central PM unit operates as a profit center, and support can be requested and purchased.

Regarding **roles and responsibilities**, roles are allocated based on key activities, i.e., there are specialists for different tasks that require different skill levels. The central PM unit does not have a dedicated manager, and the COO acts as executive sponsor, with several champions in different subsidiaries supporting PM rollout and adoption. Externally, the organization relies on its software vendor's support, particularly for training, value management, and scaling, and on an external consultancy for implementation. Data responsibility varies depending on the use case. Data for key use cases are managed centrally within the IT, while data for specific use cases of specific subsidiaries are managed by the subsidiary in question. A central function in the IT organization responsible for licensing manages the PM tool. Table 12 illustrates the categorization of the *experienced company* within the taxonomy.

9.3 Synopsis

We will now provide a conclusive evaluation of the taxonomy. As substantiated by the evaluation activities presented in Sect. 5.1, we consider the taxonomy useful, comprehensible, and sufficiently complete. Furthermore, the three exemplary cases attest to the taxonomy's efficacy in characterizing various organizational PM setups and their real-world applicability.

When analyzing the cases, we made three observations. First, there is a high variability in organizational PM setups. Moreover, there is no one-size-fits-all PM setup. Rather, PM adopters must identify the setup that helps them cope with and leverage their individual context (Zelt et al. 2018). Our observations indicate that PM setups are

Table 12 Characteristics of the organizational process mining setup of the *experienced company*

Layer	Dimension	Characteristic					
Governance and structure	*Degree of centralization*	Centralized		**Hybrid**		Decentralized	
	Anchoring	**IT**	Business	Shared services		**Executive level**	
	Institutionalization	Integrated in a (business) department	Integrated in a CoE	Cross-functional organization		**Standalone department/CoE**	
Operationalization and scope	*Key activities*	**Demand generation and assessment**	Data science and engineering	Project management	**Governance and steering**	Change and community management	Value management and scaling
	Prioritization of projects	Long-term roadmap		Mid-term pipeline		Short-term ad hoc	
Funding and planning	*Internal cost management*	**Profit center**		Hybrid		Cost center	
	Budgeting	Global	**Project-based**		Process-based	Per department	
Roles and responsibilities	*Role allocation*	Based on (business) department	**Based on key activities**		Based on end-to-end processes	Flexible	
	Internal leadership	PM lead		**Executive sponsor**		Champion	
	External support	**Vendor**		**Consultancy**		None	
	Data ownership	**IT**		**Business**		PM unit	
	Tool ownership	**IT**		Business		PM unit	

contingent on numerous contextual factors, such as company size, industry, available resources, and budget. Second, the PM setups were not static across all cases but underwent evolutionary changes over time, particularly with increasing PM adoption and the number of processes analyzed. Third, certain characteristics – such as the presence of an executive sponsor and business champions – can yield benefits, irrespective of the respective context and maturity. For instance, I8 stated, "*The most important thing about a topic like this […] is that, in addition to pure sponsorship, in other words, in addition to the executive sponsor who provides the budget for it, someone is needed who actively promotes this topic.*"

Since the taxonomy was designed and evaluated by analyzing diverse PM setups of established organizations operating in various contexts, we claim that it can be applied in similar contexts. To assess the taxonomy's transferability, we draw on the generalization framework proposed by Lee and Baskerville (2003), which differentiates four distinct strategies for generalization: data-to-description (EE), theory-to-description (TE), description-to-theory (ET), and concepts-to-theory (TT). Drawing on empirical insights in iterations 1 and 2 of the taxonomy development process, we developed a taxonomy that generalizes data to description (type EE generalizability), facilitating the characterization of organizational PM setups.

10 Discussion

10.1 Contributions

To answer our research question on organizational PM setups' characteristics, we proposed a multilayer taxonomy, laying the foundation for further research into PM's organizational aspects.

From a theoretical perspective, our taxonomy has contributed to the descriptive knowledge of PM and BPM governance, delving into an underexplored research area (Martin et al. 2021). Our main contribution is a theoretically well-founded taxonomy developed with the active involvement of PM experts. Our taxonomy is a theory for analyzing (type I) (Gregor 2006), offering descriptive insights into various organizational PM setups and presenting relevant dimensions. Further, by elaborating on selected cases, we have demonstrated that PM setups exhibit considerable variability, driven by the multifaceted organizational characteristics and contextual factors that influence their design and implementation (Reinkemeyer et al. 2022). This underlines that conventional BPM governance approaches cannot fully capture PM setups' intricacies. From a practical perspective, we have provided a holistic overview of the relevant dimensions and characteristics of a PM setup and possible manifestations. Diving into selected practical examples of a diverse group of

organizations, we shed light on the rationales involved in designing and developing an organizational PM setup.

10.2 Implications

We have made two primary theoretical contributions: We have advanced the research at the intersection of PM, BPM governance, and organizational design, providing a solid foundation for further theorizing on organizational aspects of PM.

First, we suggest that research into PM benefits from a holistic perspective that exceeds existing studies' focus on specific elements or setups. As we have observed by the variety of possible characteristics, our findings suggest investigating the relationships between certain characteristics to see whether there are set combinations of characteristics that occur in specific industries or organizations of specific sizes. Future endeavors could extend the body of knowledge on integrating PM into an organization's structures or the empirical derivation of archetypes through a configuration perspective. Future endeavors could extend the body of knowledge on integrating PM into an organization's structures or the empirical derivation of archetypes (Wanner et al. 2023). Similar to other configuration theory studies (Van Looy et al. 2022), these PM archetypes can be used to measure the relationships between specific configurations and performance.

Second, our results can serve as a basis for further theorizing on organizational and managerial aspects of PM and can be used by other scholars to develop higher-level theories (Gregor 2006) in this regard. The three exemplary cases demonstrate how explanatory knowledge can be created based on our taxonomy, i.e., an organization's rationale for certain PM configurations. Given several such indications in the initial interviews, the evaluation interview, and the exemplary cases, the links between common PM setups and organizational characteristics (e.g., size, industry, or maturity level) should be investigated. Researchers could indicate the extent to which an organization's contextual factors influence its choices of certain organizational characteristics. This could provide further guidance on which setup may suit a certain organization type at a particular point in its PM adoption journey or depending on its maturity level. Lastly, as we have broken down the relevant dimensions and characteristics of organizational PM setups, we have laid a foundation for further theorizing on the specific effects of single characteristics, such as choosing an organizational anchoring at the executive rather than the business level. Our taxonomy supports practitioners in approaching the establishment and integration of PM in an organization. It fosters structured discussion and justifies the relevant dimensions and characteristics of organizational PM setups. Besides describing a current PM setup, it also provides orientation in determining future characteristics of an organization's PM setup.

While our focus is on PM, we acknowledge that the taxonomy's dimensions and characteristics may have applicability beyond the PM domain. We claim validity for PM within the scope of our research, but we do not assert exclusivity. It should be investigated whether some findings also apply to similar disciplines within data analytics and technology-driven process improvement.

10.3 Limitations

Our work has limitations, which affect our findings' transferability and applicability. First, our sample selection for the interviews during the taxonomy development did not fully cover various organization sizes and industries. Researchers could study a larger sample to enrich our insights with size- or industry-specific conclusions. Second, applying the taxonomy could be challenging, especially in organizations with complex PM setups or structures that are unknown to a user. This complexity is further increased when multiple (partially) independent distinct PM setups operate in different parts of the organization. In such cases, the taxonomy would need to be applied repeatedly to capture the diverse setups and variations. Further, organizations implementing PM may not have all the characteristics of their PM setup (adequately) defined. Thus, we acknowledge that applying our taxonomy may be complex, potentially limiting practitioners' adoption of our approach.

11 Conclusion

While PM holds immense potential for practice (Reinkemeyer 2020), many organizations face challenges when seeking to effectively implement PM, owing to a lack of descriptive knowledge and organizational alignment (Martin et al. 2021). To address this challenge and provide a foundational understanding, we developed and evaluated a taxonomy of organizational PM setups over four iterations. We analyzed a study with 214 PM adopters, conducted 15 semi-structured interviews with PM experts from the field, reviewed relevant literature, and held a workshop among the authors. In each iteration, the taxonomy was applied and evaluated, with 13 additional practitioners rating its final version as complete, useful, and comprehensible. Finally, we conducted in-depth interviews with selected experts to gain insights into the underlying rationales influencing the decision-making process in configuring their PM setup.

Beyond its limitations, our taxonomy provides a comprehensive understanding of the diverse range of PM setups that organizations can adopt. We also provided insights for practitioners seeking to establish an organizational setup for PM. Our study serves as a resource for organizations seeking to effectively design and implement PM setups along their specific needs and objectives. This also coincides with our vision of a comprehensive guide to successful PM implementation, setups, and adoption at the organizational level, for which this work constitutes a first cornerstone.

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