Unlocking Success in Process Mining Adoption: A Comprehensive Exploration of Human Resources and Team Configuration

Simin Maleki Shamasbi

Ghent University, 9000 Ghent, Belgium

Abstract

Process mining, while rooted in technical intricacies, is greatly influenced by the human component that drives its adoption. Moving beyond the purely technical aspects of process mining, my PhD research emphasizes the often-overlooked human element in process mining adoption, shedding light on the intricate interplay between technology and the people who wield it. This paper outlines the research project that delves into the dynamics of team configurations, seeking to understand and optimize them for more effective process mining implementation. Adopting a mixed-method approach, my PhD research intricately weaves quantitative data with qualitative insights, ensuring a comprehensive understanding of the subject. My study underscores the significance of a people-centric approach, advocating that the success of process mining projects hinges not just on the technology itself, but also on the competencies, role, and configurations of teams behind it. Through this lens, this project offer organizations a roadmap to seamlessly integrate process mining into their operations, ensuring both technological prowess and human expertise are harmoniously aligned.

Keywords

process mining, organizational implications, human resources, team configuration, adoption

1. Introduction and Problem Statement

Process mining (PM) is a promising technology for the visualization, analysis, and enhancement of business processes [6]. Recent claims suggest that PM implications are key to understanding the (un-) successful adoption of this technology, calling for organizational and managerial implications [6], [14]. Socio-technical aspects are also deemed crucial, necessitating behavioral and design-oriented contributions [16]. In PM projects, a clear pathway is needed to address various aspects. Central to this is the recognition that socio-technical considerations are fundamentally anchored in the capabilities of individuals within organizations. This realization highlights the importance of human capabilities and exploration of the essential competencies and skills [13]. Consequently, research on a sound team configuration [9] and people-related aspects such as competencies (skill sets), job roles (job positions), and tasks (responsibilities) become imperative in PM adoption. Recent endeavors on developing PM Critical Success Factors (CSF) model [9], PM maturity model [3], and studies on challenges perceived by PM analysts [18] underscore the importance. However, to the best of our knowledge, little to no comprehensive research has been focused on the nature and impact of various job roles in PM implementation projects, including individual competencies and tasks, as well as how the implementation teams can be organized and optimized for ensuring a successful adoption.

With the aim of filling this crucial gap, *the main objective of this research is to develop an integrated people-centric approach for the successful adoption of PM by organizations, leading to an optimal team configuration*. To achieve this, three projects are proposed, each addressing a distinct question, which collectively champions a demand-side people-centric exploration of PM job roles and challenges toward achieving optimal team configuration for successful PM adoption.

ICPM Doctoral Consortium and Demo Track 2023

simin.maleki@ugent.be (S. Maleki Shamasbi)

0000-0002-7142-376X (S. Maleki Shamasbi)

This multifaceted approach seeks to provide actionable insights and practical guidelines, and a framework for embarking the role of people in PM implementation projects, defining job role classification, competency mapping, team structure, and people-related success metrics for a successful PM adoption. In this regard, the following three questions have been identified. Addressing these questions through in-depth investigations on job roles enables me to achieve the main objective of my doctoral research.

- **RQ1**- What are the typical job roles, patterns of competencies and tasks in PM projects of organizations shaping PM job profiles?
- **RQ2**- What HR-related challenges and CSFs exist for PM adoption, and how do they affect project performance and overall business process performance?
- **RQ3**- How to assess and improve an organization's people-centric approach for optimal PM adoption?

The research questions will be further delineated into more specific research objectives to delve deeper into the phenomenon. Figure (1) depicts the sequential flow from one project to the next, showing the output of one being the input of the next. Each project begins by probing existing literature, followed by enriching inputs with diverse methodologies, leading to the presentation of novel insights or theories. We aim at delivering multifaceted practical and scientific contributions.

2. Methodology and research Design

We adopt a mixed-method (qualitative and quantitative) approach throughout all three projects to collect a richer and stronger array of evidence [17]. Each project follows a certain type of theory according to the types introduced by [5]. Project I utilizes a theory type I for analyzing, project II employs theory type IV for explaining and predicting, and project III adopts a theory type V for design and action.

In **project I**, we aim to analyze the current patterns of job roles from the demand side reflecting the current assumption of organizations for ideal types in their PM project. We will extract all PM-related vacancies from the LinkedIn job portal to perform a descriptive analysis and text mining, namely topic modeling and cluster analysis, which is widely recommended and applied in organizational research [10], [15]. In order to have a trustworthy classification of competencies in PM professionals, we will look for a suitable skill framework. In combination with an in-depth multivocal literature review on PM job roles, we will validate findings through

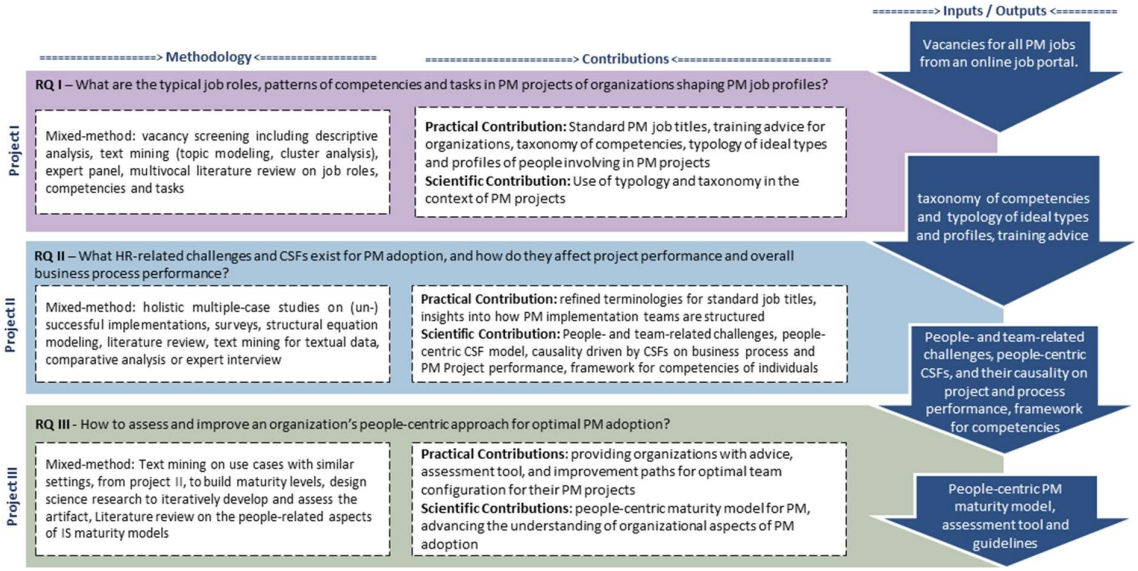

Figure 1: Doctoral Research Design Outline

an expert panel consisting of at least 20 experts, encompassing both scholars and practitioners from industry. We believe the background and geographical location of interviewees might have an influence and hence the selection should increase the generalizability. In order to increase the variations among the interviewees, we will target 10 scholars holding a PhD degree, with at least two PM-related peer-reviewed publications, and practitioners including PM/BPM managers, consultants or PM experts with at least five years of experience in PM adoption. To address the variety of geographical location, we select the interviewees from different countries with high demand in PM adoption.

In **project II**, we will follow a holistic multiple-case study design [17] to draw cross-case conclusions upon people-related challenges and CSFs in PM implementations, leveraging secondary data from the literature and empirical findings from real-world scenarios. We aim to target 20 case studies, half from SMEs and half from large-sized organizations. Recognizing the value of understanding both successful and unsuccessful PM adoptions, we will include at least 5 instances that meet our criteria for "failed adoptions" to learn from their experiences. Along with interviews, we will request PM documentation and job profiles. Furthermore, we will perform a Likert scale survey targeting 500 global respondents including PM managers, PM experts, PM consultants, IT managers, and BPM managers. Each organization will be represented by one respondent per role to control for organizational bias, given our focus on capturing a broad perspective across different organizations. With the CSFs from the case studies and the surveys, we will use Structural Equation Modeling (SEM), a multivariate statistical analysis technique, to build a theoretical model on the collected data that hypothesizes the impact of CFSs on business processes and PM project performance. Text mining algorithms will be used in case of necessity for analyzing large textual data. Using the data acquired in this step and the output of Project I, we will develop a framework for individual competencies in PM projects which can be validated through expert review or comparative analysis with existing competency frameworks.

In **Project III**, we will adopt a Design Science Research (DSR) approach, a problem-solving paradigm that builds on behavioral science, as explained or predicted in previous studies to develop artifacts addressing identified business needs and goals [7]. To this end, we will perform a cluster analysis on people-related CSFs resulting from use cases with similar settings and the results of survey analysis from project II. In addition to our primary methods, we will review relevant literature to help frame the levels of our intended PM people-centric maturity model. Our approach employes a multi-methodological procedures, as described by [7]. We will draw insights from Project II and continuously evaluate the progression of our model. We will adhere to the maturity model development procedure as defined by [1]. Our efforts include a review of people-centric elements in existing IS maturity models and an iterative process to refine our model. Expert interviews (20 in total) and a potential in-depth case study will serve as our evaluation tools.

3. Results and Contributions

This doctoral research has the potential to make both practical and scientific contributions, which will be elaborated upon in this section:

Project I provides a typology for ideal types (effective and successful [11]) and profiles of people in a PM project, and a taxonomy classifying the required competencies of PM job roles. Typology, a popular approach in management and organizational science, categorizes types of organizations, structures, and strategies [4], and has been previously used for ideal types in Business Process Management (BPM) [11]. Taxonomy, as a hierarchical arrangement of an interrelated group of definitions, has been used for classifications in various areas e.g. educational learning and organizational competencies [2], [12]. The main results and contribution of this project are providing standard PM job titles, taxonomy for classifying the required competencies in PM projects, ideal types and ideal profiles along with training advice for organizations in team

configurations to push their success. The application of taxonomy and typology for PM remains novel that provides a scientific contribution.

Project II contributes to organizations with a refined terminology of standard job titles for the critical roles in a PM project. This project provides a deeper understanding on how PM implementation teams are shaped within organizations, whether result in a success or failure of PM adoption. In this regard, we will demonstrate the results based on different types of team configurations including cross-functional teams, Center of Excellence (CoE) for PM, outsourced team, etc. From a scientific perspective, this project will contribute by identifying people- and team-related challenges and developing a people-specific CSF model. Such knowledge will be supplemented by a more in-depth analysis to derive the causality driven by the CSFs on process and PM project performance. Another scientific contribution of this project will be a framework of individual competencies in PM implementation projects, while capable of addressing existing gap in practice. This approach not only strengthens the research in the area of human resources in PM adoption but also enriches the as-is analysis, necessary for the development of a people-centric PM maturity model as we target in the third project. Our scientific exploration not only identifies challenges and develops frameworks but also introduces new methodologies and analytical techniques to the domain of PM, differentiating our approach from existing studies.

Project III contributes to the scientific understanding of organizational aspects of PM adoption, aided by a people-centric maturity model and assessment tool, offering advice to achieve an optimal team configuration. This approach equips organizations with improvement paths, allowing them to assess their current ('as-is') situation and work toward a desired ('to-be') level of maturity. Advancing on the evolution path between the two extremes involves a continuous progression regarding people-related capabilities, business process and PM project performance [1]. Furthermore, our people-centric maturity model offers a fresh perspective, incorporating unique dimensions and variables not commonly addressed in conventional models, furthering the academic discourse in this area.

4. The Current Stage of the Research

This extended abstract outlines my doctoral research design comprising three projects, each addressing specific questions aligned with the overarching research objective.

Commencing in May 2022, Project I involved a comprehensive analysis of current PM-related vacancies that I extracted from LinkedIn platform. The dataset contains the metadata of 921 job advertisements, spanning 47 countries and various organizations regarding size and sector. Leveraging this data, the analysis shed light on the diverse naming for job titles in PM job roles. The initial descriptive analysis surprisingly revealed a clear lack of homogenization in job titles, with an initial count of 838 distinct titles, reduced to 740 after basic manual cleaning. Additionally, a manual examination of job descriptions categorized vacancies into three main competency types: technical, business, or a combination of both (hybrid). The result of this descriptive analysis was presented as a workshop paper in BPM conference on 2022 [8].

To advance Project I, text mining techniques were applied to uncover latent insights within the vacancies. This approach facilitated the identification of 19 competency areas relevant to PM professionals, alongside more granular skills derived from the document-term relationship within job description. The ongoing work involves mapping these findings with the predefined job titles, and to culminate this phase, an expert panel is performing to validate the results, identify any missing elements, and further enrich the dataset. This validation process will serve as a foundation for commencing the subsequent phase II of the research.

Acknowledgements

This PhD is organized by Ghent University (Belgium) under the supervision of Prof. dr. Amy Van Looy.

References

[1] Becker, J., Knackstedt, R., & Pöppelbuß, J. (2009). Developing Maturity Models for IT Management. Business & Information Systems Engineering, 1(3), 213–222. https://doi.org/10.1007/s12599-009-0044-5

[2] Bloom, B. S.; Engelhart, M. D.; Furst, E. J.; Hill, W. H.; Krathwohl, D. R. (1956). Taxonomy of educational objectives.Vol. Handbook I: Cognitive domain. New York: David McKay Company

[3] Brock, Jonathan; Löhr, Bernd; Brennig, Katharina; Seger, Thilo; Bartelheimer, Christian; von Enzberg, Sebastian; Kühn, Arno; and Dumitrescu, Roman, "A process mining maturity model: Enabling organizations to assess and improve their process mining activities "ECIS 2023

[4] Doty & Glick. (1994). Typologies as a Unique Form of Theory Building :Author (s): D . Harold Doty and William H . Glick Source : The Academy of Management Review , Vol . 19 , No . 2 (Apr.,1994), pp . 230-251, Acad. Academy of Management Review,19(2), 230–251.

[5] Gregor, S. (2006). The Nature of Theory in Information Systems. MIS Quarterly, 30(3), 611–642. https://doi.org/10.2307/25148742

[6] Grisold, T., Mendling, J., Otto, M. and vom Brocke, J. (2021), "Adoption, use and management of process mining in practice", Business Process Management Journal, Vol. 27 No. 2, pp. 369-387. https://doi.org/10.1108/BPMJ-03-2020-0112

[7] Hevner AR, March ST, Park J, Ram S (2004) Design science in information systems research. MIS Quarterly 28(1):75–105

[8] Maleki Shamasbi, S., Van Looy, A., Weber, B., Röglinger, M. (2023). On Current Job Market Demands for Process Mining: A Descriptive Analysis of LinkedIn Vacancies. In: BPM 2022 Workshop, https://doi.org/10.1007/978-3-031-25383-6_14

[9] Mamudu, A., Bandara, W., Wynn, M.T., Leemans, S.J.J. (2022). A Process Mining Success Factors Model. I. Lecture Notes in Computer Science, vol 13420. Springer, Cham. https://doi.org/10.1007/978-3-031-16103-2_12

[10] Michalczyk, S., Nadj, M., Maedche, A. & Gröger, C. (2021) Demystifying Job Roles in Data Science: A Text Mining Approach. In: Proceedings of the 29th European Conference on Information Systems

[11] Müller, O., Schmiedel, T., Gorbacheva, E., & vom Brocke, J. (2016). Towards a typology of business process management professionals Enterprise Information Systems, 10(1), 50–80. https://doi.org/10.1080/17517575.2014.923514

[12] Nijhuis, S. A., Vrijhoef, R., & Kessels, J. W. M. (2015). Towards a Taxonomy for Project Management Competences. Procedia - Social and Behavioral Sciences, 194(October 2014), 181–191. https://doi.org/10.1016/j.sbspro.2015.06.132

[13] Peyman Badakhshan, Bastian Wurm, Thomas Grisold, Jerome Geyer-Klingeberg, Jan Mendling, Jan vom Brocke,Creating business value with process mining,The Journal of Strategic Information Systems,Volume 31, Issue 4,2022,ISSN 0963-8687, https://doi.org/10.1016/j.jsis.2022.101745.

[14] Reinkemeyer, L. (2020). Process Mining in Action

[15] Schmiedel, T., Müller, O., & vom Brocke, J. (2019). Topic Modeling as a Strategy of Inquiry in Organizational Research: A Tutorial With an Application Example on Organizational Culture. Organizational Research Methods, 22 (4), 941-968. https://doi.org/10.1177/1094428118773858

[16] vom Brocke, J., Jans, M.,Mendling, J., Reijers, H.A.: A five-level framework for research on process mining. Bus. Inf. Syst. Eng. 63(5), 483–490 (2021). https://doi.org/10.1007/s12599- 021-00718-8

[17] Yin, R. K. (2018). Case Study Research and Applications: Design and Methods (6th ed.). Thousand Oaks, CA: Sage.

[18] Zimmermann, L., Zerbato, F., Weber, B. Process Mining Challenges Perceived by Analysts: An Interview Study. In:BPMDS EMMSAD 2022. Lecture Notes in Business Information Processing, vol 450.Springer,Cham.https://doi.org/10.1007/978-3-031-07475-2_1