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Rex, Alexander; Pfaff, Hendrik; Lautenschlager, Jonathan; Mütze, Susanna; Urbach, Nils

Article

Balancing exploration and exploitation: Designing a staffing tool to leverage ambidextrous team compositions

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ORIGINAL ARTICLE

Balancing Exploration and Exploitation—Designing a Staffing Tool to Leverage Ambidextrous Team Compositions

Alexander Rex · Hendrik Pfaff · Jonathan Lautenschlager · Susanna Mütze · Nils Urbach

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Abstract In an era of rapid technological disruption, organizations must increasingly balance the exploitation of existing capabilities with the exploration of innovative business models and technologies, a duality known as ambidexterity. While prior research has largely focused on ambidexterity at the organizational and individual levels, its operationalization at the team level, particularly within project contexts, remains underexplored. This study addresses this gap by designing and evaluating a decision-support tool that enables structured, ambidexterity-informed staffing of project teams. The tool supports the scoping of business transformation projects, assesses the required balance between exploration and exploitation across different phases, and recommends team compositions aligned with these needs. Following a Design Science Research approach, the artifact was iteratively developed and refined through expert interviews, practitioner workshops, and a scholarly focus group. Additionally, we derive three design principles to guide the effective staffing of ambidextrous project teams and to support the development of information systems in ambidextrous contexts. This study advances ambidexterity research by identifying micro-mechanisms and phase-contingent requirements, linking these to concrete skill profiles through validated measurement, and demonstrating how organizations can embed evidence-based ambidextrous staffing into existing processes.

Keywords Ambidextrous Teams · Team Ambidexterity · Project Management · Staffing Tool · Decision Support System

✉ Alexander Rex · Hendrik Pfaff · Jonathan Lautenschlager · Nils Urbach
Branch Business and Information Systems Engineering, Fraunhofer FIT, Wittelsbacherring 10, 95444 Bayreuth, Germany
E-Mail: alexander.rex@fit.fraunhofer.de

Frankfurt University of Applied Sciences, Nibelungenplatz 1, 60318 Frankfurt, Germany

FIM Research Center for Information Management, Wittelsbacherring 10, 95444 Bayreuth, Germany

1 Introduction

Recent industry analyses indicate that executives are increasingly focused on balancing strategic market positioning with the need to enhance the future readiness of their business models. McKinsey reports that 80% of the executives believe that their current business models are at risk of technological disruption in the near future while 84% simultaneously emphasize the critical role of innovation in their growth strategy (McKinsey 2025). This growing concern underscores the dual focus of digital business transformation: leveraging competitive advantages through in-depth analysis while utilizing either *exploiting* persistent business models or *exploring* new ones applying established or cutting-edge technologies (Pisano 2015). To navigate these challenges successfully, established organizations must strike a balance between the tensions of exploiting their existing capabilities and advancing innovative business models and technologies (O'Reilly and Tushman 2011). Balancing and managing these tensions of exploration and exploitation is called *ambidexterity* (O'Reilly and Tushman 2008; Tushman and O'Reilly 1996). Achieving Organizational Ambidexterity (OA) requires a structured approach that integrates strategic intent with operational execution while ensuring that stability and adaptability are nurtured within the organizational framework (O'Reilly and Tushman 2013).

In this context, the ability to effectively implement ambidextrous business projects is essential for organizations striving to align strategic market positioning with future-ready business models (Barthel and Hess 2019). Business projects serve as pivotal mechanisms to balance stability and adaptability, while enabling companies to simultaneously optimize existing operations and explore new growth opportunities (Barthel and Hess 2019). Depending on their strategic focus, such projects may concentrate on sustaining current business activities that drive transformative changes or integrating both approaches within a cohesive framework (Choudhary 2019). Consequently, ambidexterity requirements vary between projects, reflecting the organization's ability to navigate the inherent tension between exploration and exploitation. The ability to manage this dynamic interplay, known as OA, is a decisive factor in ensuring long-term organizational success (O'Reilly and Tushman 2013; Tushman and O'Reilly 1996).

Although organizations have historically sought to implement OA by structurally separating exploration and exploitation, often by establishing dedicated business units, such as innovation laboratories focused on exploratory tasks (Duncan 1976; O'Reilly and Tushman 2008). This approach has been subject to criticism in research and practice (O'Reilly and Tushman 2013). A key challenge lies in the inherent difficulty of aligning these distinct operational dimensions, which often results in significant coordination costs, inefficiencies, and harms collaboration between business units (Birkinshaw and Gibson 2004; Fourné et al. 2019; Gibson and Birkinshaw 2004). Here, this structural separation may hinder the necessary dynamic integration of both dimensions, limiting the organization's capacity to adapt to rapidly changing market conditions. As a result, recent research suggests that the tensions between exploration and exploitation cannot be fully resolved at the organizational level alone, but must instead be addressed at a lower level of analysis (Dean 2022a). Specifically, scholars emphasize the team level as a more effective

dimension for managing ambidexterity, as teams possess the flexibility and cross-functional capabilities required to dynamically shift between exploratory and exploitative activities (Burke et al. 2006; Liu et al. 2019; Tikas 2017). Using team-based approaches, organizations can overcome the structural limitations of OA implementations while fostering a more adaptive and integrated mode of balancing innovation and operational efficiency (Açıkgöz et al. 2021; Jansen et al. 2016; M. J. Zhang et al. 2022).

Whilst extensive research has been conducted in the broad field of ambidexterity, prior investigations have predominantly focused on OA and Individual Ambidexterity (IA) while leaving a research gap to understand the role of ambidexterity at the team level. In particular, little is known about how the composition of ambidextrous teams affects their ability to effectively balance exploration and exploitation (Jørgensen and Becker 2017). This lack of insight is especially problematic in the context of Project Teams (PTs), which play an essential role in the execution of digital business innovation and transformation projects (Alexander and van Knippenberg 2014; Hadjielias et al. 2021). Despite their strategic importance, these PTs often operate without fully leveraging their ambidextrous potential. Since digital business transformation is inherently structured around PTs to achieve clearly defined project objectives (Barthel and Hess 2019), the need for a deeper understanding of Team Ambidexterity (TA) becomes increasingly evident. Without such insights, organizations risk inefficiencies in their digital transformation processes, as PTs remain unable to integrate exploration and exploitation effectively (Linhart et al. 2020; Werder and Heckmann 2019).

Based on this, ambidextrous staffing plays a crucial role in ensuring that PTs are equipped with the necessary competencies to achieve project-specific goals while balancing exploration and exploitation demands (Guinan et al. 2019). Empirical studies suggest that digital transformation project success rates increase by a factor of 1.5 when required skill sets are identified in advance (Boutetière et al. 2018). In contrast, inadequate staffing can lead to significant project delays, suboptimal results, or even direct failure (Guinan et al. 2019). A major challenge in this regard stems from insufficient project scoping, as an unclear definition of required competencies results in misaligned staffing decisions (Project Management Institute 2018). However, in particular with the practical execution of PT staffing, many organizations rely on intuition rather than structured methods or tools when making staffing decisions, which often leads to teams that are not specifically designed ambidextrously (Biagini 2019; Brown 2018; Guinan et al. 2019). This lack of systematic ambidextrous staffing significantly reduces the likelihood of project success, as improperly staffed or scoped projects fail to fully harness the potential of their PTs.

Considering both the theoretical gap and the practical need for effective tools to integrate TA into project staffing processes, this research aims to develop an initial artifact for ambidextrous PT staffing. Despite the recognized importance of balancing exploration and exploitation within PTs, organizations currently lack structured approaches and decision support mechanisms to facilitate this process. The artifact presented will serve as a foundational resource for practitioners seeking to optimize ambidextrous staffing while simultaneously generating design knowledge to enhance scholarly understanding of ambidexterity at the team level. Thus, we ask:

Research Question (RQ) How to design a tool to empower organizations and support decision makers to successfully staff ambidextrous project teams?

To address this RQ, we adopt a Design Science Research (DSR) approach as proposed by Peffers et al. (2007). This included deriving four Design Objectives (DOs) from the current academic literature, developing a tool to support ambidextrous team staffing, and evaluation both through 13 expert interviews, two additional workshops at a major German financial institution and a scholarly focus group. We then generalized our findings into three overarching Design Principles (DPs).

Our study advances understanding of ambidexterity in PTs by uncovering key micro-mechanisms and staffing challenges, showing how ambidextrous requirements shift across project phases, linking these requirements to concrete skill profiles, and validating a widely used ambidexterity scale for temporary project contexts. Practically, we show that effective ambidextrous staffing requires integration into existing organizational processes, clear phase-specific scoping, and evidence-based skill matching to ambidextrous project requirements.

This research paper is structured accordingly. We first outline the theoretical background of this study in Section 2 presenting the key concepts of ambidexterity and their implications for team composition. In Section 3, we detail the applied DSR approach explaining the methodological steps taken to design and evaluate the proposed staffing tool. We then define the problem space and outline the derived DOs, which form the basis for the artifact construction in Section 4. Section 5 provides a detailed description of the artifact, a tool that assesses the ambidexterity requirements of projects, and recommends suitable team compositions. Section 6 reports on the evaluation of the artifact, which included expert interviews, practical application in a workshop setting, and a scholarly focus group. In Section 7, we propose three DPs based on these evaluations that guide the further development of staffing tools to meet the ambidexterity requirements and improve the project results. We summarize our results and state the limitations in Section 8.

2 Background

2.1 Exploration-Exploitation: Trade-off in Digital Transformation

Rapid changes in the competitive landscape pose a significant threat to established organizations (Guinan et al. 2019; Vial 2019). Several industries have been disrupted by the emergence of new competitors, processes, products, and business models (Barthel and Hess 2019). Therefore, proactively adapting to evolving market conditions is crucial as the organization's ability to respond effectively to environmental changes and taking advantage of technological innovations is the key to maintaining customer value (Guinan et al. 2019; Vial 2019). These ongoing developments highlight the need for continuous innovation to ensure long-term survival. However, focusing solely on adapting to radical change is insufficient, as this will neglect the established business processes of an organization (Pisano 2015). This creates a balancing act for organizations between different types of innovation (Pisano 2015). To

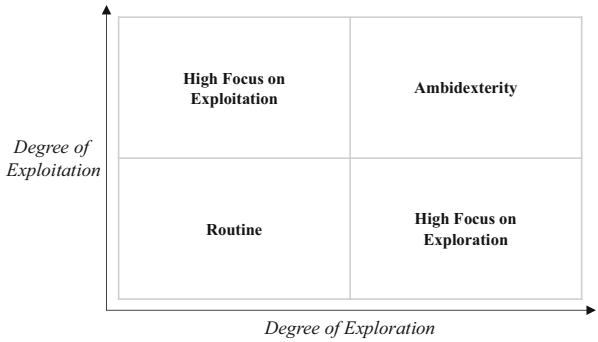

Fig. 1 Four-quadrant ambidexterity matrix

effectively manage this challenge, companies require dynamic capabilities, such as ambidexterity (Werder and Heckmann 2019).

Ambidexterity is the dynamic capability to *explore* and *exploit* to an equivalent degree and thus react to today's business demands and changes in the environment (Birkinshaw and Gibson 2004; Gibson and Birkinshaw 2004; O'Reilly and Tushman 2013; Tushman and O'Reilly 1996). Exploitation occurs in mature markets and describes the continuous improvement, optimization, and automation of existing products, services, and business models (March 1991; O'Reilly and Tushman 2013). In contrast, exploration focuses on new technologies and markets where radical improvement, flexibility, and innovation are the emphasis (March 1991; O'Reilly and Tushman 2013). Whereas exploitation has a short-term focus, exploration is focusing on the long term (Birkinshaw and Gibson 2004; Gibson and Birkinshaw 2004).

Exploration and exploitation require different structures, processes, skills, and cultures within the organization and have different managerial requirements (Raisch and Birkinshaw 2008; Tushman and O'Reilly 1996). Frequently, exploitation and exploration compete for scarce resources. Most organizations shift their resources towards exploitation, as this yields short-term success (March 1991). However, it restricts long-term viability and tricks organizations into a trap where they cannot react to environmental change (March 1991; Raisch and Birkinshaw 2008). In contrast, relying solely on exploration would result in an endless search for innovation which neglects to maintain existing profitable business activities (March 1991; Raisch and Birkinshaw 2008). Therefore, ambidexterity aims to enable organizations to balance exploitation and exploration (March 1991; Pisano 2015; Tushman and O'Reilly 1996). Furthermore, exploitation and exploration must also be carried out at high levels within the organization (Andriopoulos and Lewis 2009; Cao et al. 2009). Achieving this balance while maintaining a high level of both presents a significant challenge for organizations, requiring structured approaches to manage both simultaneously. Ambidexterity can be visualized in a matrix by plotting the degree of exploitation on the y-axis and the degree of exploration on the x-axis (Fig. 1).

2.2 Organizational and Individual Ambidexterity

In response to the challenge of maintaining high levels of exploration and exploitation, two key concepts have emerged: OA and IA (O'Reilly and Tushman 2013). An organization applies OA when it supports exploration and exploitation by creating structures, processes, and cultures that form the basis for the allocation of resources between modes (O'Reilly and Tushman 2013). Consequently, OA is anchored in the overall organization, its structures, and context. Applying OA leads to increased innovation (Benner and Tushman 2003; Sarkees and Hulland 2009), better firm performance (Birkinshaw and Gibson 2004; Cao et al. 2009; Gibson and Birkinshaw 2004; Lubatkin et al. 2006) and overall results in a higher firm survival rate in dynamic business environments (Kauppila 2010; O'Reilly and Tushman 2011; Raisch and Birkinshaw 2008; Tempelaar and van de Vrande 2012). In the past, different concepts of how to achieve OA emerged. Mainly the concepts sequential, structural, and contextual ambidexterity are well-defined in literature (O'Reilly and Tushman 2013). Sequential ambidexterity is about shifting the organization's focus from mode to mode over time, i.e., the organization first engages in exploration and then switches its general set-up to engage in exploitation (Duncan 1976). This separation results in exploration and exploitation being temporarily divided (Duncan 1976). The second way of achieving OA is structural ambidexterity. Following this approach, the organization hosts dual structures (Duncan 1976). Thereby, the organization uses autonomous structural units for each mode to solve the paradox (O'Reilly and Tushman 2013; Tushman and O'Reilly 1996). The third type is contextual ambidexterity. In distinction to sequential and structural ambidexterity, in this case both modes coexist in one business unit (Gibson and Birkinshaw 2004). Literally, contextual ambidexterity is defined as "the behavioral capacity to simultaneously demonstrate alignment and adaptability" (Gibson and Birkinshaw 2004, p. 209). Thus, the ambidexterity paradox is solved by providing the proper context for organizational members to decide how to best allocate their resources, e.g., time, to the conflicting requirements of exploration and exploitation activities (Gibson and Birkinshaw 2004).

In contrast, IA describes the individual's cognitive ability to engage in exploitation and exploration by switching focus between modes simultaneously, thus finding synergies between them (Birkinshaw and Gupta 2013; Good and Michel 2013; Mom et al. 2015; Tempelaar and Rosenkranz 2019). IA is determined by the ability to switch smoothly between both modes as an individual cannot work in both modes simultaneously (Schnellbächer et al. 2019). In practice, IA takes place by exploring new knowledge and exploiting existing knowledge during daily tasks (Schultz et al. 2013).

A high level of IA has three significant impacts: First, it increases the level of OA as individuals' activities in an organization sum up to the organization's OA level (Schnellbächer et al. 2019). Second, an ambidextrous individual can align business units and thereby leverage OA (Birkinshaw and Gupta 2013). Third, IA ensures knowledge management, increasing the performance of a business unit (Birkinshaw and Gibson 2004; Schnellbächer et al. 2019). Those positive impacts spread over to the partner units (Schnellbächer et al. 2019). All in all, high IA levels increase

the level of OA and the performance of the business unit. Consequently, the upbeat performance due to high IA levels appears vertically and horizontally in the organization (Schnellbächer et al. 2019).

In the academic discourse, OA is often criticized as top-down, whereas IA is criticized for focusing on a too small level for radical change. Therefore, both concepts are usually applied simultaneously (Birkinshaw and Gibson 2004; Kauppila 2010). To bridge the gap between these perspectives, the concept of TA has emerged, emphasizing the ability of teams to balance exploration and exploitation within their structures (Jansen et al. 2016).

2.3 Teams as Cornerstones of Ambidexterity

Teams in the workplace are defined as permanent or semi-permanent groups formed of two or more individuals who perform essential tasks for an organization by interacting regularly (Anderson and West 1998; Kozlowski and Bell 2012). Teams possess one or more goals and are responsible for the outcome (Cohen and Bailey 1997; Ilgen 1999; Kozlowski and Bell 2012). To solve the task, teams face interdependencies between team members, e.g., in workflows and knowledge (Cohen and Bailey 1997; Ilgen 1999; Kozlowski and Bell 2012). Teams are surrounded by an organizational environment that sets boundaries and constraints (Cohen and Bailey 1997; Kozlowski and Bell 2012). Therefore, teams manage their relationships with other entities of the social system, e.g., other teams (Kozlowski and Bell 2012).

Consequently, the team is where the individual and organizational layers come together (James and Jones 1976; Katz and Khan 1978). This connection is transferable to ambidexterity, i.e., OA and IA come together at the team level. More precisely, as individuals identify the most with the team, teams provide the context for individuals to act ambidextrously (Gibson and Birkinshaw 2004; Hackman 1992; Kozlowski and Bell 2012). This opposes TA clearly to contextual ambidexterity as a type of OA, where the context is provided by an abstract entity, i.e., the organization. Hence, the team leverages IA and implements OA. This underlines that teams play an integral role in balancing exploration and exploitation (Zimmermann et al. 2018).

The effectiveness of ambidexterity within a team depends on the targeted staffing of its members (Guinan et al. 2019). The manager of this staffing process is the architect of the team who must align the unit design with the strategic focus of the organization (Tushman and O'Reilly 1996). If the team is composed according to the subject matter, its ability to balance different demands is improved (Guinan et al. 2019). Explorative and exploitative tasks require distinct market orientations, technologies, and customer segments (March 1991). These contrasting tasks require different skills and knowledge (Hafkesbrink and Schroll 2014; Junni et al. 2015). Each member of the team has unique experience, allowing better synchronization between individual capabilities and project requirements (Guinan et al. 2019).

Staffing teams with ambidextrous requirements is particularly essential in temporary project-based environments (Barthel and Hess 2019). Such teams, defined as PTs, often have members from different units and a limited time frame to familiarize themselves with tasks or bridge knowledge gaps (Cohen and Bailey 1997; Guinan

et al. 2019; Hadjielias et al. 2021). Consequently, careful team composition and effective collaboration become even more critical, underlining the practical relevance of this research.

However, clear guidelines for putting ambidexterity into practice by staffing PTs according to ambidexterity requirements are lacking (Hollenbeck et al. 2012; Jansen et al. 2016; Jørgensen and Becker 2017; Stelzl et al. 2020). Many organizations struggle to create teams that effectively balance exploration and exploitation (Guinan et al. 2019). Team composition is often based on intuition rather than a structured analysis of tasks and project requirements (Guinan et al. 2019; Perretti and Negro 2006). This gap exists due to limited scientific research on how ambidexterity is implemented at the project level (Binci et al. 2020; Werder and Heckmann 2019). Consequently, more information on the micro-mechanisms of ambidexterity and specific management actions are needed (O'Reilly and Tushman 2011).

2.4 Measuring Ambidexterity On the Project Level

Bridging this gap requires reliable methods to assess ambidexterity at the project level, as a basis to align the composition of the team with the specific demands of exploration and exploitation. To systematically assess ambidexterity at the project level, Likert scales are often used (Birkinshaw and Gibson 2004; He and Wong 2004; Jansen et al. 2006; Kostopoulos and Bozionelos 2011; Lubatkin et al. 2006; Mom et al. 2007).

The various scales differ substantially in their focus, structure, and suitability for project contexts. The widely cited scale by He and Wong (2004) measures exploration and exploitation based on product and technology-related innovation goals but lacks consideration of market orientation, which is essential for comprehensive project assessment. Lubatkin et al. (2006) build on and extend this approach by integrating product, technology, and market perspectives, capturing the full spectrum of ambidextrous demands. This makes it particularly appropriate for use at the project level, although slight adaptations to its introductory structure are necessary to reflect the temporary and goal-oriented nature of projects.

In contrast, the scale by Gibson and Birkinshaw (2004) focuses on management systems and organizational alignment, which are less relevant for temporary, team-based project structures. Similarly, Kostopoulos and Bozionelos (2011) emphasize team learning behaviors, but their scale reflects ongoing team dynamics rather than deriving project-specific requirements. The measurement proposed by Mom et al. (2007) targets the activities of top management teams and lacks a direct link to the operational realities of PTs. Finally, Jansen et al. (2006) focus heavily on commercialization and overlook technology use, making their scale less applicable for projects that involve incremental innovation or adaptation of existing products.

Taken together, the scale developed by Lubatkin et al. (2006) emerges as the most holistic and adaptable tool for assessing ambidexterity at the project level, making it a suitable foundation for ambidextrous staffing and project evaluation.

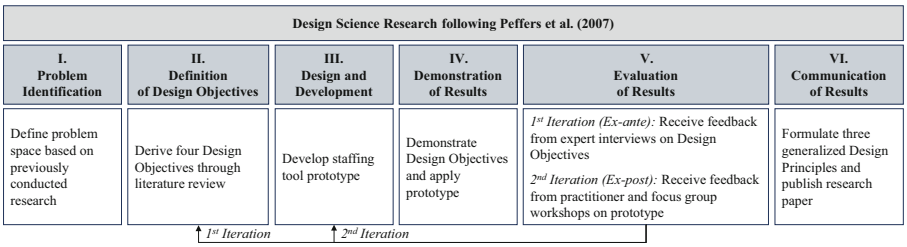

Fig. 2 Design Science Research following Peffers et al. (2007)

3 Research Method

3.1 Design Science Research

To conceptualize an artifact that addresses our RQ, how to design a tool that supports decision-makers in staffing ambidextrous PTs, we followed the DSR approach by Peffers et al. (2007) as an overarching guideline. DSR distinctly aims to create design knowledge by building and developing practically relevant artifacts such as constructs, methods, models, or instantiations for a given problem (Gregor and Hevner 2013; Hevner et al. 2004). This pronounced emphasis on artifact creation is reflected in the formation of the RQ, data collection procedures, and research contributions in the DSR context (Peffers et al. 2007).

Our goal was to build a tool that supports ambidextrous staffing by aligning project-specific exploration and exploitation requirements with suitable skill profiles. We foster scientific rigor and relevance by basing the artifact development on previous research, corresponding semi-structured expert interviews, feedback from practitioner workshops and academic insights from a focus group (Peffers et al. 2007). The chosen financial institution serves as a well-suited context for our rigorous artifact development. Its strategic industry importance, extensive market coverage, and strong regulation are representative of extensive transformation processes that are highly dependent on TA. To make a meaningful impact on ambidexterity research and organizational science, a design artifact must address a relevant business need emerging from people, organizations, or technologies within a given environment that we derive by following an iteratively structured design and development process (Hevner et al. 2004). The process of Peffers et al. (2007) comprises six steps (Fig. 2): First, we identify the problem space based on previously conducted research on ambidexterity and project staffing (Section 1). Second, we derive four DOs through a literature review (Section 4). Third, we design and develop a prototype of a staffing tool aligned with these DOs (Section 5). Fourth, we demonstrate the DOs and apply the prototype in relevant practitioner contexts. Fifth, we perform an ex-ante evaluation with experts from a major German financial institution to validate the DOs through interviews as well as an ex-post evaluation through practitioner workshops and a focus group of scholars to assess the practical applicability of the tool (Section 6). Sixth, we synthesize the results into three generalized DPs (Section 7) and communicate our findings through a published research paper.

3.2 Data Collection

To address our RQ, including the identification of the problem space and derivation of DOs, we performed a literature review adhering to the best practices specified by Webster and Watson (2002). Our goal was to consolidate and synthesize relevant academic knowledge to inform the development of a conceptual foundation for ambidextrous staffing. We focused on peer-reviewed journal articles and conference papers in the fields of information systems, innovation management, and OA.

We followed key steps commonly recommended for structured reviews, including literature search, selection, and analysis. Our keyword searches covered databases representing both information systems (*AIS* and *Web of Science*) and business research (*ProQuest, EBSCOhost* and *Web of Science*). This led to 2406 initial hits. To refine our focus, we applied the inclusion criteria: *Focus on the micro-level of ambidexterity, Focus on work teams or the individual, Focus on the research stream of innovation*, and *Focus on the current state of literature* during title, abstract and full-text screening. In contrast, we applied exclusion criteria as follows: *Focus on research stream of ambidextrous learning* and *non-English papers*. This resulted in 82 articles remaining. We complemented our initial sample through backward and forward tracking of citations to identify additional 34 relevant contributions (Webster and Watson 2002). The final sample comprises 116 articles. The process is visualized in Appendix A and helped to ensure the theoretical foundation for the identification of the problem space and the derivation of the initial DOs (vom Brocke et al. 2015).

In the ex-ante evaluation phase, we conducted 13 semi-structured expert interviews with practitioners to evaluate our tool for staffing PTs in the context of ambidexterity. We explain the detailed evaluation framework procedure in Section 3.3. All interview partners were either PL department heads related to innovation or managers with experience in staffing projects (Table 1) within a major German financial institution. Moreover, the selection of participants encompassing diverse roles, originating from different divisions, and varying seniority levels ensures heterogeneity in the experts' points of view (Myers and Newman 2007). The interviews took 29 to 46 min (average 37 min). The organizational responsibilities and professional experiences of experts are illustrated in Table 1 (Sonnenberg 2012; Venable et al. 2016).

For the ex-post evaluation phase, we assessed the relevance and rigor of the prototype (Hevner et al. 2004). To assess the relevance of our staffing tool, we conducted two interview workshops with practitioners of the previous interview sample. The interview workshops were conducted with two PL and two department heads as they were the main stakeholders in the project preparation process (Table 2).

The objective of the workshops was to provide an initial real-world demonstration of the tool. Participants were tasked with planning and staffing a fictitious project in an ambidextrous manner using the tool. The fictitious project goal was the integration of an account analysis feature into an existing banking application. Throughout the workshops, we observed the interactions between stakeholders themselves and between stakeholders and the tool. Upon completion of the task, we conducted

Table 1 Overview of the interviewed experts

ID	Position	Division	Seniority	Interview Duration
I1	Project Leader	Investment Promotion	> 5 years	41 min
I2	Project Leader	Investment Promotion	> 15 years	35 min
I3	Department Head	Services and Organization	> 15 years	46 min
I4	Group Head	Research	> 20 years	36 min
I5	Project Leader	Strategy and Corporate Development Promotion	> 5 years	29 min
I6	Group Head	Investment Promotion	> 20 years	30 min
I7	Project Leader	Investment Promotion	> 15 years	34 min
I8	Group Head	Credit	> 10 years	40 min
I9	Group Head	Corporate Banking	> 15 years	42 min
I10	Group Head	Strategy and Corporate Development	> 10 years	43 min
I11	Group Head	Investment Promotion	> 20 years	33 min
I12	Group Head	Capital Markets	> 20 years	36 min
I13	Group Head	IT	> 15 years	39 min

Table 2 Overview of the conducted interview workshops

ID	Group Head	Project Leader	Workshop Duration
Workshop 1	I6	I2	84 min
Workshop 2	I11	I1	90 min

interviews with the participants to gain insight into their experiences and perceptions (Peffers et al. 2012).

To evaluate the degree to which the tool addresses the validated DOs, we conducted a focus group with seven scholars who possess domain knowledge in OA (Sonnenberg 2012). The 70-minute session was situated within a lean research environment and comprised a prototype demonstration, structured feedback rounds, and open discussion. Based on experts' input, we refined both DOs and the staffing tool through iterative cycles of construction and evaluation according to established DSR methodologies (Hevner et al. 2004).

3.3 Data Analysis and Evaluation

The analysis process was designed to iteratively refine our supportive tool and validate its applicability. To establish the foundation of our design, we first concentrated on deriving overarching DOs addressing ambidexterity attributes and requirements of ambidexterity within the project staffing process. For data analysis, we reviewed the pertinent literature that explores the intersection of team composition, ambidexterity, and project performance, focusing on frameworks and methodologies that address the balance between exploration and exploitation in dynamic environments.

To analyze the literature, we coded the literature according to the best practices of Gioia et al. (2013) (Fig. 3). Initially, we highlighted relevant passages in the lit-

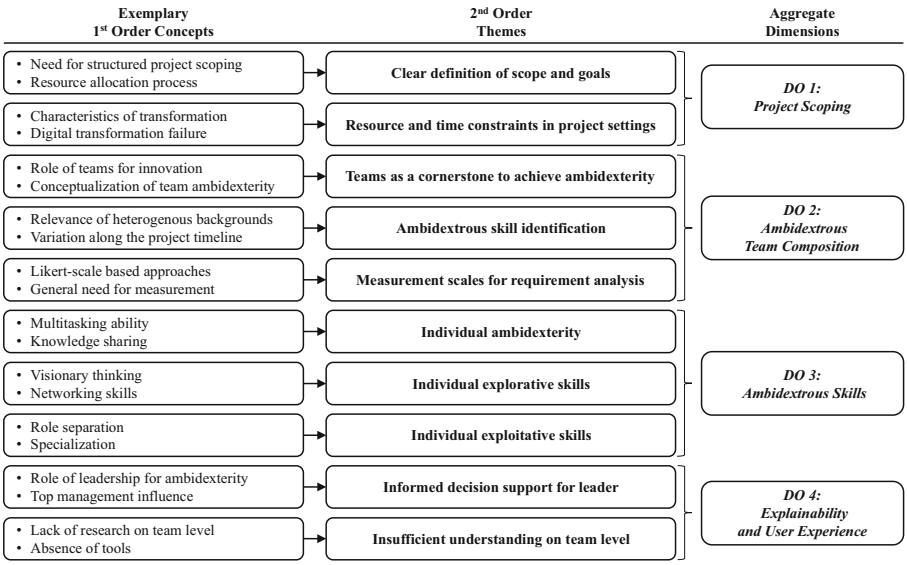

Fig. 3 Coding scheme based on Gioia et al. (2013)

erature to capture all potentially significant information. These highlighted excerpts were then systematically abstracted into 29 first-order concepts, ensuring that the coding remained close to the original wording of the sources. In the next step, we abstracted and grouped these concepts into ten second-order themes that captured emerging theoretical patterns. Finally, we consolidated these themes into aggregate dimensions representing our four DOs. This methodological approach enabled the development of well-grounded and precise DOs, which were subsequently subjected to a comprehensive, holistic analysis that incorporated key dimensions of ambidexterity.

In the ex-ante evaluation phase, we conducted expert interviews to validate the relevance and completeness of the DOs derived from the literature. The interview questions were deliberately phrased open to obtain real-world feedback from domain experts on the individual characteristics of the DOs (Appendix B). All interviews were transcribed verbatim and analyzed using qualitative deductive coding according to established guidelines (Saldana 2021). The analysis was structured along the problem space and the corresponding DOs, following the framework proposed by Maedche et al. (2019). This method ensured a comprehensive understanding of the practical challenges and informed the iterative refinement of the DOs. Based on this, we implemented iterative adjustments to the tool until our prototype addressed all identified DOs (Sonnenberg 2012).

In the ex-post evaluation phase, we analyzed data collected from both the interview-based workshops and the focus group (Appendix C and D). To ensure methodological rigor, all interviews were transcribed verbatim and coded with respect to statements related to the DOs. Data from the workshops and the focus group were examined using the evaluation criteria outlined by Sonnenberg (2012), namely ease

Table 3 Overview of the four derived DOs

No.	Design Objective	Description	References
1.	Project Scoping	The tool should define the project scope to enable targeted staffing	AlSaied and McLaughlin 2024; Guinan et al. 2019; Gupta et al. 2006; Jørgensen and Becker 2017; O'Reilly and Tushman 2011; Wang et al. 2023; West et al. 2003
2.	Ambidextrous Team Composition	The tool should optimize the allocation of team members by considering the ambidextrous nature of tasks	Antonio et al. 2021; Boutetière et al. 2018, 2018; Dean 2022b; Guinan et al. 2019, 2019; Harvard 2004; Jørgensen and Becker 2017; O'Reilly and Tushman 2011, 2013; West et al. 2003; Zhang 2023
3.	Ambidextrous Skills	The tool should primarily consider personal capabilities for the staffing recommendation	Birkinshaw and Gupta 2013; Duncan 1976; Hafkesbrink and Schroll 2014; Jansen et al. 2016; Junni et al. 2015; Schnellbächer et al. 2019; Wang et al. 2023
4.	Explainability and User Experience	The tool should be user-friendly, i.e., easy to use without a long introduction to the concept of ambidexterity	Cohen and Bailey 1997; Hollenbeck et al. 2012; Lindskog and Magnusson 2021; Turner et al. 2013

of use, applicability, effectiveness, efficiency, fidelity to real world problems, and consistency. This analysis involved a systematic review of meeting notes and a repeated examination of audio recordings to extract relevant feedback and discussion points. The insights gained from this process were used to implement targeted modifications to the tool to resolve ambiguities and improve usability.

4 Design Objectives

Through a comprehensive analysis of current research, we identified four essential DOs and their respective requirements for the development of a staffing tool for TA. We derived these findings, summarized in Table 3, from performing a literature review of work on the practical application of ambidextrous approaches in organizational settings (Section 3) (vom Brocke et al. 2015; Wolfswinkel et al. 2013).

4.1 DO 1: Project Scoping

One primary requirement for an ambidextrous staffing tool is the need to clearly define the project goals and scope for each project phase to ensure alignment with ambidextrous requirements. In the absence of nascent project goals and scope, the staffing tool may disproportionately emphasize one aspect, such as prioritizing experienced employees for efficiency, at the expense of another, such as recruiting diverse skill sets for innovation (Jørgensen and Becker 2017). Given that projects typically operate under significant resource and time constraints that hinder innovation, clear objectives serve to optimize workforce planning to effectively support both (AlSaied and McLaughlin 2024). Articulating the project's objectives and scope further assists

in selecting employees whose skills and attributes meet the specific demands of the project, be it stability and expertise or flexibility and experimentation (Guinan et al. 2019; West et al. 2003). Pertinent research highlights that defining micro-mechanisms for ambidexterity and structured resource allocation is important to balance exploration and exploitation effectively (Gupta et al. 2006; O'Reilly and Tushman 2011). By establishing goals and scope at the beginning of the process, the staffing tool ensures that the employees are strategically aligned with the ambidextrous requirements of the project, thus addressing the inherent paradox of ambidexterity within teams (Wang et al. 2023). Thus, the tool must account for the project scope and goals and adjust its staffing recommendations accordingly. As a result, aligning staffing decisions with clearly defined project goals and scope as DO 1 enables a balanced approach to exploitation and exploration, ensuring that ambidextrous workforce strategies effectively support dynamic project requirements.

4.2 DO 2: Ambidextrous Team Composition

Ensuring successful project outcomes requires a strategically designed approach to team staffing, particularly in dynamic environments, where balancing exploitation and exploration poses a significant challenge (Dean 2022b). The effect of staffing is not negligible, as management studies show that the success rate of transformational projects increases by 1.5 times when the skills required for the project are identified beforehand (Boutetière et al. 2018). Thus, the staffing tool should systematically suggest personnel alignment with the necessary degree of ambidexterity, ensuring that teams are structured to meet both innovation and efficiency demands. Importantly, the required level of ambidexterity, whether focusing on exploration, exploitation, or a combination of both, varies between different stages of a project. The early phases may require a stronger focus on exploration to foster innovation, while the later stages often require an emphasis on exploitation to ensure operational efficiency and successful implementation. The sole reliance on incremental advancements is insufficient for managing digital business transformation while breakthrough innovations carry substantial risk, especially in large-scale infrastructure projects (Zhang 2023). Teams that do not address this paradox negatively impact organizational performance, whereas those staffed according to their domain expertise significantly increase their likelihood of success (Guinan et al. 2019; Jørgensen and Becker 2017; West et al. 2003). Notably, more than 90% of initiatives within ambidextrous organizations achieve their innovation objectives, far exceeding the success rates of other organizational structures (Harvard 2004). Consequently, the tool must facilitate precise and context-specific staffing decisions, equipping Project Leaders (PLs) with the necessary resources to build teams that respond effectively to the unique demands of each project. Achieving this requires leaders to dynamically allocate resources between the two core dimensions of ambidexterity (Antonio et al. 2021). The ability of a leader to make staffing decisions that balance these requirements is a critical success factor (O'Reilly and Tushman 2011, 2013).

Without a well-structured and data-driven staffing tool, PLs must often rely on intuition or generic staffing models, increasing the risk of imbalanced team compositions and suboptimal project results (Brown 2018). Given the strategic role of

staffing in fostering both innovation and operational excellence, the tool must help identify staffing recommendations that align with the specific requirements of each project, ensuring that personnel are optimally assigned to improve overall performance. Finding the right ambidextrous team composition as DO 2 suggests increases the project's success.

4.3 DO 3: Ambidextrous Skills

The third objective is the systematic assessment and integration of an individual's ambidextrous skills in both exploitation and exploration when formulating staffing recommendations. This ensures alignment with the required level of ambidexterity for a given project at a given time as those contrasting tasks require different skills and knowledge (Hafkesbrink and Schroll 2014; Junni et al. 2015). TA is conceptualized as "*the extent to which teams engage in exploratory and exploitative learning simultaneously, as their members search for, experiment with, and develop new knowledge and skills while they concurrently refine, recombine, and implement existing ones"* by Jansen et al. (2016). This definition highlights the necessity of achieving a balance between these two learning modes at the team level, underscoring the critical role of individual contributions in resolving the inherent tensions of ambidexterity (Birkinshaw and Gupta 2013). Approaching TA from an individual perspective reinforces the importance of selecting team members with complementary skill sets that collectively enable the simultaneous pursuit of innovation and efficiency. Individuals ensure the integration and coordination of ambidexterity across the organization (Schnellbächer et al. 2019). Within a team individuals must navigate and reconcile the paradoxical demands of ambidexterity, making it imperative that staffing decisions account for their distinct capabilities in both exploratory and exploitative activities (Wang et al. 2023). The exploitative character is an analytical problem-solver with subject expertise and a tight network. In contrast, the explorative character is rather creative, encompasses visionary thinking, combines different roles, and maintains a broad network with strong bridging ties. The ambidextrous character combines both by being a knowledge broker who shares and enlarges knowledge, takes the initiative proactively, has a strong cooperative behavior with a complex network, and multitasks (Birkinshaw and Gibson 2004; Hafkesbrink et al. 2010).

Additionally, staffing should consider not only an individual's static skill set but also their capacity for dynamic learning and adaptation, as ambidexterity often requires employees to shift between modes depending on the project phase (Duncan 1976). Consequently, the staffing tool should incorporate a comprehensive evaluation of personnel skills, ensuring that team compositions are strategically configured to foster ambidextrous functioning. By doing so, the tool can enhance the effectiveness of team-based learning processes and contribute to improved organizational adaptability and performance. Matching ambidextrous skills with the ambidextrous requirements as DO 3 results in the best-fitting PT.

4.4 DO 4: Explainability and User Experience

The fourth objective is that the tool must be functional and easily accessible to PLs responsible for staffing without requiring extensive expertise in ambidexterity (Cohen and Bailey 1997; Hollenbeck et al. 2012). While ambidexterity is widely discussed in academic literature, its practical implementation remains insufficiently understood, making it difficult for managers to take informed ambidextrous staffing decisions (Lindskog and Magnusson 2021). This gap is even more pronounced in real-world applications, where theoretical insights often fail to translate into actionable strategies. Although ambidexterity is recognized as a key approach for management under uncertainty, many PLs struggle to integrate its principles into workforce planning due to the absence of clear, intuitive tools (Turner et al. 2013). Staffing of projects is a recurring and operational management task to maximize adoption and effectiveness fostering project success (Cohen and Bailey 1997; Hollenbeck et al. 2012). Hence, PLs need to be able to seamlessly integrate the tool into existing project management environments ensuring that users can operate it without a steep learning curve. A complex interface or unfamiliar system could hinder adoption while reducing its impact on staffing decisions. Beyond usability, the tool should actively function as both a decision-support system and an educational resource, helping PLs develop a deeper understanding of ambidextrous workforce strategies over time. By embedding interactive guidance and contextual explanations of ambidextrous principles, the tool can bridge the knowledge gap and improve its practical utility. For instance, explainability features such as visual analytics and scenario-based staffing suggestions can provide immediate insights while simultaneously fostering long-term learning. This dual function ensures that PLs not only receive clear, step-by-step staffing recommendations but also develop the ability to make informed, ambidextrous workforce decisions independently. Ultimately explainability and ease of use for the tool DO 4 helps transform the knowledge from ambidexterity research into practice.

5 Artifact

5.1 Design and Components of a Staffing Tool for Team Ambidexterity

Based on the derived DOs, we designed and constructed the staffing tool to effectively incorporate multiple core aspects of TA into a coherent artifact (Fig. 4). The final tool version consists of three overarching components: the *Project View*, the *Dashboard View*, and the *Filling Aid*. Each consists of multiple submodules that incorporate the DOs and features a variety of interactive user interface elements for data input and graphical visualizations to display information. The version of the tool presented herein represents the finalized iteration, incorporating all refinements and enhancements derived from the preceding cycles of iterative development and evaluation.

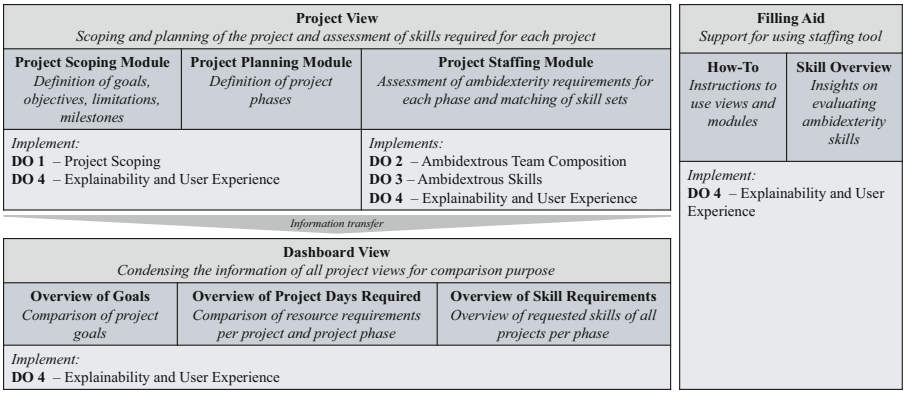

Fig. 4 Overview of how the individual modules of each view in the staffing tool implement the DOs

5.1.1 Project View

The *Project View* functions as a dedicated workspace that enables users to systematically capture key information related to project scoping, planning, and the requisite competencies of team members across different phases. It comprises three interrelated submodules: the *Project Scoping Module*, the *Project Planning Module*, and the *Project Staffing Module*. This view facilitates the structured design of projects by delineating goals, objectives, and phases, assessing the ambidextrous requirements of each phase, and deriving well-founded staffing recommendations accordingly.

Project Scoping Module The *Project Scoping Module*, located in the *Project View* of the staffing tool, includes various user interface elements designed to input vital overall project details such as project goal, objectives, limitations, and milestones (Fig. 5a). Thereby it addresses DO 1 and DO 4.

Project Planning Module The *Project Planning Module* facilitates the structured input elements for project scheduling and planning data, including the number of phases, their sequence, start and end dates, as well as their estimated duration. Each phase is further subdivided by delineating the tasks to be completed. To enhance clarity and project oversight, the defined phases are subsequently visualized in a Gantt chart (Fig. 5b). Thereby it addresses DO 1 and DO 4.

Project Staffing Module The *Project Staffing Module* consists of a structured questionnaire based on Lubatkin et al. (2006) (Section 2.4) with multiple statements for requisite skill sets for each previously defined project phase. Based on the phase's evaluation, the corresponding skill sets—spanning personal, professional, methodological, and social competencies—are subsequently presented (Fig. 5c). The staffing recommendations are derived from the skill set framework proposed by Hafkesbrink and Schroll (2010, 2014), with the three skill sets being detailed in the *Required Skill Overview* of the *Filling Aid* (Section 5.1.3). Thereby it addresses DO 2, DO 3, and DO 4.

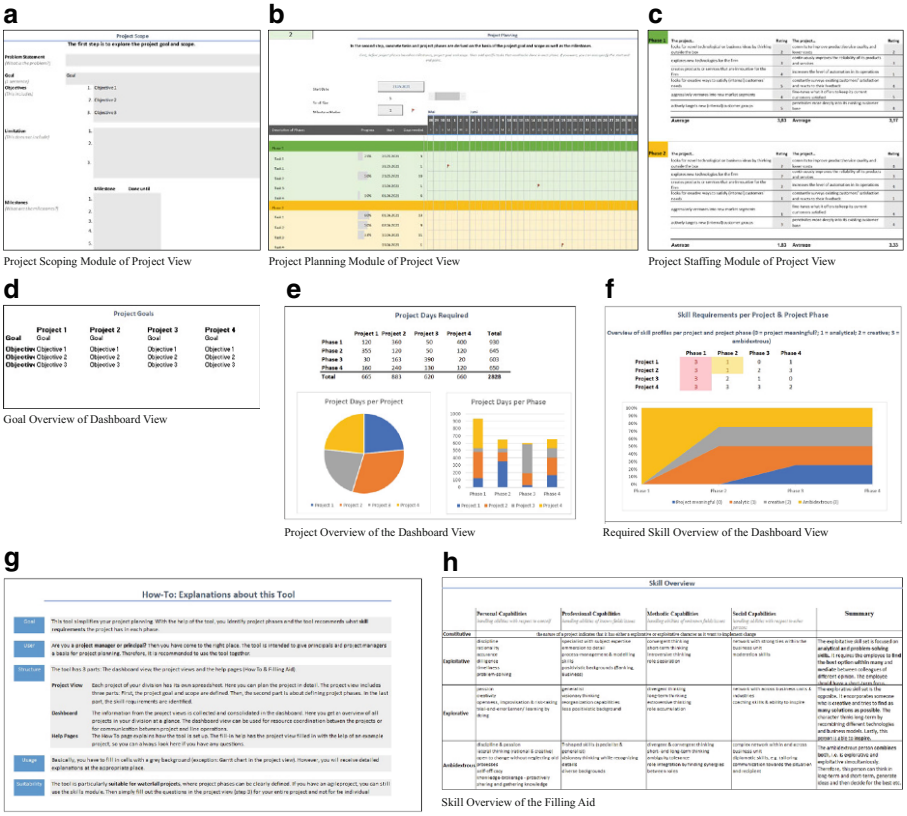

Fig. 5 Screenshots of the project view and dashboard view of the staffing tool

5.2 Dashboard View

The *Dashboard View* presents multiple graphical elements that encapsulate key insights into the dual ambidextrous staffing requirements at each stage of the project. The Dashboard View consists of three modules: the *Goal Overview*, the *Project Overview*, and the *Required Skill Overview*. By aggregating and synthesizing the data from all entered projects, it provides a consolidated overview of multiple entered projects.

Goal Overview Module The *Goal Overview Module* presents the values for the project goal and associated objectives for each project in a tabular format, as previously entered in the *Project Scoping Module*. Each project is represented in a separate column, with the corresponding goal and objective values listed in the rows below (Fig. 5d). Thereby it addresses DO 4.

Project Overview Module The *Project Overview Module* provides graphical visualizations of the defined project phases of the *Project Planning Module* (Fig. 5e).

The module presents a table detailing the number of project days allocated to each phase for every specified project, along with the total number of days accumulated. A pie chart complements this information by illustrating the percentage of total project days assigned to each project, while a vertical bar chart visualizes the distribution of project days across the different project phases. Thereby it addresses DO 4.

Required Skill Overview In the *Required Skill Overview*, the ambidexterity skill sets required for each defined project phase are presented (Fig. 5f). A heat map illustrates the project phases using color codes to indicate the extent to which analytical, creative, or balanced ambidexterity skills must be enhanced among the assigned team members. Furthermore, an area chart visualizes the proportion of individuals needed with the corresponding skill sets. Thereby it addresses DO 4.

5.3 Filling Aid

The staffing tool offers multiple explanatory descriptions and contextual guidance through the dedicated *Filling Aid* consisting of the *How-To* section and a *Skill Overview*. These resources provide detailed clarifications, facilitating a deeper understanding of key concepts, including ambidexterity, even for users with minimal or no prior knowledge.

How-To The tool's *How-To* section delivers in-depth and insightful explanations regarding the tool's operation, including its various submodules (Fig. 5g). It provides guidance on how to use the tool and an understanding of its internal mechanics. Thereby it addresses DO 4.

Skill Overview The *Skill Overview* offers a detailed account of the specific skills necessary for the phases of projects, whether they are exploitative, explorative, or ambidextrous (Hafkesbrink et al. 2013; Hafkesbrink and Schroll 2010). This tabular format not only aligns the skills with each project phase but also includes a supplementary summary for every skill set (Fig. 5h). Thereby it addresses DO 4.

5.4 Work Process of Staffing Tool

A thorough understanding of the staffing tool's architectural components permits a systematic presentation of the interactive processes occurring between users and the tool (Fig. 6). The effective utilization of the tool within a practical business environment follows a structured sequence of four essential steps, each contributing to the seamless integration of project planning and resource allocation.

In the first step, users need to provide fundamental project-related information, encompassing overarching goals, specific objectives, inherent constraints, key milestones, and existing dependencies. This foundational input serves as the cornerstone for subsequent phases by ensuring that all relevant project parameters are comprehensively documented while simultaneously enabling a structured and transparent planning process.

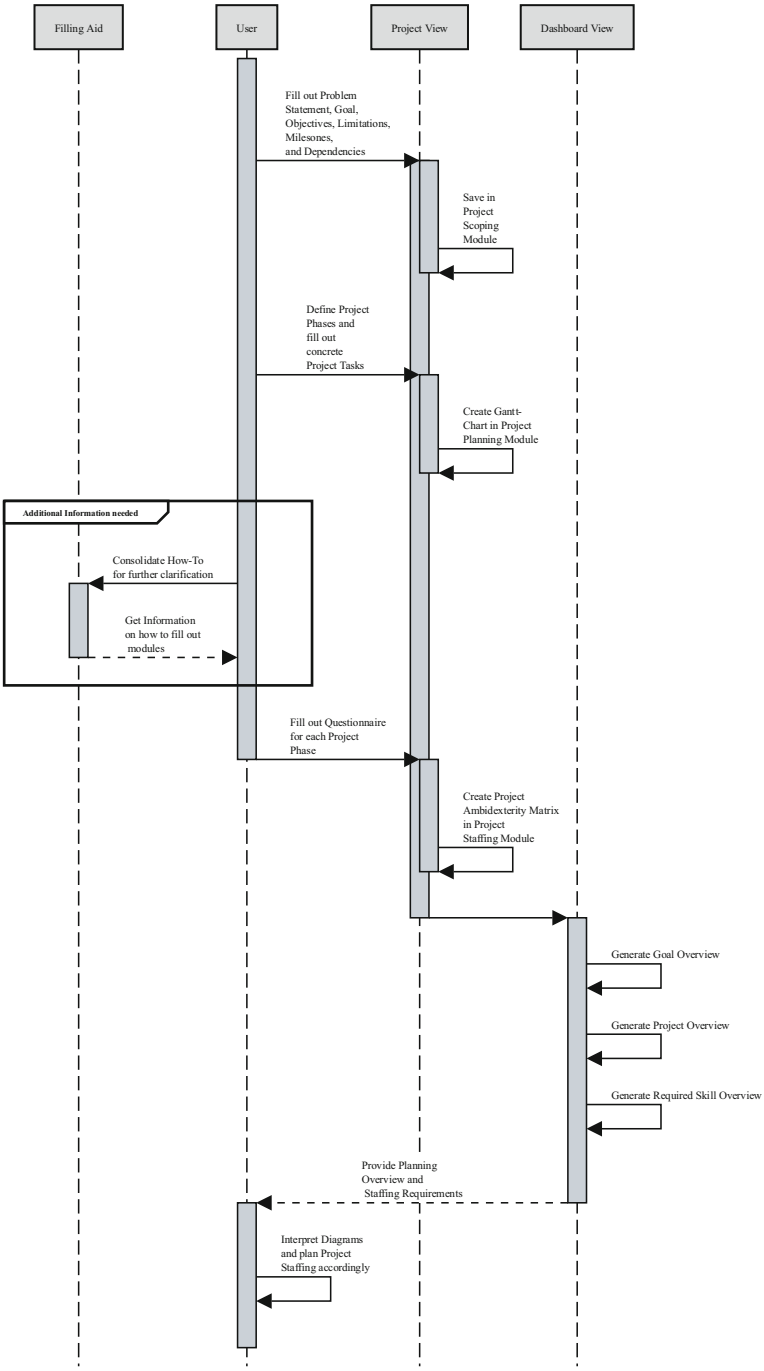

Fig. 6 Sequence diagram for the process of using the staffing tool

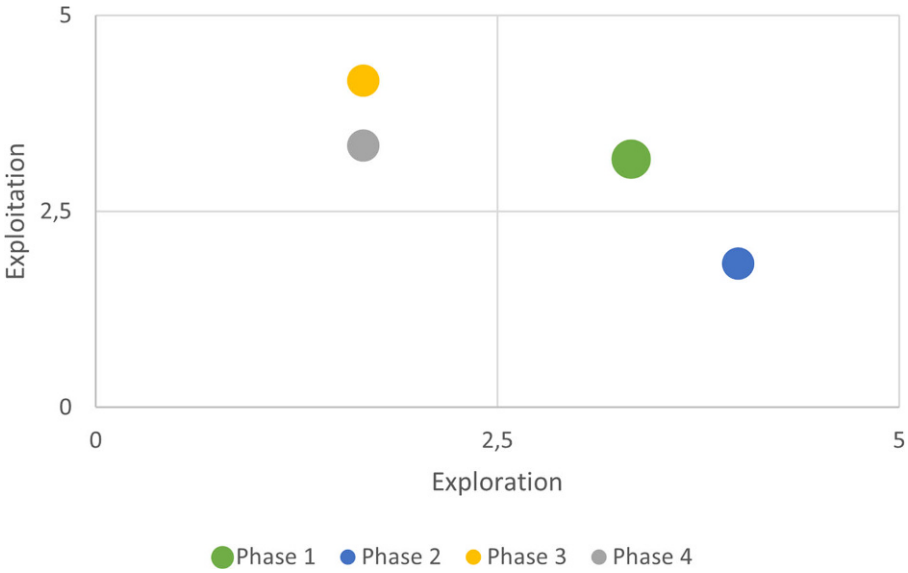

Fig. 7 Screenshot of the ambidexterity matrix of the staffing tool

Building upon this initial input, the second step necessitates the detailed specification of the various project phases along with their corresponding tasks and projected time frames. By delineating the distinct phases, users establish a clear temporal and functional framework, which facilitates a structured overview of the project's development and ensures the precise allocation of resources in alignment with each phase's specific requirements. Following the definition of project phases, users are required to complete a comprehensive questionnaire for each individual phase in the third step to derive the ambidexterity requirements and essential information regarding required competencies and specific resource needs for each stage of the project.

Thus, the results of this assessment are visualized in a 2×2 matrix (Fig. 7) as introduced in Fig. 1. The visualization depicts both the type and intensity of exploration and exploitation activities. Ratings are based on a five-point Likert scale by Lubatkin et al. (2006), with five representing the maximum value (Section 2.4). A project phase is classified as explorative if the average rating for exploration exceeds 2.5 and the rating for exploitation falls below 2.5. In contrast, it is deemed exploitative if the exploitation score is above 2.5 and the exploration score remains below this threshold. When both average values exceed 2.5, the phase is characterized as ambidextrous. If both averages fall below 2.5, the project phase is neither explorative nor exploitative. Nonetheless, by definition, projects inherently exhibit either an explorative nature or an exploitative nature (Cohen and Bailey 1997). Consequently, if both averages are low, the task is a routine task, and no project is needed.

The structured nature of this data collection process ensures that all relevant factors influencing the staffing process are considered, allowing for a data-driven

approach to personnel planning. Upon successful data input and processing by the staffing tool, the final step involves the interpretation and application of the system-generated insights. At this stage, users review the analytical recommendations provided by the tool and integrate them into the staffing process by either confirming, adjusting, or redefining the allocation of personnel. This iterative approach ensures that staffing decisions are not only aligned with the project's evolving requirements but also dynamically optimized to address potential competency gaps and workforce constraints following this structured workflow, users can systematically leverage the functionalities of the ambidextrous *staffing tool* to enhance decision-making, improve resource coordination, and facilitate an optimized, data-driven approach to project staffing considering ambidextrous requirements.

The staffing tool was implemented using Microsoft Excel to ensure accessibility and ease of use for practitioners, leveraging built-in features such as dropdown menus, conditional formatting, formulas and Gantt chart visualizations.

6 Evaluation

6.1 Evaluation of Design Objectives

Throughout our design and development process, we iteratively evaluated our DOs and our artifact's ability to address the identified DOs (Section 3). In doing so, we first applied a qualitative evaluation (ex-ante) based on expert interviews (Sonnenberg 2012; Venable et al. 2016). In these interviews, we discussed the literature-based DOs with the experts. Subsequently in the second iteration step, we evaluated the tool itself (ex-post) in interview workshops with practitioners, and a focus group with scholars. Based on the experts' feedback, we redefined our DOs and the staffing tool in iterative build-and-evaluate loops (Hevner et al. 2004).

6.1.1 DO 1: Project Scoping

The interviews successfully validated the first DO. The interviewees highlighted, in line with (Mohammed K. Fageha and Aibinu 2013) that the PL and the department head should actively engage in a detailed discussion of the project goal and scope before staffing the project. The scope includes *"What is the goal of the project? What can I achieve relatively realistic within this project? And creating clear boundaries what the project does not include"* (I 1). This clear scoping provides the PL with a more precise guideline on what to achieve and work on (I 1–2, I 7) and helps to avoid scope creep (Komal et al. 2020). Many staffing issues arise from insufficient coordination and communication between stakeholders. To address this, the scoping process aims to improve stakeholder communication while practitioners emphasized that the tool must actively support the PL and the department head by providing a foundation for detailed discussions regarding the project goal and scope. The defined scope enables the PL to estimate the resource need in an informed way (I 1–2, I 6–7), which *"would make the planning process easier, faster and simpler"* (I 6). In this regard, practitioners emphasized that *"to make such an initial anal-*

ysis of a project period, scope, and goal, we can think of relatively many points in a relatively small area" (I 2). Furthermore, a solid foundation for project scoping and skilling must be created *"with relatively little effort"* (I 1). This aligns with the need for improved cross-project coordination, allowing stakeholders to make better informed staffing decisions.

Our tool effectively tackles the DO by establishing a structured and organized foundation for defining project scope, offering stakeholders access to both the *Project Scoping Module* and the *Project Planning Module* specifically designed for this function. First, practitioners confirmed that our tool has high fidelity with real-world project challenges (I 1–2, I 6, I 11): "*So I think it could be pretty powerful to have a tool like that*" (I 2). Specifically, it provides a structured basis for discussions between the PL and the department head, ensuring that both parties engage more intensively with the project order. As one practitioner emphasized, *"It also helps to deal more intensively with the project order"* (I 2). By offering a clear interface in form of the, *Project Scoping Module* and *Project Planning Module*, for defining project goals, milestones, objectives, and limitations, our staffing tool prevents misalignment and ensures that projects start with a well-defined scope that enables structured staffing (Blair-Early and Zender 2008).

6.1.2 DO 2: Ambidextrous Team Composition

The second DO was successfully validated in the interviews. This DO specifies that the tool should propose an appropriate team composition based on the project's required level of ambidexterity. The interviewees confirmed this need by stressing that different types of projects require different skill sets, which is in line with Hafkesbrink and Schroll (2014). In particular, they pointed out that operational projects require a different team composition than transformational ones (I 2–3, I 6, I 10, I 12): "*then it can happen that you actually have different skills that you may not need for the project at that particular point in time.*" (I 1). In addition, they emphasized that the required skills vary between different stages of the project. In the early conception phase, for example, creativity, strategic thinking, and evaluative capabilities are especially critical. As one practitioner explained, this phase is *"a creative process, where networked thinking, and evaluation of things"* is needed (I 3). In contrast, during the implementation phase, execution-oriented employees play a crucial role, as they are responsible for bringing plans into action without overanalyzing every detail. As another interviewee noted, this phase requires employees *"who bring the horsepower to the road, just implement and do not question everything"* (I 3). By integrating these insights, our tool should ensure that team compositions are dynamically adjusted to match the type and stage of the project. This structured approach allows PLs to make informed staffing decisions, balancing exploration and exploitation as needed.

Our tool effectively fulfills the second DO through the *Project Staffing Module*, which ensures that the team composition is aligned with the required ambidexterity level of the project. During the evaluation process, the interviewees identified inconsistencies in the project assessment questions, revealing the potential to improve the module's accuracy and usability (I 1–2, I 6, I 11). In response, we revised the ques-

tionnaire by addressing each project phase individually. This refinement reflects the observation of the interviewees that skill requirements vary throughout the project lifecycle (I 1–2, I 6): "*Above all, you need the ability, or the team needs the ability, to constantly adapt to unknown things*." (I 11). To account for these dynamics, we restructured the assessment questions to explicitly reference specific project phases rather than the project in its entirety, allowing for more precise input for staffing recommendations.

Another specific question in the *Project Staffing Module* previously combined two distinct aspects: *"The project commits to improving product/service quality and lowering costs."* (I 1). The interviewees noted that the projects could aim to improve quality without necessarily reducing costs and vice versa (I 1, I 11). This aligns with the scientific insights of March (1991), as both improving quality and lowering costs are exploitative behaviors, but a project does not have to address both simultaneously to be classified as exploitative. To eliminate ambiguity and improve clarity, we refined this question to: *"The project phase commits to improving product/service quality or lowering costs"*. This revision ensures that responses accurately reflect the objectives of the project without forcing an unnecessary correlation between cost reduction and quality improvement. By refining these aspects, the project staffing module improves the reliability of skill assessments, leading to better team composition recommendations that match the ambidexterity requirements of each project phase.

6.1.3 DO 3: Ambidextrous Skills

The third DO was successfully validated in the interviews. This DO states that the tool should systematically assess and integrate individuals' ambidextrous skills in both exploitation and exploration when generating staffing recommendations. The interviewees underscored the relevance of cross-functional teams in meeting the challenges *"that an organization is confronted with in the context of digitalization and adaptability"* (I 10). Consequently, they confirmed that diverse expertise within PTs is crucial to balancing efficiency and innovation (I 13). This aligns with previous findings from the literature (Guinan et al. 2019; Junni et al. 2015; Revilla and Rodríguez-Prado 2018). At first, our tool implemented this requirement through a role-based logic, ensuring that every PL assembles PTs with essential roles such as developers, user experience designers, or sales experts. However, the interviewees expressed a need for a more detailed differentiation that considers not only the subject's expertise but also the methodological competencies and personal skills (I 4, I 11, I 13). The reason behind this request is "*those who have the mindset will be able to teach themselves all the other skills"* (I 2). This perspective underscores the importance of adaptability and learning capabilities in team composition (Tempelaar and Rosenkranz 2019). By incorporating these insights, the *Project Staffing Module* of the tool should be enhanced by evaluating candidates not only based on their role definition but also on their personal, professional, methodic, and social capabilities to operate effectively in ambidextrous environments. This integration ensures that team compositions foster both the stability necessary for exploitation and the adaptability required for exploration.

Our tool effectively addresses the third DO through its project staffing module, which ensures a structured and comprehensive approach to assessing ambidextrous skills. Although the skill profiles within the tool were found to be consistent with the prior project experience of the practitioners (I 1–2), interviewee I1 emphasized that the language and definitions of the skills were too abstract and required additional clarification: *"That's a bit too abstract for me, to be honest."* (I 2). To address this, we implemented an information spreadsheet within the *Project Staffing Module* that provides an overview and summary of the skill sets. This addition ensures that practitioners have access to detailed explanations when needed, improving transparency and usability. By offering this additional resource, the tool improves clarity and ensures that project managers can make informed staffing decisions based on a well-defined skill framework. Despite initial concerns about abstraction, "When developing an app, you need a completely different developer than for classic front-end/back-end development." (I 6), practitioners validated the three skill sets and appreciated the emphasis of the *Project Staffing Module* on social skills and capabilities rather than predefined roles: *"I have found that I can apply the skill profiles [...] quite well in projects."* (I 1). This aligns with their practical experience, as they emphasized that *"the most important thing is the mindset and not the pure expert skills"* (I 2). By prioritizing personal, professional, methodic, and social capabilities over rigid role definitions, the *Project Staffing Module* remains consistent with real-world staffing needs and effectively supports ambidextrous team composition.

6.1.4 DO 4: Explainability and User Experience

The interviewees validated the fourth DO as the DO specifies that the tool must be management-friendly, enabling all stakeholders to easily understand and apply it. The interviewees confirmed this requirement, as all participants involved in the evaluation held managerial positions (I 1–2, I 4, I 8–9, I 11, I 13). Moreover, the tool actively fosters communication among stakeholders by providing a simple yet credible interface that builds trust and encourages adoption across user groups: *"It is less relevant for me, but especially for external communication."* (I 11). The interviewees emphasized that, for the tool to be effective, it must offer a seamless user experience that enables managers to make informed staffing decisions without requiring extensive technical expertise and knowledge on ambidexterity (Lindskog and Magnusson 2021). This requirement is particularly essential given that the interviews revealed a general unfamiliarity among managers with the concept of ambidexterity. In the absence of prior knowledge, a complex tool could have posed significant barriers to adoption. By striking a balance between usability and methodological rigor, the tool should align with the expectations of managerial stakeholders and facilitates more effective collaboration in workforce planning. Simultaneously, it functions as an implicit learning instrument, introducing the ambidexterity concept in a practical and accessible manner.

Our tool effectively addresses the fourth DO by ensuring ease of use across all views and modules. Throughout the development process, DO 4 was carefully considered to create an intuitive and user-friendly tool that facilitates seamless adoption. Although usability improvements were implemented throughout the tool, the *Filling*

Aid Module, specifically its *How-To* section and *Skill Overview*, explicitly addresses this DO. The evaluation confirmed that the tool is largely self-explanatory and no knowledge of the concept of ambidexterity is required, as no knowledge-intensive questions arose during usage: *"Excel can be taken to meetings, some numbers can be changed to try different possibilities and compare projects"* (I 11). However, to further improve usability and ensure that functionalities are used correctly, we implemented several refinements based on practitioner feedback, "*Yes, I also noticed that more instructions need to be included overall.*" (I 1). One key area of improvement was the Gantt-Chart functions, where participants unintentionally overwrote formulas due to uncertainty about which cells needed input. To address this, we enhanced the *Filling Aid Module* by adding clearer explanations in the *How-To* section and visually highlighting the cells that require user input. In addition, we simplified functionalities by removing the milestone marker, ensuring that the tool remains intuitive and easily comprehensible. Another observation was that the participants tended not to read the instructions provided. To counteract this, we improved the visibility of instructions within the *How-To* section by using colors and larger font sizes, making key guidance more prominent. Furthermore, users detected minor bugs related to formatting, such as line breaks and missing drop-down menus, which we corrected. Beyond usability, the tool plays a crucial role in enhancing communication between projects, particularly in staffing. Practitioners highlighted that it facilitates a more transparent exchange of resource needs across different projects, reducing conflicts and inefficiencies (I 2, I 11). Furthermore, the *Dashboard View* consolidates key project information, making communication with line operations more effective by clearly visualizing peak times in resource demand. This feature enables proactive planning and better resource allocation, ensuring that staffing decisions are well informed and aligned with project needs. Furthermore, the *Skill Overview* within the *Filling Aid Module* provides practitioners with essential information about required competencies, ensuring that they can make informed staffing decisions. This component helps clarify role expectations and supports the alignment of team composition with project requirements. By integrating these improvements, our tool successfully ensures ease of use in all views and modules, while explicitly addressing DO 4 through the *Filling Aid Module*, the *How-To* section, and the *Skill Overview*. These enhancements ensure that managers can navigate the tool effortlessly while leveraging its capabilities to optimize project planning and workforce coordination.

6.2 Focus Group Findings

The scholarly focus group perceived the tool as highly relevant and effective in addressing the research problem through a clear and user-friendly approach: "Well, I think that's a really relevant topic. [...] It's also great that you say, well, before we start the projects, we actually need to be clear about who we need. Often it's just a question of who has time right now.". However, operationality concerns were raised regarding user roles and motivation, which were resolved by adding a detailed instruction manual. In terms of robustness, visual and textual emphasis on the *Skill Module* was strengthened, and the connection between rating and skill recommendation was clarified.

In the focus group workshop, a significant limitation of the tool emerged, highlighting its vague applicability within agile environments: *"What remains unclear in the tool is how it addresses the fact that projects unfold differently. Especially in the context of agile projects, it is often still uncertain where the project is actually headed."* To address suitability in such agile environments, usage instructions now specify the tool's primary application for waterfall projects while offering guidance for agile adaptation. Overall, the evaluation confirmed the tool's real-world relevance and effectiveness while resulting in focused refinements to increase its usability and clarity.

7 Discussion

7.1 Summary of Results

In our research, we addressed the practical and theoretical gap in how PTs are staffed to meet ambidextrous project requirements (Biagini 2019; Brown 2018; Guinan et al. 2019). Although ambidexterity has been extensively studied within organizational and individual contexts, we observe a lack of guidance for its operationalization at the team level, where projects are practically implemented (Jansen et al. 2016; Jørgensen and Becker 2017; Werder and Heckmann 2019). We responded to this challenge by designing a staffing tool that contributes to practice by supporting decision makers in composing teams that align with both exploratory and exploitative project requirements. To guide the development of this artifact, we derived four DOs from the literature. These emphasize the importance of scoping the project prior to staffing, aligning the team composition with phase-specific ambidexterity, incorporating individual ambidextrous skills, and ensuring the tool is both explainable and user-friendly. Based on these objectives, we developed and iteratively refined a prototype that assesses ambidextrous project characteristics and translates them into skill-based staffing recommendations. The tool consists of three interconnected components that support structured decision making at different levels: defining project goals, evaluating ambidextrous needs per phase, and matching these needs with skill profiles. Through expert interviews, practitioner workshops, and a scholarly focus group, we evaluated the applicability of both the DOs and the artifact.

7.2 Design Principles

Building on the identified gap between the theoretical concept of TA and its practical implementation in staffing processes, our DPs translate both theoretical insights and empirical findings into actionable guidelines for the development of staffing tools (Gregor and Hevner 2013). Table 4 provides an overview of these three principles. The description of our DPs is based on the guidelines for formulating DPs by Gregor et al. (2020) to ensure their generalizability.

Table 4 Overview of the three generalized DPs

No.	Design Principle
1.	Establish a structured scoping process before staffing, to facilitate ambidextrous capabilities in project teams
2.	Apply detailed ambidexterity assessment tools as a basis for staffing, to ensure alignment between project needs and team composition
3.	Ensure alignment between tool usage and ambidextrous organizational workflows, to support adoption and acceptance across different stakeholder groups

7.2.1 DP 1: Establish a Structured Scoping Process Before Staffing, to Facilitate Ambidextrous Capabilities in Project Teams

Aim, Implementer, and User The aim of this principle is to ensure that staffing decisions are based on a shared structured understanding of the purpose, constraints, and required outcomes of the project, because staffing decisions are often made without a clear and shared understanding of the intent and structure of the project (Project Management Institute 2018). As a lack of adequate scoping poses significant challenges for organizations, the implementation of well-defined scoping becomes essential (Boutetière et al. 2018). Before applying any staffing logic, decision makers must first define what the project aims to achieve (Komal et al. 2020). For example, the selection of the appropriate project environment, whether waterfall or agile, depends on the project scope. This includes clarifying the project phases, subtasks, and milestones. Implementers should design staffing tools to make this scoping step a prerequisite. An interviewee stated, *"you could almost make an own tool for the staffing aspect"* (I 1). Users can translate high-level goals into actionable staffing decisions.

Mechanism and Rationale To support structured project scoping before staffing for ambidextrous project requirements, staffing tools should embed functionality that guides users through a scoping process before recommending team configurations. This process should present core information such as project goals, expected deliverables, time constraints, and required levels of exploration or exploitation (Section 4.2). By formalizing these project attributes early, the tool creates a strong foundation for staffing decisions. In addition, in the process of operationalizing this DP, it is imperative that implementers do not neglect the social dimensions associated with organizational project scoping, particularly in relation to the management of limited resources. When staffing is performed without structured scoping, team compositions can misalign with actual ambidexterity needs, leading to performance issues.

Context This principle is relevant for all organizations with multiphase projects. Our interviews confirmed that by establishing structured scoping as a default starting point, staffing tools can help align stakeholders and prevent strategic misalignment between team setup and project intent.

7.2.2 DP 2: Apply Detailed Ambidexterity Assessment Tools as a Basis for Staffing, to Ensure Alignment Between Project Needs and Team Composition

Aim, Implementer, and User The aim of this principle is to discover and quantify the ambidextrous needs of a project so that staffing decisions are based on solid data-informed foundations, because ambidextrous requirements often remain implicit and are not systematically assessed in both the literature and field research (Biagini 2019; Brown 2018; Guinan et al. 2019). These needs often remain implicit, leading to staffing choices that reflect assumptions or default patterns rather than strategic intent (Biagini 2019; Brown 2018). Because PTs play an essential role in the execution of digital business innovation and transformation projects, evaluating the requirements of the ambidextrous project is crucial (Alexander and van Knippenberg 2014; Hadjielias et al. 2021). Implementers of staffing tools should therefore enable PLs and decision-makers to articulate ambidextrous demands explicitly and translate them into structured, quantified input for staffing logic. Our evaluation confirmed that practitioners would welcome structured assessment tools (Section 6.1).

Mechanism and Rationale To support the assessment and express the ambidexterity requirements in each phase, the staffing tools must implement mechanisms that help users measure (Section 2.4). This may include targeted survey items, sliders, rating scales, or diagnostic prompts that capture how much exploration and exploitation is needed. When assessing ambidextrous project requirements in practice, tools can be based on Lubatkin et al. (2006) measurement scale. By converting qualitative project characteristics into quantitative values, tools establish a more objective and consistent foundation for staffing decisions, and thus project success (Boutetière et al. 2018; Guinan et al. 2019). This quantification also allows for comparison between projects and alignment with skill profiles or team configurations.

Context This principle is important in environments where evidence-based, transparent, and reliable arguments are required for staffing decisions. Making the ambidexterity degree demanded explicit and measurable allows organizations to improve transparency, facilitate cross-project alignment, and reduce reliance on intuition in the staffing process.

7.2.3 DP 3: Ensure Alignment Between Tool Usage and Ambidextrous Organizational Workflows, to Support Adoption and Acceptance Across Different Stakeholder Groups

Aim, Implementer, and User The aim of this principle is to ensure that staffing tools are not only easy to use for users, but also produce outputs that are understood, accepted, and trusted by other key stakeholders, especially the supervisor and the employees to be staffed (I 2, I 11). Trusted staffing tools facilitate a more profound comprehension of TA, thereby potentially enhancing organizational efficiency during the digital transformation process (Linhart et al. 2020; Werder and Heckmann 2019). Implementers should therefore design tools that combine intuitive interac-

tion with transparent and comprehensible decision logic and are easy to integrate into managerial workflows to efficiently manage stakeholders (Rashmi Assudani and Kloppenborg 2010).

Mechanism and Rationale To support the adoption and acceptance of the concept of ambidexterity in practice, staffing tools must be integrated into familiar planning environments, highlight required input, provide embedded guidance and apply user-friendliness. For tool outputs to be accepted by broader stakeholders, results must be explainable and grounded in transparent logic: *"It is about being able to tell managers that you need people with the skills to do the job"* (I 2). Tools must make it clear how project requirements were assessed and which competencies or availability data influenced the match. If the rationale behind staffing decisions remains opaque, the legitimacy of the tool can be questioned, leading to resistance or manual workarounds. The operationalization of DP 3 can be attained through the employment of widely used software, user interface standards, and established data protocols in the development of staffing tools.

Context This principle is important because staffing decisions can be sensitive and therefore the human-machine interaction plays an important role. A staffing tool that is technically sound, but lacks user-friendliness or stakeholder legitimacy, is unlikely to be adopted. Ensuring both usability and acceptance increases the likelihood that ambidexterity-informed staffing decisions are implemented as intended and respected by all parties involved.

The introduced DPs synthesize the core findings of our literature review, expert interviews, and artifact evaluation. They serve as a foundation for the development of tools that empower organizations and support decision makers to successfully staff ambidextrous PTs.

7.3 Theoretical Contribution

Prior literature establishes that organizations operating in digitally transforming environments must balance exploration and exploitation to remain competitive (March 1991; Tushman and O'Reilly 1996; Birkinshaw and Gibson 2004; O'Reilly and Tushman 2013; Vial 2019). Research has extensively developed OA and IA, demonstrating their positive effects on firm performance while outlining structural, sequential, and contextual mechanisms for achieving this balance (Gibson and Birkinshaw 2004; Raisch and Birkinshaw 2008; O'Reilly and Tushman 2013; Schnellbächer et al. 2019). Furthermore, studies recognize particularly PTs as critical integration points where organizational structures and individual behaviors converge, highlighting that effective team composition and targeted staffing are essential for managing ambidextrous tensions (Guinan et al. 2019; Barthel and Hess 2019; Hadjielias et al. 2021). Despite the importance of PTs, ambidexterity at this level remains insufficiently understood, particularly within staffing contexts (Jørgensen and Becker 2017). Existing literature provides limited insight into how ambidextrous capabilities emerge within PTs and their composition influences the effective balancing of exploration and exploitation (Hollenbeck et al. 2012; Jansen et al. 2016; Jørgensen and

Becker 2017; Stelzl et al. 2020). Our study contributes design and action-oriented knowledge in the form of four distinct theoretical contributions (Gregor 2006).

First, we contribute the understanding that ambidexterity at the level of PTs cannot be implemented effectively without aligning staffing practices with existing organizational workflows and stakeholder interactions. In the interview workshops, the experts reinforced this need by emphasizing that various kinds of projects call for distinct sets of skills. This insight is reflected in DP 3, which emphasizes the need to embed staffing approaches into ambidextrous organizational routines to ensure stakeholder acceptance and cross-project coordination.

Second, we contribute a phase-contingent perspective on ambidexterity in projects, demonstrating that ambidextrous requirements shift systematically across project phases. Our evaluation reveals a clear pattern: Early project phases require more exploration, while later phases demand stronger exploitation, with some phases exhibiting genuinely ambidextrous profiles. Although the ambidexterity literature conceptualizes exploration and exploitation as organizational tensions, it provides little guidance on how these tensions unfold over the lifecycle in a dynamic project environment (Barthel and Hess 2019). DP 1 derives from this insight and establishes that a structured scoping process is essential before staffing ambidextrous teams. This principle clarifies when exploration, exploitation, or ambidextrous capabilities are needed.

Third, we link measured ambidextrous requirements to concrete skill profiles. By integrating the ambidexterity assessment into our artifact, we show how exploration and exploitation requirements can be mapped onto the skill sets of PT members. This mapping underpins DP 2, which positions ambidexterity assessment tools as a foundation for deriving team composition recommendations (Lubatkin et al. 2006). It provides a novel microlevel mechanism that connects abstract ambidexterity constructs with actionable staffing logic (Gupta et al. 2006; O'Reilly and Tushman 2011).

Fourth, we validate the applicability of the ambidexterity measurement scale by Lubatkin et al. (2006) for temporary, project-based contexts (Section 2.4). By comparing established measurement approaches in a project-based setting, we contribute to the debate on how ambidexterity should be measured in applied organizational settings. In accordance with DP 2 rigorous measurement should form the basis for staffing ambidextrous teams.

In summary, our research responds to existing calls to theoretically investigate ambidexterity from a project-level, team-level, and microlevel perspective, while contributing to the refinement of its measurement and implementation in staffing contexts (Binci et al. 2020; Gupta et al. 2006; Jansen et al. 2016; Jørgensen and Becker 2017; Lubatkin et al. 2006; O'Reilly and Tushman 2011; Werder and Heckmann 2019).

7.4 Practical Implications

Prior literature demonstrates that effective staffing aligned with project-specific skill requirements is critical for enabling PTs to balance exploration and exploitation and thereby successfully execute digital transformation initiatives (Guinan et al. 2019;

Linhart et al. 2020; Werder and Heckmann 2019). Empirical evidence shows that early identification of required competencies substantially improves project success rates, whereas inadequate staffing leads to delays, suboptimal outcomes, or project failure (Boutetière et al. 2018; Guinan et al. 2019). However, despite this recognized importance, practical implementation remains insufficiently developed, as organizations frequently rely on intuition rather than structured methods or decision-support tools for staffing decisions, resulting in PTs that are not systematically designed to achieve ambidexterity and thus fail to fully realize their potential (Biagini 2019; Brown 2018; Guinan et al. 2019). The practical implications resulting from our theoretical insights, as well as the development and evaluation of the staffing tool, are threefold.

First, aligning staffing practices with existing organizational workflows and stakeholder interactions implies that managers cannot treat ambidexterity as a stand-alone staffing criterion. Instead, staffing decisions must be embedded into established project governance processes to ensure acceptance across stakeholder groups and to support coordination between exploration- and exploitation-oriented initiatives.

Second, the phase-contingent nature of ambidexterity highlights that project managers should begin each project with a structured scoping effort that clarifies the dominant mode, exploration, exploitation, or ambidexterity, expected in each phase. This enables more deliberate and dynamic staffing adjustments over the project lifecycle, reducing mismatches between required and available skill sets.

Third, linking ambidextrous requirements to concrete skill profiles provides practitioners with a micro-level mechanism for selecting and composing teams: By assessing exploration and exploitation needs through validated criteria, organizations can match team members to tasks in a more evidence-based manner. This supports more transparent staffing decisions and helps overcome intuition-driven allocation processes that often dominate project settings.

Together, these implications guide practitioners in operationalizing ambidexterity in project staffing, offering actionable pathways for translating abstract ambidexterity constructs into concrete managerial routines.

8 Conclusion

Using a DSR approach, this study developed and evaluated a staffing tool to support ambidextrous PTs. Beyond this, the research contributes three generalizable DPs that guide the development of staffing tools aiming to balance exploration and exploitation: DP 1 targets the enabling of ambidextrous decision environments through project-specific scoping, DP 2 focuses on grounding staffing decision on quantifiable ambidextrous measurements, and DP 3 emphasizes seamless integration into user workflows to ensure tool adoption, acceptance and use. Together, these DPs provide a structured foundation for developing information systems that support dynamic PT composition and strategic workforce planning (McClough and Rogelberg 2003). We encourage practitioners and researchers to apply the DPs in a range of Human Resources processes beyond project staffing.

Based on our results, we present four theoretical contributions that inform the advancement of the field: we revealed the micro-mechanisms and staffing challenges that arise when implementing ambidexterity in temporary PT; we demonstrated that ambidextrous requirements shift systematically across project phases, thereby conceptualizing phase-contingent ambidexterity in project environments; we linked measured exploration and exploitation requirements to concrete team skill profiles, providing an actionable mechanism for staffing ambidextrous teams; and we validated the applicability of the ambidexterity measurement scale by Lubatkin et al. (2006) in temporary, project-based contexts. Practically, our study shows that ambidextrous staffing must be embedded in existing organizational processes, guided by a clear scoping of exploration and exploitation needs across project phases, and supported by evidence-based matching of skill profiles to these requirements.

Despite these contributions and implications, our work is subject to three main limitations. First, while the tool as a proof of concept was evaluated through expert interviews, it has not yet been tested in a full real-world deployment covering the entire staffing process (Venable et al. 2016). Besides, the expert interviews were conducted exclusively within a single organization based in Germany, which may limit the extent to which the results apply to smaller, less regulated organizations that are currently not involved in large-scale transformation initiatives. Consequently, it was not possible to assess its incorporation into real organizational staffing processes (Larsen et al. 2020). Capturing this dynamic requires longitudinal and organizationally embedded studies. Future work could also investigate how the staffing tool can be technically integrated within existing Human Resource systems and how it performs under real-world constraints characterized by conflicting stakeholder interests. Furthermore, subsequent research might explore how the ambidextrous staffing tool can be utilized across various project management environments and organizational cultures.

Second, the current version of the tool is focused on skill-based staffing logic, with a focus on aligning individual competencies to project phase demands. Although skills are critical, this approach may overlook the interpersonal dynamics that influence PT effectiveness in ambidextrous settings (Perretti and Negro 2006). For example, how PTs handle the tension between exploring and exploiting members or how changes in PT composition through ambidextrous skill-based staffing affect PT performance. Future research should explore behavioral, cognitive, and interpersonal factors in staffing logic, potentially incorporating elements such as knowledge distribution among project phases, adaptability under pressure, or collaboration preferences.

Third, the tool was designed for waterfall project structures with defined phases and scopes. However, ambidexterity is increasingly relevant in agile environments, where project goals are fluid, PT roles shift, and staffing needs evolve continuously (Binci et al. 2023; Project Management Institute 2018). Adapting the tool to agile settings would require rethinking some foundational assumptions. Especially concerning initial scoping since projects in agile environment are conducted through iterative sprints rather than being split into separate phases (Marnada et al. 2022). Furthermore, in agile project environments, the manner in which team members independently assign their sprint tasks conflicts with the clear categorization outlined

by ambidexterity requirements (Masood et al. 2020). Future research could explore the adaptability of ambidextrous staffing tools to these agile project environments.

Just as a car engine requires the right type of fuel to function properly, projects require PTs that are carefully aligned with their ambidextrous requirements. Mismatched staffing can hinder progress or completely derail outcomes. With ambidexterity becoming increasingly essential in today's rapidly changing environments, future research should continue to explore how staffing tools and PTs design can ensure that managers always fuel their projects with the right combination of skills, mindsets, and structures.

9 Appendix A

9.1 Details On Literature Review Process

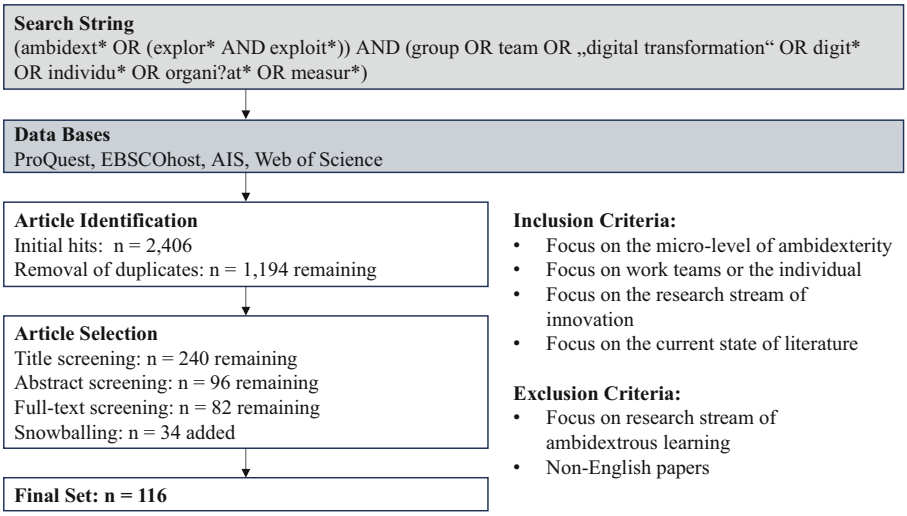

Fig. 8 Literature review process

10 Appendix B

10.1 Interview Guide 1st Iteration (Ex-ante)

Part I—Introduction

- Introduction to topic of research project
- General information on interview structure, recording and confidentiality

Part II—The Role of Teams in the Transformation

- Please tell me about your position.
- How do you describe the role of project teams in the digital transformation?
  - Do they work on new products, processes or business models or do they improve existing ones? Or both?
  - How does that look like specifically? Do you have an example?
- Does it require different team skill sets for improving existing business models, processes and products versus finding new business models, processes and products?
- Did you struggle in the past from a mismatch between project requirements and team skills? How?
  - What was the result of this mismatch?
  - How could this mismatch be avoided in the future?

Part III—Retrospective On Staffing Project

- Tell me about one project you are satisfied with. What is the goal?
- How were the people staffed on the project?
  - Who decides about the staffing?
  - How were the requirements of the project in terms of skills assessed?
  - How were employees chosen for the project?
  - Are there any areas where you would want to improve?
- Is that the same procedure with every project your team/your colleagues work on? Or does the process deviate from project to project?
- What works well in the other processes?

Part IV—Prospective of Staffing Project

- If we match all the process bits we just named as good: How would the ideal staffing process look like for you hypothetically?
- In the project discussed: How would it have helped in the process to have a tool that analyzes the requirements of the different tasks and then indicates the staffing requirements?
  - Who is going to use this tool?
  - What is important to you in this tool?
  - What are requirements for you using this tool?

Part V—Closing

- Thank you very much for your time and answers
- Do you have any questions or comments left we did not ask about?

11 Appendix C

11.1 Interview Guide 2nd Iteration (Ex-post)

Part I—Introduction

- Introduction to topic of research project
- General information on interview structure, recording and confidentiality

Part II—Initial Situation and Introduction to the Tool

- Description of Initial situation:
  - Problem 1: Lack of project scoping, i.e. PL and principal are not taking the time to define the project goal. This makes it difficult for the PL to request resources and request is often based on a gut feeling.
  - Problem 2: Resource availability, line groups do not want to pass on the resources because a) they do not understand what projects are made for and what their benefit is and b) they themselves do not have the resources because several projects request the same resources.
- Description of tool structure and how it aims to minimize these problems

Part III—Case Study and Tool Testing

- Description of task for PL and principial:
  - You are PL and principal of a project in a bank. The principal has received information from me in advance about the content of the project. Together you should now plan this project with the help of the tool, so that in the end you also have the required skills. To keep the situation realistic, you, PL, do not yet know what the project is about. You will have to work this out together.
- Description of task only available to principial:
  - You work in a bank and are the principal of a project. In this project, you want a new feature to be added to your bank's existing banking app. Namely, an account analysis is to be implemented. This means that all income and expenses will be analyzed and categorized. This should provide customers with maximum transparency about their spending. One of your competitors has already introduced this feature.

Part IV—Interview On Tool

- What was your impression when using the tool?
- Ease of use

  - How easy was it to use the tool?
  - Do you consider the tool to be management-friendly?
- Applicability
  - How would the tool help you in your next project planning?
- Effectiveness
  - Is the tool target-oriented (effective) in the preparation process of a project?
  - Does it increase the success of the project?
- Efficiency
  - Can good results be achieved in a short time?
- Fidelity with real world problem
  - Can a clear picture be created through project planning as far as the project scope/project goal is concerned? Is this a good basis to decide on resource needs?
  - How does the tool help you in communicating with line units?
  - How does the tool help to coordinate the resource needs of multiple projects? Does it help to better manage resource availability?
  - What do you think of the phase model? In your eyes, would this give the option to balance excess resource needs?
- Consistency:
  - Are the three skill profiles appropriate?
- Further suggestions
  - Do you have any other ideas and suggestions on how to further develop the tool?

Part V—Closing

- Thank you very much for your time and answers
- Do you have any questions or comments left we did not ask about?

12 Appendix D

12.1 Interview Guide Focus Group

Part I—Introduction

- Introduction to topic of research project
- General information on interview structure, recording and confidentiality

Part II—Presentation of the Artifact

- Description of tool structure and how it aims to minimize staffing problems

Part III—Open Discussion

- What are your first impressions/your first thoughts about the tool's applicability?
- Does the tool solve real world problems of potential stakeholders?

- Is the tool effective in doing so?
- Can good results be achieved within a short time/reasonable effort efficiently?
- Is the tool easy to use and management-friendly?
- Is the tool complete and consistent?
- Do you have general suggestions and comments?

Part V—Closing

- Thank you very much for your time and answers
- Do you have any questions or comments left we did not ask about?

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Data Availability Upon request, the authors are ready to grant access to interview and workshop transcriptions and the artifact developed.

Conflict of interest A. Rex, H. Pfaff, J. Lautenschlager, S. Mütze and N. Urbach declare that they have no competing interests.

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