How to Put Organizational Ambidexterity into Practice – Towards a Maturity Model

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Abstract. Organizational ambidexterity (OA) is a vital capability for surviving in dynamic business environments by simultaneously pursuing exploitation, i.e., continuous streamlining of business processes, and exploration, i.e., radical innovation of products, services, and processes. During the last years, OA knowledge has continuously matured, comprising insights into performance outcomes, antecedents, and moderators. However, there is a lack of guidance on how to put OA into practice. Addressing this challenge, our research is geared toward the development of an organizational ambidexterity maturity model (OAMM) using a design science research approach. Our OAMM follows a prescriptive purpose of use, helping organizations select actionable practices. To develop our maturity model, we first reviewed the general OA literature to identify actionable practices. Second, we built on the six core elements of BPM, i.e., strategic alignment, governance, methods, information technology, people, and culture, to structure identified practices. Third, we used card sorting to assign practices to maturity levels. We evaluated our OAMM with respect to general design principles for maturity models. Our work lays the foundations for the structured development of OA capabilities and for future research in this area.

Keywords: Organizational Ambidexterity, Exploitation, Exploration, Maturity Model, Capability Development, BPM Capabilities, Card Sorting

1   Introduction

Organizational ambidexterity (OA) emerged as an essential capability to explain how organizations sustain success in dynamic and turbulent environments [32]. The enduring challenge lies in reconciling tensions between exploitation and exploration as two inseparable modes of organizational learning and change [28]. Yet a considerable number of organizations struggle in aligning and configuring the entire organization to solve these tensions and achieve a balance between exploitation and exploration [17].

To date, scholars have researched the outcomes, antecedents, and moderators of OA as three major streams in conceptual and empirical studies on ambidexterity [34, 40]. *Outcomes* relate to the positive performance effects that OA entails, e.g., in terms of sales growth, profitability, and operational performance [13, 19, 27]. *Antecedents* de-

scribe the elements or mechanisms of organizational design employed to achieve balance between exploitation and exploration [46]. *Moderators* are all factors which influence the OA-performance linkage, e.g., competitive dynamics or firm size and age [40]. The benefits of OA as a competitive differentiator and precursor of long-term survival have been broadly recognized [13, 19, 27]. Therefore, research on OA antecedents investigates sequential and simultaneous approaches and thus, structural, contextual, and leadership-based antecedents [13, 34, 40]. Although their combination is considered beneficial [1, 40], the interrelations between different types of OA antecedents remain under-researched [40]. Hence, answers to the question of *how* to put ambidexterity into practice remain open and a lack of practical guidance persists [1, 33]. To address this gap, we seek to enhance prescriptive knowledge on OA capability development answering the following research question: *How to put OA into practice by systematically developing OA capabilities?*

In answering our research question, we adopt the design science research (DSR) paradigm [16] and develop an organizational ambidexterity maturity model (OAMM) as resulting artifact. Our OAMM serves a prescriptive purpose of use, assisting organizations in the development of OA capabilities based on actionable practices. They describe clear actions helpful to implement OA and thus assist the configuration of ambidextrous organizations. For justificatory knowledge, we built on business process management (BPM) from a capability perspective and OA antecedents to structure the application domain. This is reasonable for the following arguments: First, maturity models (MM) are valid design products [29] and an established tool for capability development, not only but particularly in the BPM domain [18, 25, 38]. Further, MM intended for a prescriptive purpose of use include good or best practices which is helpful to provide practical guidance [37]. Second, capability development is tightly linked to BPM because capabilities and processes both deal with a coordinated set of tasks and their execution [26, 35, 54]. We therefore rely on BPM to foster OA capability development. Third, focusing on OA antecedents reveals prerequisites for the configuration of ambidextrous organizations and related capabilities [46], whereas outcomes and moderators address the OA-performance linkage providing the rationale for why OA is beneficial. Our OAMM is an initial step offering guidance for OA researchers to systematically develop OA capabilities.

In developing our OAMM, we draw upon the research process for design science as proposed by Peffers et al. [36]. Subsequent to problem identification and motivation as carried out in this introductory section (*research problem*), we deliver on the theoretical background in section 2 and derive design objectives for our problem solution (*objectives for a solution*). Our research approach is presented in section 3. Section 4 is concerned with the design specification of our OAMM (*design and development*) based on the procedure model by Becker et al. [3]. Moreover, our evaluation activities are presented (*demonstration and evaluation*). The conclusion section summarizes the main insights, delivers on both theoretical and practical implications (*communication*), and provides avenues for future research pointing to the limitations of our study.

2 Theoretical Background

2.1 Organizational Ambidexterity

OA is described as an organization's capability to maintain dual capacities for both exploitation and exploration for surviving in dynamic business environments and managing organizational change [53]. Exploitation seeks the refinement of existing products by continuous streamlining of business processes for productivity in operations [44]. Activities related to exploitation are described in terms of efficiency, control, and certainty [19, 28]. Exploration strives for radical innovation of products, services, and processes, to achieve adaptability and growth [44]. Activities related to exploration are associated with experimentation, autonomy, and risk-taking [19, 28].

Considering OA antecedents as one of three major research streams on OA, sequential and simultaneous approaches in implementing OA can be distinguished. Early studies conceptualize OA as the temporal sequencing of exploitation and exploration for their separation over time [17, 41, 45]. In contrast, subsequent studies suggest that tensions between exploitation and exploration do not need to be an either/or proposition and can be addressed simultaneously within the organization [17, 49, 53]. The extant literature concerned with a simultaneous pursuit of OA features three different modes of OA, distinguishing structural, contextual, and leadership-based antecedents [40]. Structural ambidexterity originates from dual organizational structures with independent business units for exploitation and exploration [4, 34]. Contextual ambidexterity anchors the ability to balance exploitation and exploration to individuals [1, 13]. Leadership-based ambidexterity attributes a key role to leadership processes in fostering OA [27, 33]. Thus, we specify the following design objective:

(DO.1) *Ambidextrous organizations:* To systematically develop OA capabilities, an organization must develop dual capacities for exploitation and exploration. Therefore, sequential and simultaneous approaches, including structural, contextual, and leadership-based antecedents of OA, need to be integrally covered.

2.2 Business Process Management and Capability Development

With process orientation being a central paradigm of organizational design, BPM is closely related to capability development [22, 35]. BPM reflects the skills and routines necessary to integrate, build, and reconfigure an organization's business processes in response to environmental change [12, 52]. Therefore, six core elements of an organization's BPM capability have been identified: strategic alignment, governance, methods, information technology, people, and culture [57]. These elements further split into thirty BPM-related capability areas. Table 1 shows a brief description of the six core elements, for a detailed description see the handbook of BPM [57]. Against the background of dynamic business environments highlighting the importance of OA to sustain success [32], the BPM domain recognizes the need to foster 'ambidextrous BPM' [44]. As such an organization consciously decides whether its BPM should strive for exploitation (e.g., improvement), exploration (e.g., innovation), or both simultaneously. This leads to the following design objective (DO):

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(DO.2) *BPM and capability development:* To systematically develop an organization's OA capabilities, it is necessary to improve distinct capability areas related to the six core elements of BPM by developing both exploitative and explorative BPM capabilities for each of the core elements (*ambidextrous BPM*).

Table 1. The Six Core Elements of BPM Capability.

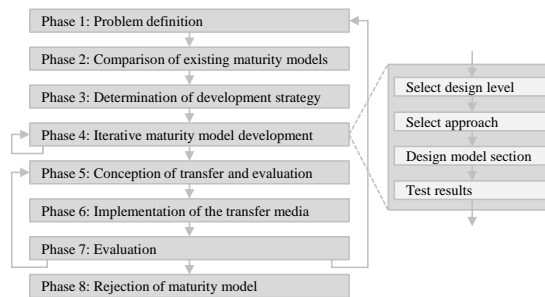| Core Elements	Description
Strategic Alignment	BPM goals and the execution of businesses processes need to be tightly linked to an organization's strategy.
Governance	Roles and responsibilities for various levels of BPM need to be appropriately defined for transparent accountability. Governance further relates to designing decision-making and reward processes to guide process-related tasks.
Methods	Methods accumulate all tools and techniques that support and enable activities along the process lifecycle and within organization-wide BPM initiatives.
Information Technology	IT-based solutions such as application and support systems utilized in activities along the process lifecycle and BPM initiatives are comprised within IT.
People	People relates BPM capabilities to an organization's human capital and ecosystem. It captures individuals and groups continually enhancing and applying their process skills.
Culture	Culture comprises all values and beliefs with respect to an organization built around process orientation. A facilitating environment offers the surrounding for BPM initiatives.

2.3 Maturity Models

A vast number of MM have been developed and applied to various domains in the context of BPM [9, 59]. MM are highly appreciated to support organizations in improving their BPM capabilities by elucidating a maturation path along different stages in an anticipated, desired, or logical way [43, 55]. Therefore, MM contain a sequence of maturity stages as well as a descriptions of each stage's characteristics [37]. Progress along the maturation path towards the final state of maturation requires constant improvement related to organizational capabilities [3, 43].

MM serve three purposes of use when practically applied: prescriptive, descriptive, or comparative [3, 37]. A descriptive purpose of use applies if the MM can be used to assess the organization's as-is situation [37]. The MM has a prescriptive purpose of use if it provides guidance on how to determine desirable future maturity stages and suggests initiatives for improvement [37]. A comparative purpose of use is given if the MM serves internal or external benchmarking [37]. To guarantee the usefulness and applicability of MM, first, the process of model design requires substantiation with a procedure model. Second, the model as a design product itself needs to account for design principles [37]. Therefore, the framework of general design principles (DPs) as per Pöppelbuß and Röglinger clusters nine DPs into three nested groups: basic principles, principles for descriptive purpose of use, and principles for prescriptive purpose of use [37]. A depiction of the DPs is provided in Figure 3 (see section 4). This leads to the following design objective:

(DO.3) *Maturity Models:* To systematically develop OA capabilities, MM need to be developed following an accepted procedure model and account for general design principles.

3   Research Method

Maturity Model Development. Our study follows the DSR process by Peffers et al. [36] to develop our artifact, i.e., the OAMM that assists organizations in developing OA capabilities based on actionable practices. When formulating the design specification of our OAMM in the design and development phase of the DSR process, we follow the procedure model for MM development by Becker et al. [3] (Figure 1), supplemented by a literature review and the card sorting approach [61].

| Phase 1: Problem definition |
| Phase 2: Comparison of existing maturity models |
| Phase 3: Determination of development strategy |
| Phase 4: Iterative maturity model development |
| Phase 5: Conception of transfer and evaluation |
| Phase 6: Implementation of the transfer media |
| Phase 7: Evaluation |
| Phase 8: Rejection of maturity model |

Select design level
Select approach
Design model section
Test results

Fig. 1. Procedure model for developing maturity models [2].

Phase 1 to 4 are crucial to develop the design specification of a MM, whereas phases 5 to 8 concern its application and evaluation. Our research comprises the development of the OAMM, while subsequent phases are planned for future research.

The development of our OAMM started from stating the research problem (phase 1) in the introduction. Recognizing a lack of guidance on how to put OA into practice, we address this gap by enhancing the systematic development of OA capabilities. Searching the extant body of knowledge, no MM targeted to OA has been identified (phase 2). Neither CMMI as the archetype of capability MM [7], nor other BPM-related MM [43] are presumed adequate for answering our research question. MM are mostly based on established best practices [7], whereas our OAMM is a first attempt to structure OA capability development with no accurate measures [19]. Thus, we selected a strategy of completely new model design (phase 3). To iteratively develop the OAMM (phase 4), we selected two approaches: (1) literature review to identify required capabilities for OA development, i.e., actionable practices, (2) card sorting approach to assign these practices to different maturity stages. Both approaches are briefly explained below.

Literature Review. We first conducted a literature review [58, 60] to extract actionable practices for OA capability development. We searched Google Scholar [15] and the Web of Science Core Collection [6] such that we assume to have covered core publications from the general OA literature. Using "organizational ambidexterity" as a search term delivered 20,285 results. To obtain a manageable scope of papers, we selected the top 25 search results by number of citations for each of the two databases. In doing so, we assume to cover the most relevant articles which provide us with a sound basis for developing our OAMM as an initial step. Ending up with a list of 50 articles, we first removed duplicates. Second, the relevance of each publication was assessed based on the title and abstract and non-adequate articles were sorted out. We compiled a final list of 15 publications [1, 5, 11, 13, 17, 23, 24, 32–34, 40, 41, 46–48] to be included in our

in-depth screening process. Focusing on OA antecedents in screening the articles, we extracted 754 relevant statements and consolidated all that contained the same message. For the remaining statements, we decided if OA antecedents were addressed on a high, medium, or low level of abstraction to exclude all that were not actionable enough to assist organizations in putting OA into practice. To illustrate the three levels, we consider the example of structural ambidexterity: It postulates dual organizational structures [4, 34] (high level), distinguishing mechanistic and organic structures [41] (medium level), which require large and centralized exploitative units and small and decentralized explorative units respectively [40] (low level). We rephrased all remaining statements in a concise and action-oriented manner to become actionable practices. All practices promote OA by either distinguishing clear actions for exploitation and exploration or focus on the ambidextrous idea in general. Thus, there are no practices only addressing exploration or exploitation separately. The result of our literature review provided a set of 44 actionable practices to be included in our OAMM. Structuring our set of practices along the six factors of BPM, we realized that it does not contain practices for IT. However, against the background of digitalization [14], we acknowledge an organization's IT capability as a key component [14, 31]. Consequently, we decided to search for additional articles within the the AISeL [2] and EJIS [51] databases. Using the search term "IT ambidexterity" and "ambidexterity" within title and abstract leads to 13 articles. We proceeded exactly as we have done before and included three more articles, more precisely 10 more actionable practices.

Card Sorting. After conducting the literature review to identify actionable practices for OA capability development, we used the card sorting approach. Card sorting is generally used to organize and categorize knowledge [61]. It can be performed in an open or closed manner. While in a closed card sorting participants sort content into predetermined categories, an open card sorting asks them to sort and categorize content into their own categories [42]. To ensure reliability of our results, the level of agreement between two raters is calculated [30]. To assess inter-rater reliability, the Cohen's Kappa coefficient is used [8]. It can be interpreted as the proportion of joint judgement in which there is agreement after chance agreement is excluded. In cases of disagreement, the raters discuss all mismatching assessments and decide on one maturity stage.

Evaluation Activities. To evaluate our OAMM, we follow the DSR evaluation framework by Sonnenberg and vom Brocke [50]. Basically, the choice of evaluation strategies occurs along two dimensions: *when* and *how* to evaluate [39, 56]. *When* to carry out the evaluation is determined relative to artifact construction. While ex-ante evaluation happens before the construction of an artifact, ex-post evaluation is conducted afterwards. For *how* the evaluation of an artifact occurs, two different types of evaluation approaches can be distinguished. Artificial approaches refer to the formal proof of an artifact, e.g., by feature comparison, whereas naturalistic approaches cover an initial demonstration by involving real problems, users, tasks and systems, e.g., by case studies. We use an ex-ante artificial evaluation approach, i.e., feature comparison to assess whether the design specification of our OAMM contributes to the solution of our research problem. Therefore, we discuss it against the design objectives derived from justificatory knowledge in section 2.

4 Design Specification of the Maturity Model

4.1 Conceptual Architecture

In this section, we provide insights into the *design and development* of our OAMM (phase 4) by presenting the results of conducting the four sub-steps of this phase: selecting the design level, selecting the approach, designing the model section, and testing the results (Figure 1). Our OAMM is intended to provide guidance for the structured development of an organization's OA capabilities. Therefore, we present our OAMM as a matrix, where the vertical axis includes the six core elements of BPM, corresponding capability areas, and underlying actionable practices as criteria for maturity assessment. The horizontal axis includes five consecutive maturity stages (Table 2). To compile the overall architecture of our OAMM, we performed a closed card sorting assigning each actionable practice to exactly one predefined maturity stage.

For the vertical axis, we structure our set of 54 actionable practices along the six core elements of BPM and corresponding capability areas, which have already been appreciated by researchers across various domains [57]. This seems reasonable as capability development is tightly linked to BPM because capabilities and processes both deal with a coordinated set of tasks and their execution [35, 54]. The six core elements of BPM are further presumed to provide a comprehensive description of all areas of organizational design which embody an organization's BPM capabilities. Moreover, there is no alternative classification that we considered to fit our research.

Table 2. OAMM Maturity Stages and Stage Characteristics.

Maturity Stages	Stage Characteristics
(1) Novice	The novice organization is given instructions for acting based on objectively defined rules. These rules are independent of the OA domain and can be understood without OA capabilities. The organization lacks ambidextrous thinking and behavior. It is indifferent towards ambidextrous strategies and related outcomes.
(2) Advanced Beginner	The advanced beginner organization gains understanding of the OA domain. The organization has some experience coping with real cases. Specific requirements in pursuit of ambidextrous strategies are recognized. The organization is indifferent towards related outcomes as ambidextrous thinking is not disseminated.
(3) Competent	The competent organization perceives multiple antecedents and requirements of OA and judges on their relative importance based on instruction or experience. It strives for routines in showing ambidextrous behavior. The organization recognizes ambidextrous goals, but does not take on ambidextrous attitudes. It is concerned with the positive or negative consequences of ambidextrous strategies.
(4) Proficient	The proficient organization is aware of ambidextrous goals. Requirements related to ambidextrous goals and behaviors can be prioritized with respect to specific situations. A holistic view enables the organization to intuitively recognize challenges and benefits of OA. It still needs rules for action and guidance on how to put OA into practice. Ambidextrous thinking and attitudes are demonstrated.
(5) Expert	The expert organization draws on substantial experience in the OA domain. Dual capacities for exploitation and exploration enable immediate situational responses. Knowing which reaction is best to accomplish a certain goal, decision making and allocation of resources to exploitation and exploration are based on intuitive expertise. The organization is fully committed to the pursuit of ambidextrous strategies.

For the horizontal axis, we derived five maturity stages based on the Dreyfus model of directed skill acquisition which describes developmental stages for how individuals acquire skills [10]. The model reveals progressive changes in a performer's perception of

their task environment assuming that advanced skills lead to less dependency on abstract principles or instruction and more on concrete experience [10]. We suggest a fit between the model and our research goal of enhancing structured OA capability development as the development of an organization's capabilities can be tightly linked to learning patterns and skill development of individuals [11]. We labelled our OAMM maturity stages in accordance with the skill levels contained in the Dreyfus model: (1) novice, (2) advanced beginner, (3) competent, (4) proficient, (5) expert. In contrast, the stages' definitions have been adapted by retaining general definitory elements from the Dreyfus model and respecting characteristics of the OA domain within our definition. Table 2 depicts the five maturity stages as contained in our OAMM.

4.2   Card Sorting and Final Results

To compile the overall architecture of our OAMM, we performed a closed card sorting. Two authors were provided with the identified set of 54 actionable practices and asked to independently assign each practice to one maturity stage. Our OAMM as the resulting artifact is shown in Figure 2. Thus, the assignment of each practice to one maturity stage as well as the percentage of practices associated with each of the six core elements and maturity stages is given. Based on these card sorting results, the inter-rater reliability was calculated using Cohen's Kappa [8]. We achieved a value of 0.67, which indicates reliability of our results [30].

Finally, testing the results of compiling our OAMM, we first present key findings with respect to the six core elements, its capability areas, and actionable practices, i.e., vertical axis. Thereby, we also account for maturation paths which can be seen as sequences of actionable practices related to a distinct capability area. Second, we discuss key findings with respect to maturity stages, i.e., horizontal axis. Third, we tested our results for comprehensiveness, consistency, and problem adequacy [3]. It is worth mentioning that all key findings reflect particularities of the sample reviewed for purposes of our study and therefore, the distribution of practices per core elements and maturity stages as well as all related insights are highly dependent on our research approach.

Vertical axis. As for the six core elements, our OAMM covers all factors. People comprises around one fourth of all practices, followed by strategic alignment, IT, governance, culture, and methods. This distribution is reasonable as it resembles the relative importance of different OA antecedents as presented in the existing body of knowledge. For example, the pivotal role of the top management team in balancing exploitation and exploration is recognized [49]. OA capabilities related to leadership skills and behaviors are comprised within the *people* dimension, suggesting its strong presence in our OAMM. Besides the leadership-based approach, the literature is largely concerned with structural antecedents of OA [23], pointing to the relative importance of *strategic alignment* as revealed in our OAMM. Further, our OAMM reveals that the development of an organization's ambidextrous IT capabilities is a strategic issue. Investments in digital technologies need to be cautiously orchestrated to align with existing IT capabilities complementary IT portfolios [31] and avoid excessive costs for resource integration.

Six Core Elements	Capability Areas	Ref.*	Actionable Practices	(1)	(2)	(3)	(4)	(5)
Strategic Alignment (25%)	Strategy & Process Capability Linkage	[33]	Pursue further growth in a single core business and a limited expansion around that core into closely related new areas.	x				
		[33]	Adopt a combination of induced strategy processes (exploitation) and autonomous strategy processes (exploration).		x			
		[18],[39],[8]	Externalize either exploitation or exploration to achieve efficient specialization across an inter-organizational network, e.g. strategic alliances, corporate ventures, spin-off entities.		x			
		[13]	Establish both additional relationships with existing partners (exploitation) and relationships with new partners (exploration) when externalizing either exploitation or exploration in an inter-organizational network.			x		
		[38]	Strive for diversity and good connections but not the utmost central position in a network, to make the externalization of either exploitation or exploration effective by realizing information and resource benefits as well as strategic integration.				x	
		[18],[34],[33]	Foster the ability to internally apply knowledge, which has been accessed outside the organization by externalization of either exploitation or exploration, through own R&D efforts.					x
	Enterprise Process Architecture	[27],[34],[33]	Use semi- or quasi-structures to shift formal organization structures over time, for the dynamic and temporal sequencing of exploitation and exploration.		x			
		[39],[13],[18]	Develop switching rules and appropriate change routines to facilitate transitions in the temporal sequencing of exploitation and exploration.			x		
		[33],[27],[18]	Deploy dual structural arrangements in a simultaneous pursuit of exploitation and exploration, creating large and centralized exploitative units with mechanistic structures, and small and decentralized exploratory units with organic structures.			x		
		[34],[10],[39]	Create team-based structures to pursue exploitation and exploration simultaneously within one single business unit, whereby one group adopts a mechanistic structure while another takes on an organic structure.			x		
		[34],[33]	Build parallel organizational structures, e.g. quality circles, that enable people from the same unit to switch between the mechanistic structure for exploitation and organic structures for exploration.				x	
	Process Mgmt Decision Making	[10],[26],[17]	Impose top-down direction for definitive resource allocation decisions, while creating mechanisms that allow actors at lower hierarchical levels to access the resources available to others.			x		
		[33],[34],[40]	Involve managers with dynamic decision making, such that they repeatedly and intentionally orchestrate firm resources.				x	
Governance (20%)	Process Roles and Responsibilities	[27],[10],[1]	Attribute clear job descriptions and instructions to individuals in business units focused on either exploitation or exploration, for explicate roles and segregated work modes, i.e. routine and non-routine responsibilities.		x			
		[13],[1]	Employ distinct roles, such that extrinsically motivated individuals perform tasks focused on acting appropriately (exploitation), and those intrinsically motivated take on activities focused on creativity (exploration).		x			
		[1],[17],[8]	Switch roles and responsibilities by varying the nature of work at different times rather than addressing exploration and exploitation simultaneously, e.g. by change of project focus and project rotation.				x	
		[1],[10],[27]	Adopt routines to systematize the creative process, such that employees follow well-defined processes and standardized best practices for exploitation, while continuously having possibilities of experimentation for exploration.					x
	Process Related Standards	[25],[33],[8]	Establish a top management incentive system that makes individual benefits dependent on a team's outcome and the overall firm performance, such that no individual agendas are pursued.			x		
		[10],[38],[18]	Adopt clear objectives and goal-setting programs for distinct standards of performance (exploitation), while setting aggressive but not unrealistic targets to encourage individuals to push for ambitious goals (exploration).				x	
		[1],[10],[38]	Value both exploitation and exploration activities and reinforce them with rewards and recognition, while being consistent in the application of sanctions.				x	
Methods (7%)	Process Program & Project Management	[1],[26],[18]	Diversify your project portfolio by selecting routine projects for exploitation as well as high-risk projects for exploration.			x		
		[1]	Iterate between work modes of project control (exploitation) and freedom in projects (exploration) for their temporal separation, and increase iterations in frequency as projects progress.				x	
		[1]	Foster improvisation in projects, such that project work follows clear processes and adheres to defined goals (exploitation), while simultaneously facilitating creative expression to move beyond customer constraints (exploration).					x

Assigned maturity stage

Maturation path

(%) Distribution of core elements / maturity stages by number of associated practices; OAMM Maturity Stages: (1) = Novice, (2) = Advanced Beginner, (3) = Competent, (4) = Proficient, (5) = Expert

*Note: We listed a maximum of three references with each practice for reasons of clarity. A detailed list of references will be provided upon request.

Fig. 2. Organizational Ambidexterity Maturity Model (OAMM).

	Capability Areas	References	Actionable Practices	Maturity Stages (1)	(2)	(3)	(4)	(5)
Six Core Elements — People (32%)	Process Education	[1],[10]	Establish socialization practices – from hiring to mentoring to ongoing reviews – to help employees identify themselves as paradoxical work identities with both discipline (exploitation) and passion (exploration).			x		
		[10],[39]	Provide job enrichment programs for education, training and experience in both exploitation and exploration.				x	
		[10],[13],[33]	Instrumentalize decentralized and direct interpersonal learning for implicit knowledge transfer, e.g. sharing best practices.					x
	Process Collaboration	[40],[38],[10]	Facilitate open discussion about tensions between exploitation and exploration to foster acceptance.			x		
		[17],[34]	Establish cross-functional interfaces at lower hierarchical levels, e.g. cross-functional teams, projects, temporary workgroups, task forces, liaison personnel.			x		
		[34],[17],[33]	Acquire high levels of top-down, bottom-up, and horizontal knowledge flows for connectedness to all hierarchical levels and integration of differentiated efforts for exploitation and exploration.				x	
		[1],[34],[33]	Create interactions across different organizational levels to cope with exploitation and exploration on multiple levels and leverage synergies, e.g. between business unit, group, individual level.					x
	Process Management Leaders	[13],[25],[33]	Compose top management teams that are heterogenous, reagarding its members' diversity of hierarchical status, knowledge and experience working together, e.g. adopting a mix between "newcomers" and "old timers".	x				
		[18]	Enable risk-averse decision makers to drive exploitation, and draw on risk-prone managers for purposes of exploration.		x			
		[17],[27],[39]	Assign different leadership behaviors and management styles, such that transactional leadership is related to exploitation, whereas transformational leadership is related to exploration.		x			
		[10],[40]	Adopt management strategies of acceptance rather than defensiveness towards exploitation-exploration tensions in combination with resolution strategies.			x		
		[25],[38],[34]	Develop conflict resolution skills of the top management team to openly discuss conflicting task issues and freely exchange differing knowledge for integration of exploitation and exploration.			x		
		[18],[33],[38]	Develop coordination skills of the top management team related to collaborative behavior, information exchange, and joint decision making, for a common agenda and integration of exploitation and exploration.				x	
		[10],[39],[40]	Employ effective leaders with a breadth of past experience who have the cognitive capabilties and behavioral repertoires to engage in paradoxical thinking and take on complex tasks related to ambidextrous management.					x
Culture (16%)	Process Values & Beliefs	[27],[25],[39]	Develop an overarching strategic intent and a common paradoxical vision.			x		
		[25],[26],[1]	Relentlessly communicate the ambidextrous strategy and reiterate such supportive communication, to infuse the paradoxical vision and reinforce dual purposes for exploitation and exploration.				x	
		[25],[26],[10]	Make the pursuit of an ambidextrous strategy compelling and denote strategic coherence through shared ambitions and a collective identity.					x
	Leadership Attention to Process	[18],[10],[33]	Ensure support of top management for the organizational restructuring that modes of temporal or structural differentiation between exploitation and exploration entail.			x		
		[34],[25],[10]	Employ managers that engage in both exploitation and exploration activities, and especially act as pioneers in triggering creativity for exploration.				x	
	Process Attitudes & Behaviors	[10],[27],[38]	Nurture a flexible organization culture that equally builds on performance management and social support, striving for a balance between norms for control (exploitation) and collaboration (exploration).					x
		[8],[40],[5]	Foster cognitive and behavioral complexity as well as calmness of your employees, for acceptance of exploitation-exploration tensions and adoption of appropriate behavior to allocate their time accordingly.					x
				5%	14%	34%	27%	20%

Assigned maturity stage
Maturation path

(%) Distribution of core elements / maturity stages by number of associated practices; OAMM Maturity Stages: (1) = Novice, (2) = Advanced Beginner, (3) = Competent, (4) = Proficient, (5) = Expert
*Note: We listed a maximum of three references with each practice for reasons of clarity. A detailed list of references will be provided upon request.

Fig. 2. Organizational Ambidexterity Maturity Model (OAMM) (continued).

Additionally, fourteen maturation paths within various capability areas could be identified. We consider two illustrative examples. First, the capability area 'roles and responsibilities' contains four practices. The related maturation path outlines their desired implementation order as indicated by consecutive maturity stages (2) to (5). Organizations systematically develop OA capabilities by implementing the practice located with maturity stage (2) first and stepwise completing practices along the maturation path. Second, the capability area 'enterprise process architecture' contains five practices. The two practices relating to sequential approaches are located at maturity stages (2) and (3) and thus precede those three practices relating to simultaneous approaches and located at maturity stages (3) to (5). This finding complies with the consecutive emergence of sequential and simultaneous approaches in the literature [17, 41].

Horizontal axis. Analyzing the number of practices per maturity stages provides some interesting insights. Only two practices have been associated with maturity stage (1). These practices reflect general requirements conducive to OA, but need to be implemented independent of domain-specific characteristics. Moreover, while all practices feature the ambidextrous idea, novice organizations show only rare or no properties of OA at all. A majority of 34 practices has been assigned to maturity stages (3) and (4). This can be explained as it is easier to develop capabilities on lower maturity stages, while it is more difficult to finally reach the highest maturity stage (5). Additionally, searching the specific OA literature is most likely to address advanced OA capabilities and thus reveal practices located at the higher maturity stages, while the general literature as covered by our study is presumed to address more basic requirements of lower stages. Another interesting insight show that initial stages in maturation of the ambidextrous organization require the accomplishment of practices associated with strategic alignment and people, whereas for example the demonstration of ambidextrous IT capabilities mostly requires proficient (4) or expert (5) stage.

Test for comprehensiveness, consistency, and problem adequacy. Overall, we assume comprehensiveness of maturity assessment based on the OAMM as we built on an established framework of BPM capabilities [57]. Yet we acknowledge that reducing the overall number of hits from our literature review (see section 3.1) limits the comprehensiveness of our set of practices. A satisfactory level of inter-rater reliability for our card sorting indicates consistency of our results. We further postulate problem adequacy as our OAMM contains various maturation paths, which supports our goal of enhancing prescriptive knowledge on OA capability development.

5   Evaluation

In line with our evaluation strategy based on the DSR evaluation framework by Sonnenberg and vom Brocke [50], we conduct an artificial ex-ante evaluation by discussing the design specification of our OAMM against the three design objectives derived in section 2. Figure 3 shows the results of our feature comparison. In sum, feature comparison revealed that our OAMM address all three design objectives, but not to the full extent. The OAMM is beset with some limitations from a theoretical perspective for the sake of increased applicability. We capture the resulting need for future research in the conclusion.

DO	Features of the Model
(DO.1)	*Ambidextrous organizations:* To systematically develop OA capabilities, an organization must develop dual capacities for exploitation and exploration. Therefore, sequential and simultaneous approaches, including structural, contextual, and leadership-based antec-ents of OA, need to be integrally covered.
(DO.2)	*BPM and capability development*: To systematically develop an organization's OA capabilities, it is necessary to improve distinct capability areas related to the six core elements of BPM by developing both exploitative and explorative BPM capabilities for each of the core elements (ambidextrous BPM).
(DO.3)	*Maturity Models:* To systematically develop OA capabilities, MM need to be developed following an accepted procedure model and account for general design principles.

General Design Principles for Maturity Models

Design Principles for a Prescriptive Purpose of Use

DP 3.1	Improvement measures for each maturity level and level of granularity (i.e. actionable practices)
DP 3.2	Decision calculus for selecting improvement measures (not included)
DP 3.3	Target group-oriented decision methodology (not included)

Design Principles for a Descriptive Purpose of Use

DP 2.1	Assessment criteria of intersubjective verifiability for each maturity level and level of granularity (i.e. actionable practices)
DP 2.2	Target group-oriented assessment methodology of intersubjective verifiability (not included)

Basic Design Principles

DP 1.1	Provision of basic information (e.g. maturation of organizations in the OA domain, prescriptive purpose of use, serves scholars and practitioners, documented design process)
DP 1.2	Definition of central constructs related to maturity and maturation (i.e. core elements and capability areas of BPM, OAMM maturity stages and maturation paths)
DP 1.3	Definition of central constructs related to the application domain (i.e. exploitation/exploration, OA antecedents)
DP 1.4	Target group-oriented documentation (i.e. matrix representation)

fulfilled　　partially fulfilled　　not fulfilled

Fig. 3. Results of Feature Comparison.

6　　Conclusion

To thrive in turbulent competitive environments, it is vital for organizations to develop OA capabilities, i.e., dual capacities for exploitation and exploration [40, 53]. Following an identified need for guidance on *how to put OA into practice* [1, 33], we developed our OAMM to assist organizations in acquiring OA capabilities. To do so, we built on the six core elements of BPM and corresponding capability areas [57] as well as five maturity stages to anticipate fourteen related maturation paths based on 44 actionable practices. Our OAMM is meant to serve as a starting point for structured OA capability development and paves the way for maturation towards an ambidextrous organization.

The results of our research have implications for both academia and practice. As for theoretical implications, first, our set of actionable practices consolidates insights from different research streams related to OA antecedents. Therefore, our literature review identifies OA capabilities for different organizational levels, i.e., the corporate, business unit, group, and individual level. This multi-level concept is important to fully capture an organization's exploitation and exploration activities [40]. Second, the architecture of our OAMM provides insights into OA from a BPM perspective. This is done by applying the six core elements of BPM and related capability areas to structure our set of actionable practices derived from OA literature. Additionally, we outline maturation paths for organizations based on various capability areas to advance from novice (1) to expert stage (5) regarding ambidextrous capabilities. Finally, our OAMM lays the groundwork for further elaboration, i.e., including additional practices and deriving further maturation paths. Therefore, our OAMM facilitates the classification of actionable practice along the six core elements of BPM and its capability areas [57] as well as five maturity stages (Table 2). In sum, our OAMM is an initial step towards a MM offering guidance to systematically develop OA capabilities. Our OAMM thereby contributes to prescriptive knowledge in respect of *how to put OA into practice*, i.e., on how the desired balance between exploitation and exploration can be achieved. Future OA research can use our OAMM to identify and structure further antecedents based on the six factors. If further antecedents are identified and analyzed in a conceptual way, these insights can be subsequently integrated in the OAMM to facilitate the development of an ambidextrous organization.

As for practical implications, our OAMM assists practitioners in implementing OA and configuring ambidextrous organizations. Delivering on a descriptive purpose of use, our OAMM allows organizations to assess their as-is-situation and provides a sufficient basis for determining an organization's current state of maturity. Delivering on a prescriptive purpose of use, our OAMM outlines maturation paths and guides practitioners in the selection and implementation of practices associated with distinct capability areas. Thereby, our set of actionable practices lays the foundation for enhancing the development of OA capabilities. It is noteworthy that practitioners may alter maturation paths in respect of their organization's specific situation, prioritizing the development of certain capability areas and implementing practices along the respective maturation paths until a satisfactory level of OA capabilities is reached.

Pointing to the limitations of our study, we present several avenues for future research. First, our findings build on a selection of 15 articles from the general OA literature. Thereby, we focused on the most cited studies since they cover core OA research. As a consequence, more specific fields of OA capabilities, e.g., capabilities for information technology or methods, are partly covered. Consequently, DO.1 is only partly fulfilled. Further research should include a more extensive literature search by searching more databases and including specific OA literature, e.g., literature investigating IT ambidexterity or exploitation and exploration methods. Second, we performed the card sorting from a researchers' perspective only. We believe, however, that the current card sorting is adequate to provide first insights on the development of OA capabilities based on various maturation paths. Further research may perform the card sorting with both researchers and practitioners. Third, in developing our OAMM we followed Becker et al.'s [3] procedure model, but did not finalize the whole procedure. We performed all crucial steps through phase 4 and then moved on to the evaluation of our OAMM (phase 7). To complete the model development procedure, a transfer to academics and practitioners is suggested. Moreover, the evaluation (phase 7) should be extended to assess the applicability and usefulness of our OAMM in naturalistic settings, e.g., conducting expert interviews or real-world case studies. Fourth, the artificial ex-ante evaluation of our OAMM revealed that general design principles for MM are addressed, but not to the full extent. To fully serve the intended prescriptive purpose of use, we suggest developing our OAMM further as a stand-alone artifact by including a decision calculus for the selection of improvement measures and some target group-oriented decision methodology. Overall, we call for future research in the area of structured OA capability development to address the currently observed imbalances in the number of practices assigned to core elements and maturity stages which reflect the particularities of this study's research approach.

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