Exploitation and Exploration in Business Process Management – An exploratory paper

Carin Lindskog [0000-0003-4657-2832]

Karlstad University, Karlstad Business School, Karlstad, Sweden

carin.lindskog@kau.se

Abstract. This exploratory paper introduces the terms exploitation and exploration within the business process management (BPM) context. Despite the fact that BPM grows in popularity, more and more organizations report on BPM failure. The most recent development in the BPM field has led to a variety of new requirements. Almost all processes in BPM are different and may thus be almost impossible to standardize. Researchers in the BPM research field have recently differentiated between exploitation and exploration as two distinct goals of BPM. Today, BPM is applied to different purposes and the trend is going from the exploitation capabilities of BPM to exploration capabilities. This paper addresses the following research question: *Can an understanding of exploitation and exploration be a help for BPM organizations to become more successful?* For long-term success, it is essential for BPM organizations to identify the competencies and skills of their employees according to changed requirements. The paper ends with an overview of the author's ongoing thesis project.

Keywords: Business Process Management, BPM, Exploitation, Exploration, Learning activities, Organizational learning.

1 Introduction

Exploitation and exploration continue to be a debate in different research fields within e.g., management, innovation, and learning. In short, exploitation refers to the use of past knowledge and exploration refers to learning and innovation [1]. Gupta et al. and Benner & Tushman state the importance of exploitation and exploration for successful organizational adaptation, technological innovation, organizational learning, and even organizational survival [1,2].

Dumas et al. define BPM as the body of methods, techniques, and tools to discover, analyze, redesign, execute and monitor business processes [3]. BPM grows in popularity as a way of working to strengthen the quality of the work and meet the demands of efficiency [4,5]. Despite this popularity more and more organizations reporting on BPM failure e.g., [6-8]. Abdolvand et al. and Trkman report that as many as 60–80% of BPM initiatives have been fruitless [6,7]. One reason for this frequency of BPM failure is the lack of knowledge about the extended scope of BPM to other business contexts that include, for example, more creative business fields [8,9]. Another

reason for failure is the fact of the employees' resistance to change [7]. The frequency of BPM failures damages the reputation and put many process improvement implementations on hold [10].

The founders of BPM focused on incremental and exploitative innovation, rather than radical, or exploratory innovation. Researchers and practitioners have been conservative and resistant to anything but incremental innovation [2]. The most recent development in the field has led to a variety of new requirements. Therefore, we have to move to a more situational perspective on BPM. Researchers in the field have recently differentiated between exploitation and exploration as two distinct goals of BPM [8,11].

This exploratory paper introduces the terms exploitation and exploration within the BPM context. In exploring the terms, this paper addresses the following research question: *Can an understanding of exploitation and exploration be a help for BPM organizations to become more successful?*

Exploitation and exploration are discussed in different research fields and are defined as, for example: concepts, processes, orientations, set of activities and learning activities. Throughout this paper, the terms exploitation and exploration, are used as "learning activities" defined by [12,13]. Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, and execution. On the other hand, exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation [12].

The differences between exploitation and exploration, as well as the need to accommodate different learning activities, has been discussed among scholars in contexts such as organizational learning, technological innovation, organizational adaptation, strategic management, and organizational design. In this paper, the focus is on the organizational learning in the context of BPM.

2 Literature review

2.1 BPM

One can see a process as a sequence of interdependent events, activities, and choices over time [14]. Langley proposes developing strategies for understanding processes. BPM can be used as the body of methods, techniques, and tools to discover, analyze, redesign, execute and monitor business processes [14].

One can also see BPM as an art and science of how work should be performed in order to ensure consistent outputs and managing to produce added value for an organization [3,7]. BPM strives to better understand the key mechanisms of a business to improve and in some cases to radically change the business performance by identifying opportunities for e.g., new business, efficiency and new technology to support business processes [15]. In order to clarify how different related tasks fit together, BPM is often described as a lifecycle model [16].

Research in this field originate from work in computer science, management science, and information systems [4,5,17]. These works have resulted in a plethora of models,

methods, and tools that support the design, enactment, management, and analysis of BPM. BPM has traditionally focused on increasing the efficiency and effectiveness of business processes through exploitation, standardization or automation. It also offers opportunities for exploration, innovation or problem-solving [8].

One can see BPM as a "theory in practice" since practical demands in the field inspire the development of new methods and techniques, and the application of these methods and techniques feeds back to the scholars [3]. Unlike exploitation, which is driven by current practices, exploration is focused on possible future process practices. Mendling mentions that there is a need to improve BPM, and refers to Recker and Mendling [4]´s recommendation that further develop BPM as a behavioral science [16].

Today, BPM is applied to different contexts, and the trend is going from the exploitation capabilities of BPM to exploration capabilities of BPM [8]. Exploitation in the BPM context implies utilizing known tools, increasing efficiency in the processes, and techniques of BPM. Several quality management approaches and process integration, serve as appropriate approaches to deal with an exploitation-oriented goal. Exploration-oriented BPM, on the contrary, aims at innovating processes, services, products, and business models, abductive thinking, design, and communication [10].

The organizational goal is the first contextual factor that is important for BPM when implementing BPM practices, since goals directly influence how BPM should be implemented or which tools and techniques should be applied [8]. To pursue this goal, more creative management approaches, such as design thinking and open innovation seem to be more appropriate [10].

2.2 The organizational view of exploitation and exploration

Well-known examples of exploitation are refining and using existing knowledge. Furthermore, well-known examples of exploration are innovation, problem-solving and creating new knowledge [1,12]. Researchers have suggested that exploitation and exploration compete for a limited set of organizational resources [1,12].

A one-sided focus on exploitation may increase short-term performance, but it can also result in a competency pitfall if the organization cannot respond to environmental changes [12,13]. The certainty, in other words, predictable process execution, speed, proximity, and clarity of feedback ties exploitation to its consequences more quickly and more precisely than in the case of exploration [10,12]. Excessive exploration may increase the organization's ability to develop its knowledge base, but can at the same time put the organization in an endless cycle of change [13].

A major challenge for organizations is the balance between exploitation and exploration [8,10]. According to [13], long-term success demands an organizational balance between continuity and change. The problem of balancing exploitation and exploration is a common issue in studies of organizational learning [12]. Both exploitation and exploration are essential for organizations [2,12]. If organizations would like to survive in the face of changes, they need to exploit their current business and explore new business fields by developing new capabilities strategic leadership [18].

2.3 Organizational learning

Senge [19] defines a learning organization as "an organization continually expanding its capacity to create its future". Scholars have applied the concept of organizational learning to different domains [20] and the organizational learning literature reviews also expose the diversity of definitions. In other words, there is no consensus about the term organizational learning. The multiplicity of definitions of what "organizational learning" is contributing to confusion [21].

One of the interpretations of organizational learning is that behavior in an organization is based on routines [22]. Feldman and Pentland [23] theorized about the organizational routines based on understanding on the relationship between structure i.e., the abstract idea of the routine and action, by people, at specific times, in specific places. Interactions among individuals and processes within organizations may provide insights into how routines emerge [24]. Dynamic capabilities are embedded in organizational routines [18]. Organizations develop, stabilize and follow routines over periods of time and adapt to a changing environment by reconfiguring routines and creating new ones. These routines serve as stores of organizational memory, skills and tacit knowledge. The creation and replication of new routines can be depicted as a process involving a life cycle from early exploration to widespread exploitation [25]. Feldman and Pentland emphasize the role of variation in organizational routines and the interplay between variability and stability [23,26]. Organizational routines are often designed to be flexible so it may be as easy for people to change the technology, as to change existing routines [27].

Organizational learning links cognition and action, in other words, organizational learning is a dynamic process. Furthermore, organizational learning is multilevel, therefore the theory of organizational learning needs to consider the individual, group, and organizational levels [20]. In other words, learning happens over time and across levels, but it also creates a tension between incorporating new learning (feedforward) and exploiting or using what has already been learned (feedback). Through feed-forward processes, new ideas and actions move from the individual to the group, to the organization levels. At the same time, what has already been learned feeds back from the organization, to a group and individual levels, and has an impact on how people act and think [20]. Edmondson and Moingeon [21] are on the same track when they define organizational learning as a process, in which people in the organization actively use data to guide behavior in such a way as to stimulate the ongoing adaptation of the organization. This learning process is an ongoing cycle of reflection and action and is a process that can be initiated, developed and practiced.

Several scholars in [28] describe the concepts "double-loop learning" and the "ambidextrous organizations", as dynamic capabilities, in the exploitation of the habitual process and exploration of developments. Double-loop learning is the confrontation of underlying assumptions, norms, and objectives and the changes in mental models [29]. Ambidextrous organizations are described as organizations capable of simultaneously exploiting existing competencies and exploring new opportunities [30]. Ambidextrous management requires organizations to exploit existing knowledge, coordinate this knowledge and explore new knowledge [30].

Knowledge exploitation involves certifying that knowledge that is potentially available within an organization is actually accessed, and that the same mistakes are not repeated. Knowledge exploration, on the other hand, refers to using and creating new knowledge and to produce new products, services, organizational arrangements or business models [31].

The ambidextrous organizations with both exploitative and explorative strengths at the same time, demand different competencies [10]. Unlike exploitation, exploration implies developing new skills. Exploitation primarily involves learning from a top-down process, and in contrast, exploration generally involves a bottom-up learning process [32].

Organizations have to focus on their competencies in order to create strategic competitive advantages [17,33]. Oberweis and Schuster claim that competencies and skills are neglected and they are not explicitly modeled in the context of BPM [33]. For long-term success, it is also essential for organizations to identify the competencies and skills of their employees as the business context changes according to changed requirements.

Design thinking is an approach to problem-solving that uses tools, practices or methods to support the development of organizations. Design thinking is a way of thinking that balances both the exploitation of current knowledge and exploration of new knowledge [34]. There are three different types of tools: [i)] need finding tools such as observations and interviews, [ii)] idea-generating tools such as brainstorming and co-creation/co-design, and [iii)] idea-testing tools such as prototyping and experimentation. The use of design thinking tools in organizations triggers an experiential learning process that ultimately supports the development of organizational cultures [34].

Gupta et al argue that it is more natural to differentiate between exploration and exploitation by focusing on the type or degree of learning than on the presence or absence of learning [1].

3 Discussion

This paper is exploratory: it attempts to move the "learning activities" of exploitation and exploration forward beyond the operational understanding of both processes to exploring these in the wider context of the BPM. In general, it seems that both exploitation and exploration are essential for organizations, but we must have in mind that they compete for scarce resources. As a result, organizations make explicit and implicit choices between the two [12]. This paper addresses the following research question: *Can an understanding of exploitation and exploration be a help for BPM organizations to become more successful?* Almost all processes in BPM are different and may thus be hard to standardize. To understand what is needed is the first step. For long-term success, it is essential for organizations to identify the competencies and skills of their employees according to the business context changed requirements. The diversity of business processes provides various possibilities of BPM. Thus, BPM requires continuous adaptation to the given context since contextual factors, such as resources or competitiveness, may change from time to time [8]. The problem of

balancing exploitation and exploration is a common issue in studies of organizational learning [12]. Design thinking can be one way of thinking that balances both the exploitation of current knowledge and exploration of new knowledge. Design thinking tools may help people "learn how to learn" and can contribute to organizational learning [34]. However, further investigations are clearly needed since a gap exists in our understanding of how an ambidextrous organization, including exploitation and exploration, is actually managed [18].

4 Overview of the proposed Thesis project

Due to the increase of BPM popularity, more organizations reporting on BPM failure [6-8]. However, the fact that 60-80% of BPM initiatives having been fruitless [6,7]. Among the reasons for this frequency of BPM failure is the lack of knowledge about the extended scope of BPM to extend business contexts. Although several studies have revealed that BPM has a positive impact on organizational performance, there is limited research on the link between BPM and organizational performance [15].

Projects are the key activities in many organizations (e.g., organizational change, strategy implementation and, new product development). However, until recently project management (PM) has not captured the attention of the wider community of business and management academics [35]. Geraldi and Söderlund [36] claim that the study and practice of projects ought to have extended their level of analysis from mainly focusing on individual projects to focusing on organizations around projects.

The key differences between a process and a project appear to be the temporary vs ongoing nature of the undertaking, the complexity and the unique nature of a project's outcome. BPM view the endeavor as a continuously improving recurrent activity and PM has an approach as a deliverable-focused endeavor [28]. According to [28,37], project as a work form should be used to address situations where there is a business requirement that cannot be satisfied by normal routines. Despite the differences, linking BPM and PM ought to be natural and important since project work and repetitive operations occur in processes [35]. In other words, projects are characterized by exploratory learning when organizations experiment with the new bid, and project practices required to cope with unfamiliar activities [38].

Maylor et al. emphasize the importance of understanding how BPM and PM are interrelated, how they conflict with each other, and how they may unfold synergistically (or otherwise) [35]. According to [28], few scholars have recognized the need to explore the "gray area" between BPM and PM. In order to address these shortcomings, the two management fields should be compared, contrasted, and clarified [28].

Efforts to promote exploitative or exploratory learning are closely connected to the rate of complexity or change in the organization. In stable environments, where established processes and routines rarely become obsolete, there may be little interest in learning through exploration. The integration of exploitation and exploration is especially valuable when considering how complexities are to be approached, as this generates a deeper discussion of whether existing approaches can be utilized or whether innovative solutions may be more appropriate [39]. In unstable or temporary environments, e.g., projects, organizations face the challenge of exploring new

alternative routines and practices. Project members must be prepared to "break the rules" to invent new ways of working [38]. Both the BPM and PM literature identify the complexities that face managers in those fields. The PM literature generally treats complexity as an issue to be resolved or reduced, whereas the BPM literature specifically categorizes complexity as for instance: ineffective processes, procedures, and errors with damaging consequences [39].

Raisch et al. [30] emphasize the different levels of ambidexterity: individuals, groups, and organizational. Ambidexterity is rooted in an individual's ability to exploit or explore and there is a need to capture ambidexterity across individuals, groups and as organizational level [30]. It is proposed to investigate how different factors affect organizational learning. What are the similarities, contradictions, and interrelations between individual's, group's, and an organization's activities that affect ambidexterity?

The overall research question that the thesis project aims to answer is the following: *How can experiences from the PM field improve the BPM field to get a more organizational balance between exploitation and exploration?* This research question can break down to several questions and two of these questions are as follows: *What sort of learning activities are found in the BPM and PM fields? What sort of learning activities lead to a successful BPM and PM?*

This paper explores the concepts of exploitation and exploration and suggests that there still exists a gap in understanding how an ambidextrous organization, including both exploitation and exploration, is actually managed. Next study, a systematic literature review (SLR), will explore the status of learning activities in the BPM and PM fields. The research will be conducted in a systematic manner with rigorous explicit methods. An SLR with the state-of-the-art status of needed competencies in the role of project manager and process manager has already been done. An outcome from the SLR will be a framework of learning activities from the included publications. The learning activities will be categorized to focus on exploitation or exploration or both. The learning activities will also be categorized in different levels: individual, group, and organization.

The thesis will consist of an introductory section and several individual case studies in different types of BPM organizations. The case studies will be developed based on an identified framework. For the data collection part of the research, I will use ethnographic methods in order to gain a deep understanding of the BPM fields. These methods will be interviews with key actors in different business functions, documentary information e.g., process documentation and organizational charts and direct observations e.g., working procedures and analyses of BPM tools applied.

The introductory section acts as the frame that ties the individual studies together. The methodologies/methods I will use will be appropriate for the research problem. The research problems are treated as the main factors in choosing a particular approach.

To follow a doctoral program is learning about a research subject and the research process. The purpose of education is to stimulate inquiry and skill in the process of knowledge getting, more than memorizing a body of knowledge [40]. My perspective on learning is referred to "experiential" and emphasizes the central role that experience has in the learning process. The experiential learning theory is, according to [41], a holistic integrative perspective on learning that combines experience, perception,

cognition, and behavior. My motivation for using this perspective is in line with the idea of learning as an inherently reflective practice, which emphasizes the experiential, dynamic, cyclic, and unfolding nature of the way the different management roles work also referred to as "reflection in action".

A form of a qualitative research strategy that emphasizes an inductive approach to the relationship between theory and research will be undertaken. Even though the emphasis is placed on the generation of theories, I plan to use the socio-technical theory as a grand theory, which operates a more abstract level [42]. Despite that grand theories offer little help to researcher according to [42], the theory will help me to have a socio-technical thinking and perspective. Other kinds of theories, like middle-range -theories, will complement the grand theory.

In order to understand and clarify the BPM and PM fields, as well as investigate possible differences, interactions, and synergies, my plan is to try to use the framework presented by vom Brocke, et al. [8]. This framework with goal-, process-, organization- and environment-dimensions, will be used in the context of BPM. By understanding the context of management in BPM, we can move towards a more situational perspective on BPM and plan and manage effective BPM implementations [16].

The proposed research aims at contributing to the existent body of knowledge of BPM and PM. The effect of the work will help researchers and practitioners to **1)** understand how the balance between exploitation and exploration can improve performance in organizations and **2)** understand how to prepare employees in BPM in a better way to handle the variety of new requirements in the BPM field.

References

1. Gupta, A.K., Smith, K.G., Shalley, C.E.:The interplay between exploration and exploitation. Academy of Management journal 49, 693-706 (2006).
2. Benner, M.J., Tushman, M.L.: Exploitation, exploration, and process management: The productivity dilemma revisited. Academy of Management Review 28, 238-256 (2003).
3. Dumas, M., La Rosa, M.; Mendling, J., Reijers, H.A.: Fundamentals of business process management. Springer. Vol. 1 (2013).
4. Recker, J., Mendling, J.:The state of the art of business process management research as published in the BPM conference. Business & Information Systems Engineering 58, 55-72 (2016).
5. Van der Aalst, W.M.: Business process management: A comprehensive survey. ISRN Software Engineering, Article ID 507984, 37 pages (2013).
6. Trkman, P.: The critical success factors of business process management. International Journal of Information Management, 30, 125-134 (2010).
7. Abdolvand, N., Albadvi, A. Ferdowsi, Z.: Assessing readiness for business process reengineering. Business Process Management Journal 14, 497-511 (2008).
8. Vom Brocke, J., Zelt, S., Schmiedel, T.: On the role of context in business process management. International Journal of Information Management 36, 486-495 (2016).
9. Paim, R., Mansur Caulliraux, H., Cardoso, R.: Process management tasks: A conceptual and practical view. Business Process Management Journal, 14, 694-723 (2008).
10. Rosemann, M.: Proposals for future BPM research directions, Proceedings of Asia-Pacific Conference on Business Process Management, LNBIP 181, 1-15, Springer (2014).

11. Vom Brocke, J., Mendling, J.: Business Process Management Cases: Digital innovation and Business Transformation in Practice. Springer (2017).
12. March, J.G.: Exploration and exploitation in organizational learning. Organization Science, 2, 71-87 (1991).
13. Raisch, S., Birkinshaw, J.: Organizational ambidexterity: Antecedents, outcomes, and moderators. Journal of Management, 34, 375-409 (2008).
14. Langley, A.: Strategies for theorizing from process data. Academy of Management Review, 24, 691-710 (1999).
15. Pradabwong, J., Braziotis, C., Pawar, K.S., Tannock, J.: Business process management and supply chain collaboration: A critical comparison. Logistics Research, 8, 6 (2015).
16. Mendling, J.: From scientific process management to process science: Towards an empirical research agenda for business process management. In C. Hochreiner, S. Schulte (Eds.): Proceedings of 8th ZEUS Workshop, Published at http://ceur-ws.org/Vol-15621-4, (2016).
17. Eicker, S., Kochbeck, J., Schuler, P.M.: In Employee competencies for business process management. International Conference on Business Information Systems, 251-262. Springer. (2008).
18. O'Reilly III, C.A.,Tushman, M.L.: Organizational ambidexterity in action: How managers explore and exploit. California Management Review 53, 5-22 (2011).
19. Senge, P.M.:The fifth discipline, the art and practice of the learning organization. Performance Improvement journal, 30, 37-37 (1991).
20. Crossan, M.M., Lane, H.W., White, R.E.: An organizational learning framework: From intuition to institution. Academy of Management Review, 24, 522-537 (1999).
21. Edmondson, A., Moingeon, B.: From organizational learning to the learning organization. Management Learning, 29, 5-20 (1998).
22. Levitt, B., March, J.G.: Organizational learning. Annual Review of Sociology, 14, 319-338 (1988).
23. Feldman, M.S., Pentland, B.T.: Reconceptualizing organizational routines as a source of flexibility and change. Administrative Science Quarterly, 48, 94-118 (2003).
24. Felin, T., Foss, N.J., Heimeriks, K.H., Madsen, T.L.: Microfoundations of routines and capabilities: Individuals, processes, and structure. Journal of Management Studies X, 49, 1351-1374 (2012).
25. Davies, A., Frederiksen, L., Cacciatori, E., Hartmann, A.: The long and winding road: Routine creation and replication in multi-site organizations. Research Policy, 47, 1403-1417 (2018).
26. Pentland, B.T., Feldman, M.S.: Designing routines: On the folly of designing artifacts, while hoping for patterns of action. Information and Organization, 18, 235-250 (2008).
27. Leonardi, P.M.: When flexible routines meet flexible technologies: Affordance, constraint, and the imbrication of human and material agencies. MIS Quarterly, 147-167 (2011).
28. Harvey, J., Aubry, M.: Project and processes: A convenient but simplistic dichotomy. International Journal of Operations & Production Management 38, 1289-1311 (2018).
29. Argyris, C., Schön, D.A.: Organizational learning: A theory of action perspective. Reis, 345-348 (1997).
30. Raisch, S., Birkinshaw, J., Probst, G., Tushman, M.L.: Organizational ambidexterity: Balancing exploitation and exploration for sustained performance. Organization Science 20, 685-695 (2009).
31. Newell, S.: Managing knowledge and managing knowledge work: What we know and what the future holds. Journal of Information Technolog 30, 1-17 (2015).
32. Lubatkin, M.H., Simsek, Z., Ling, Y., Veiga, J.F.: Ambidexterity and performance in small-to medium-sized firms: The pivotal role of top management team behavioral integration. Journal of Management, 32, 646-672 (2006).

33. Oberweis, A., Schuster, T.: A meta-model based approach to the description of resources and skills. Proceedings of 16th Americas Conference on Information Systems (AMCIS 2010), 3677-3688, Association for Information Systems (2010).
34. Elsbach, K.D., Stigliani, I.: Design thinking and organizational culture: A review and framework for future research. Journal of Management, 44(6), 2274-2306 (2018).
35. Maylor, H., Meredith, J.R., Söderlund, J., Browning, T.: Old theories, new contexts: Extending operations management theories to projects. International Journal of Operations & Production Management, 38, 1274-1288 (2018).
36. Geraldi, J., Söderlund, J.: Project studies: What it is, where it is going. International Journal of Project Management, 36, 55-70 (2018).
37. Anderson, D.K., Merna, T.: Project management strategy-project management represented as a process based set of management domains and the consequences for project management strategy. International Journal of Project Management, 21, 387-393 (2003).
38. Brady, T., Davies, A.: Building project capabilities: From exploratory to exploitative learning. Organization Studies, 25, 1601-1621 (2004).
39. Turner, N., Aitken, J., Bozarth, C.: A framework for understanding managerial responses to supply chain complexity. International Journal of Operations & Production Management (2018).
40. Bruner, J.S.: Toward a theory of instruction. Harvard University Press. Vol. 59 (1966).
41. Kolb, D.A.: Experiential learning: Experience as the source of learning and development. FT Press (2014).
42. Bryman, A.: Social research methods. Oxford University Press (2001).