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### ► To cite this version:

Giada Baldessarelli, Nathalie Lazaric, Michele Pezzoni. Organizational routines: Evolution in the research landscape of two core communities. *Journal of Evolutionary Economics*, 2022, 32, pp.1119-1154. 10.1007/s00191-022-00779-2 . halshs-03718851

**HAL Id: halshs-03718851**

**<https://shs.hal.science/halshs-03718851>**

Submitted on 9 Jul 2022

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# **Organizational Routines: Evolution in the Research Landscape of Two Core Communities**

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## **Abstract:**

Organizational routines are a popular field of research dominated by two communities of scholars: the capability community and the practice community. Based on a bibliometric study of 635 peer-reviewed articles, this paper proposes a systematic analysis of the recent contributions to the field made by the two communities. Our findings yield two main insights. First, we show that, even if both communities have been contributing to advancing the scholarly understanding of routines, practice scholars' research has grown faster than capability scholars' in recent years. Second, using a Latent Dirichlet Allocation algorithm for text analysis, we identify 33 research topics that have sparked scholars' interest in the period 2005-2016 and we explore the evolution of key topics. Specifically, we observe that topics characteristic of each community concerned the theoretical foundations of organizational routines and, for practice scholars, also context-related internal dynamics. We also find diverging topics that created gaps between the two communities. For capability scholars, diverging topics pertained to specific aspects of the theoretical foundations, such as dynamic and ordinary capabilities, and the effects of routines. For practice scholars, diverging topics pertained to context-related internal dynamics of routines. These insights provide a comprehensive map of the research landscape illustrating that, even if the communities have maintained parallel conversations, their growing interest could lead to synergies.

**Keywords:** organizational routines, practice, capabilities, bibliometric analysis

**JEL codes:** O30, C60

## 1. Introduction

Organizational routines are repetitive patterns of interdependent actions (Feldman and Pentland 2003; Nelson and Winter 1982). Since the foundational work of the Carnegie School (Cyert and March 1963; March and Simon 1958), scholars have acknowledged routines as core components of organizational life, and they have explored the characteristics of routines, their effects on firm performances, and their downsides (e.g., Feldman 2000; Pentland 1995; Windrum et al. 2009; Zollo et al. 2002).

Despite the growing interest, however, the construct of organizational routines has raised criticisms and ambiguities that some scholars have tried to puzzle out through literature reviews. Among others, two reviews published in 2011 made a significant step forward in unraveling this “thorny construct” (Salvato and Rerup 2011): Parmigiani and Howard-Grenville’s *Academy of Management Annals* piece and Salvato and Rerup’s *Journal of Management* piece. Parmigiani and Howard-Grenville (2011) suggest that there are two main perspectives to the analysis of routines – and two related communities of scholars or “camps” as the scholars dubbed the groups: One so-called “capability perspective” led by organizational economists that studies routine effects on firms, and a “practice perspective” led by organizational theorists focused on how routines work in practice. Scholars engaging with the first perspective view routines as “black boxes” and explore their impact on firm performance, while scholars adopting the second perspective focus on action enactment and how routines operate in practice. Put differently, while the first perspective, often traced back to Nelson and Winter’s book (1982), treats routines as whole entities that guide firm outcomes, the second perspective, popularized by Feldman’s 2000 and Feldman and Pentland’s 2003 articles, focuses on the internal complexity and dynamism of routines (see also Howard-Grenville and Rerup 2017). In the second literature review, Salvato and Rerup (2011) take a different approach and analyze the relationship between routines and capabilities, providing theoretical insights on routines as “assemblages or networks of heterogeneous parts rather than as collective entities” (p. 469). Their critical review suggests that treating routines as patterns of interdependent actions and focusing on the micro-activities that make them up help understand how routines evolve and affect organizational work.

Although these reviews have significantly contributed to organizing the literature, they were published more than a decade ago and relied on selected publication outlets (i.e., Parmigiani and

Howard-Grenville's review focuses on papers published in five management journals from 1996 to 2011; Salvato and Rerup's review focuses on 33 management journals published before 2011). In the years that followed the reviews, the body of research on organizational routines continued to grow both in management scholarship (a special issue on the micro-foundations of routines and capabilities was published in 2012 in the *Journal of Management Studies*, and a special issue on routine dynamics was published in 2016 in *Organization Science*) and in other related disciplines (e.g., economics and organizational sociology).

To the extent of our knowledge, there is hardly any study that provides a detailed map of the landscape of the field looking at how the two perspectives (and related communities of scholars) have contributed to advancing the literature. This leaves us with an incomplete understanding of how the construct of routines has been taken up and employed in different academic disciplines, making it difficult to identify promising avenues for the evolution of the research on the topic. Similar to Cohen et al. (1996), this "paper is therefore designed with the audience of fellow researchers—and especially graduate students—chiefly in mind" (p. 654). Specifically, we analyze the recent evolution of the literature, mapping how the publication landscape of the two communities has changed over time and identifying topics that are historically attributable to each perspective and topics that are creating gaps between the communities. To this end, we first analyze knowledge production between 1982 and 2016 to assess the contributions of the capability and practice communities. Then, we focus on the most recent period (2005-2016), and we conduct a systematic analysis of the topics that are characteristic of each perspective (which we call "community-specific topics") and topics that have been fostering research gaps between the two communities (which we call "community-diverging topics").

To achieve our goal, we conduct a bibliometric study of the peer-reviewed articles published in journals of economics, organizational sociology, and management. Building on Parmigiani and Howard-Grenville's (2011) distinction between capability and practice communities or camps, we conduct a relational link analysis using articles' backward citations to assign each article to one of the two communities and articles' forward citations to measure the contribution of each community to the literature. We then use the Latent Dirichlet Allocation (LDA) algorithm for text analysis to identify the topics related to the field of routine and to trace their popularity among scholars in the past decade

(2005-2016). Unique to our study, we focus on the content of the articles rather than adopting the more common approach of mapping co-citation networks of scientific contributions (Apriliyanti and Alon 2017; Vogel and Güttel 2013).

Our analysis yields two main insights. First, we find that the two camps have continued to provide evidence of the role of routines in organizations contributing to the advancement of the overall field of research. Nonetheless, we also find that the practice community has recently caught up with the older capability community growing faster in the past two decades. Second, we note that, between 2005 and 2016, the two communities have largely persisted in exploring a number of community-specific topics, specifically concerning the theoretical assumptions that lay the foundations for the two perspectives. We also identify diverging topics that, for capability scholars, center on the theoretical foundations and the effects of routines, while, for practice scholars, on the internal dynamics of context-specific routines. As a whole, our findings illustrate that, although calls have been made to create a more synergic body of research (e.g., Parmigiani and Howard-Grenville 2011), the two communities have been having parallel conversations as a result of their different theoretical foundations (evolutionary theory versus practice theory) and focus of analysis (actions versus effects). Nonetheless, we believe that cross-fertilization potential exists that could help create collective advancements in the research.

Our paper is organized as follows. First, we provide a concise overview of the two communities, illustrating their origins and focusing on their salient differences. Afterward, we detail our methodology and then present our findings. Next, we advance a broad picture of the evolution of the research on organizational routines between 1982 and 2016, and we dive into capability-specific and diverging topics published between 2005 and 2016. We finally conclude with general considerations and implications.

## **2. Capability and Practice Communities: A Brief Overview**

Although the construct surfaced in the contributions of leading scholars before 1940 (e.g., Taylor 1911[2004]), the term ‘routine’ was first introduced by Stene that year to denote “that part of any organization’s activities which has become habitual because of repetition and which is followed regularly” (Stene 1940, p. 1129). Subsequently, the topic gained momentum becoming progressively a

popular area of inquiry, especially thanks to the work of the Carnegie school. Led by James March, Richard Cyert, and Herbert Simon, the Carnegie school engaged extensively in studying routine-based behavior (Anderson and Lemken 2019; Feldman, Pentland, D'Adderio, et al. 2021; Gavetti et al. 2007). The school emphasized that organizational routines enable stable outcomes, the storage of organizational memory, and the release of cognitive resources to be employed in decision-making processes (Cyert and March 1963; March and Simon 1958; Simon 1947 [2013]).

Two decades later, Nelson and Winter (1982) extended the value of organizational routines beyond their connection with decision-making processes in their book *An Evolutionary Theory of Economic Change*. Arguably the most well-known milestone in the research on routines (Becker 2004; Parmigiani and Howard-Grenville 2011), the book puts organizational routines at the center of organizational life, bringing to the fore their importance for many organizational tasks. Comparing routines to biological genes, Nelson and Winter (1982) foregrounded routines as the basic unit of analysis to understand organizational work and change.

In the following decades, the study of routines grew in popularity among scholars (Becker 2004, Parmigiani and Howard-Grenville 2011), giving rise to a community of researchers, later dubbed *capability community*, that explores what routines do and their effects on organizational performances (Parmigiani and Howard-Grenville 2011). However, along with increasing interest, the concept of routines also generated ambiguities. As Becker (2008) argued, “it does not come as much of a surprise that the term ‘routine’ has been linked to a set of different (albeit related) concepts” (p. 8). Scholars conceptualized routines first as cognitive regularities and later as behavioral regularities (for reviews, see Becker 2004; Becker 2005; see also Lazaric 2021). Different conceptualizations entail different levels (cognition versus activity) and a different focus on the mechanisms that drive routines and influence their effects (Becker 2005; Salvato and Rerup 2011). This ambiguity led some researchers to criticize routines as sources of inertia and mindless behavior rather than as the building blocks of organizational life (Ashforth and Fried 1988; Gersick and Hackman 1990; Hannan and Freeman 1984). In an attempt to solve conflicting understandings, Martha Feldman and Brian Pentland (Feldman 2000; Feldman and Pentland 2003; Pentland and Rueter 1994) proposed a new theoretical perspective, called routine dynamics, that regards actions as constitutive, thus moving away from the debate on whether

routines are behavioral or cognitive mechanisms. This new perspective has grown rapidly in the past two decades giving rise to the second community of scholars, called *practice community*, that explores the internal dynamics of routines and how they simultaneously produce stability and change (Feldman, Pentland, D'Adderio, et al. 2021).

Next, we describe the main differences between the two communities.

The first to emerge and consolidate, the capability perspective originates from the academic tradition of evolutionary economics and focuses on what routines do and their effects on organizations. Routines are regarded as black-boxed entities, and empirical studies focus on organizations as the level of analysis (Howard-Grenville and Rerup 2017, Parmigiani and Howard-Grenville 2011, Salvato and Rerup 2011). Scholars in this community regard routines as the building blocks of capabilities (Collis 1994; Dosi et al. 2001; Winter 2003; Zollo and Winter 2002). As Dosi et al. (2008) stated, routines “are the building blocks of capabilities with a repetitive and context-dependent nature, although they are not the only building blocks of capabilities” (pp. 1167-1168). Following Winter (2003) and others, therefore, an organizational capability is “a high-level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization’s management a set of decision options for producing significant outputs of a particular type” (Winter 2003, p. 991). In short, the capability community regards routines as the underlying components of capabilities that, studied as whole entities, are crucial for organizational performances (Parmigiani and Howard-Grenville 2011; Salvato and Rerup 2011).

Instead, the practice perspective flourished in the early 2000s thanks to Martha Feldman and Brian Pentland’s work (Feldman 2000, 2003; Feldman and Pentland 2003) and took its theoretical standpoint from sociological theories (e.g., Bourdieu 1977). This perspective illuminates the internal dynamics of routines. Routines consist of multiple entangled elements: actors, actions, artifacts, and organizational contexts (Howard-Grenville and Rerup 2017, Parmigiani and Howard-Grenville 2011). In his early work, Pentland compared routines to “grammars of action”: whereas grammar defines a set of possibilities and variations for a specific language, routines denote a set of possible actions to achieve a task (Pentland 1995; Pentland and Rueter 1994). As such, a routine “is not a single pattern but, rather a set of possible patterns” (Pentland and Reuter 1994, p. 491), and any interaction exhibits some degree

of flexibility and entails mindful behavior that makes routines “effortful accomplishments.” A few years later, Feldman’s work took a step forward and suggested that routines are both “effortful accomplishments” and “emergent accomplishments” (Feldman 2000, p. 613). Routines do not only involve mindful effort, but their repeated enactment also provides stimuli for variation and change that emerge in action. These insights shifted the focus of research from the effects of routines on organizations to the situated actions that make up routines. Building on the work of sociologists (Bourdieu 1977; Giddens 1979; Lave 1988), the scholars conceptualized routines as patterns of actions that are constituted and re-constituted through their enactment and that enable both stability and change (Feldman and Pentland 2003; Pentland and Feldman 2005; Pentland et al. 2012; Pentland et al. 2011). Put differently, routines are viewed as generative and dynamic, and “stability and change in routines are not opposites but that in fact they are mutually constituted” (Feldman, Pentland, D’Adderio, et al. 2021, p. 7). “Each time a routine is enacted is an occasion for variation, and may also be an occasion for some amount of reflection” that enables to re-think routines and guide change (Feldman et al. 2016, p. 508). In short, the practice perspective takes the role of agency (Feldman 2000) seriously and investigates how actions are performed by multiple actors at specific times and places, and how recognizable, repetitive patterns of actions emerge and change (Feldman et al. 2016; Feldman, Pentland, D’Adderio, et al. 2021).

Although the two communities have contributed to the progressive understanding of routines, “researchers in each group seem to be having parallel conversations” (Parmigiani and Howard-Grenville 2011, p. 414), leading to barriers toward a synergic knowledge production (Kay 2018; Salvato 2021). The salient differences between the two perspectives have resulted in two distinct academic conversations that we explore in our bibliometric analysis.

### **3. Methodology**

We conducted a bibliometric study of published articles dealing with organizational routines. A bibliometric analysis is well suited to analyze large bodies of literature as it “offers a powerful set of methods and measures for studying the structure and process of scholarly communication” (Borgman and Furner 2002, p. 2). We selected articles published in peer-reviewed journals belonging to three



disciplines in social science: economics, organizational sociology, and management. We then conducted a relational link analysis, in which we used the list of references of each article as an indicator of the connectedness of the article with either the capability community or the practice community. Specifically, we assigned each article to a community based on the count of the references attributed to two groups of authors that we identify as representatives of each community. Once we assigned each article to a community, we evaluated its contribution by counting the number of articles published. We used topic modeling techniques in a second set of analyses to identify latent topics in our sampled articles. Specifically, we used the probability model for Latent Dirichlet Allocation (LDA) to infer topics in the abstracts of each article. Then, we identified community-specific topics characterizing each community and divergent topics creating gaps between the communities.

### **3.1 Study Sample**

We collected all articles in the SCOPUS (Elsevier) bibliometric database that reported in the title, abstract, or keywords the term “routine(s).” We limited our analysis to articles in the following subject areas as per SCOPUS classification: Business, Management and Accounting, Economics, Econometrics and Finance, Social and Political Science. We chose these subject areas because of the theoretical foundations of the two communities, i.e., economic-oriented vs. organization-oriented theories (Parmigiani and Howard-Grenville 2011). We focused on academic papers published in peer-reviewed journals between 1982 and 2016. We chose such outputs because they are important indicators of a field evolution and contribute to creating a field knowledge base (Ayoubi et al. 2019; Cowan and Foray 1997). We chose 1982 as our starting year because it is the year Nelson and Winter’s influential book, *An Evolutionary Theory of Economic Change*, was published. We found 9,932 articles published in 3,152 distinct journals.

For each paper, we collected all relevant bibliometric information—authors, title, abstract, keywords, journal, publication year, publisher, issue, references, pages, and citations received. Relying on Parmigiani and Howard-Grenville (2011), we identified four leading, representative scholars who substantially contributed to the study of routines in the two communities: Sidney G. Winter and Richard R. Nelson for the capability community and Martha S. Feldman and Brian T. Pentland for the practice

community. We considered the articles published by these scholars and their co-authors as references likely to appear in the bibliographies of our sampled articles (see Section 3.2 for the detailed list of representative authors). To ensure that we included in our sample only articles considering routines as a subject of study and not using the term “routine(s)” as a general colloquial term, we restricted our initial sample to those articles that reported in their references at least two publications authored by one of the representative scholars and/or their co-authors. We also conducted a qualitative check of the papers in our sample by reading their abstracts and dropping those articles that used the term “routine(s)” solely as an adjective loosely coupled with the construct of organizational routines (e.g., hospital routine screening). We ended up with a sample of 635 articles published in 245 distinct journals.

### **3.2 Relational Link Analysis**

Once we identified our study sample, we conducted a relational link analysis to assign each article to one of the two communities (Borgman and Furner 2002; Thelwall 2006). Relational link analysis is especially suited to understand “Who is related to whom?” (Borgman and Furner 2002), that in our case means which article is related to which community. To do so, we classified each article as a capability article or a practice article following two steps.

First, we identified the representative scholars for each community and their co-authors<sup>1</sup>. As reported in Section 3.1, we identified Sidney G. Winter and Richard R. Nelson as representatives of the capability community. We did so because their work is rooted in the evolutionary economics tradition and informs the study of routines from a capability perspective (Parmigiani and Howard-Grenville 2011). We then extended the list of representatives of the capability community to Winter and Nelson’s co-authors, namely Becker, Burkhart, Cohen, Dosi, Egidi, Foss, Heimeriks, Lazaric, Marengo, Warglien, and Zollo<sup>2</sup>. We proceeded similarly for the practice community. We identified Martha S.

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<sup>1</sup> We refer here to co-authors as those scholars that published at least one peer-reviewed article on organizational routines with at least one the four leading scholars.

<sup>2</sup> Articles co-authored by Sidney Winter and Richard Nelson include: Becker, Lazaric, Nelson, & Winter (2005) “Applying organizational routines in understanding organizational change”; Cohen, Burkhart, Dosi, Egidi,

Feldman and Brian T. Pentland as representative scholars of the practice community (Howard-Grenville and Rerup 2017; Parmigiani and Howard-Grenville 2011). We then included Feldman and Pentland's co-authors to the list of representatives of the practice community, namely Becker, Choi, Hillison, Haerem, Jarzabkowski, Lê, Liu, Miller, Orlikowski, Rafaeli, Rerup, Reuter, and Worline<sup>3</sup>.

Second, we attributed each of the 635 articles in our sample to either the capability community or the practice community. To do so, we analyzed the list of references reported in the bibliographies of each article. We assigned each reference to one of the two communities by looking at the authors listed in the references. For instance, if a reference R1 reported in the bibliography of article A1 was authored by a representative of the capability community, we assigned reference R1 to the capability community. References that did not include at least a representative from the two communities were not considered. If we found representatives of both communities among the authors of reference R1, we assigned it to both communities. Once we had classified the references, we performed a manual control of the reference list: we scanned all the articles and manually selected only those that included the word "routine(s)" in the main text (i.e., title, abstract, and main body) to ensure that the referenced papers actually dealt with routines. Afterward, we counted for each of the 635 sampled articles the references assigned to each community and attributed the article to either community. For instance, if article A1 had more references from the capability community, it was classified as a capability article; vice versa, if article A1 had more references from the practice community, it was classified as a practice article. Among the 635 articles in our study sample, we identified 329 capability articles and 306 practice articles.

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Marengo, Warglien, & Winter (1996) "Routines and Other Recurring Action Patterns of Organizations: Contemporary Research Issues"; Foss, Heimeriks, Winter, & Zollo (2012). "A Hegelian dialogue on the micro-foundations of organizational routines and capabilities"

<sup>3</sup> Articles co-authored by Martha Feldman and Brian Pentland include: Feldman & Orlikowski, 2011 "Theorizing practice and practicing theory". Feldman & Rafaeli, 2002 "Organizational routines as sources of connections and understandings". Feldman & Worline, 2016 "The practicality of practice theory". Jarzabkowski, Lê, Feldman, 2012 "Toward a theory of coordinating: Creating coordinating mechanisms in practice". Miller, Pentland, Choi, 2012 "Dynamics of performing and remembering organizational routines". Pentland, Feldman, Becker, Liu, 2012 "Dynamics of organizational routines: A generative model". Pentland, Haerem, Hillison, 2011 "The (n) ever-changing world: Stability and change in organizational routines". Pentland & Reuter, 1994 "Organizational routines as grammars of action". Rerup & Feldman, 2011 "Routines as a source of change in organizational schemata: The role of trial-and-error learning".

### 3.3 Topic Analysis

To identify the topics investigated in the articles, we employed topic modeling. “Borrowed from computer science, this method involves using algorithms to analyze a corpus (a set of textual documents) to generate a representation of the latent topics discussed therein” (Hannigan et al. 2019, p. 587). In particular, we used the Latent Dirichlet Allocation (LDA) model estimated with the Gibbs sampling algorithm (Griffiths and Steyvers 2004; Steyvers and Griffiths 2007). LDA is a probabilistic framework that assumes that a mixture of latent topics generates texts, where a topic represents “a bag of words that frequently appear together across documents” and “the derived word(s) from a topic in topic modeling representing word tokens” (Hannigan et al. 2019, p. 592). The LDA model relies on two main assumptions. First, each article—or in our case each abstract—is a mix of (latent) topics; second, each topic is characterized by a probability distribution of words, i.e., some words are more likely than others to be generated from a given topic (Blei et al. 2003). The outcome of the LDA model estimated with the Gibbs sampling algorithm is a vector of shares representing the mix of latent topics that generated an article. Knowing the vector representation of the articles included in our sample allowed us to trace the evolution of each topic in the articles published by the two communities (Griffiths and Steyvers 2004).

Estimating the LDA model with the Gibbs sampling algorithm requires two main inputs: A list of meaningful words appearing in each of 635 abstracts included in the corpus and an exogenous number of latent topics generated by the algorithm as it scans the entire corpus of data (Hannigan et al. 2019). To identify the first input, we generated a list of words contained in the 635 abstracts. We deleted words with three or fewer characters, words belonging to a conventional list of 728 “stop-words” (e.g., about, above, across, actually), and numbers. We ended up with 47,033 words that appear in the corpus (about 74 words per abstract) and a vocabulary of 6,636 distinct words. To identify the second input, we needed to manage a trade-off between choosing a small number of topics that produces topics that are too broad and difficult to interpret, and choosing a large number of topics that produces topics that are too narrow and characterized by “idiosyncratic word combinations” (Conti et al. 2014). We selected the number of latent topics following the methodology proposed by Griffiths and Steyvers (2004). We estimated different LDA models by imposing a growing number of topics from 5 to 100. Each LDA model is

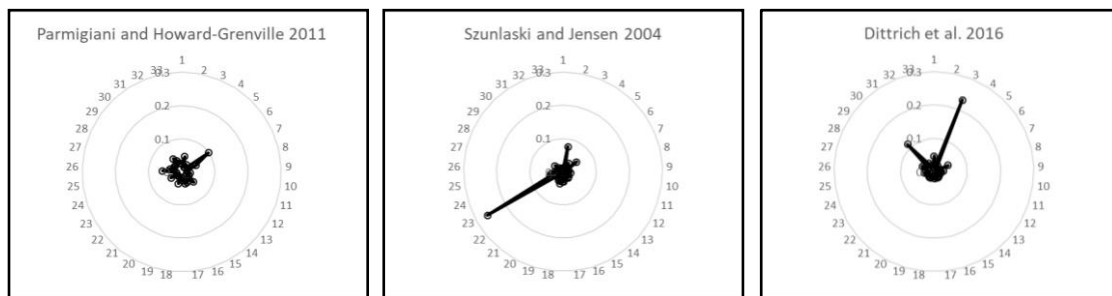
estimated with the Gibbs algorithm, and the quality of each estimation (i.e., fit between the model and data) is represented by a log-likelihood value. We found that 33 is the number of topics with the highest log-likelihood value (Figure A1 in Appendix A1 displays the log-likelihood values when the number of topics ranges between 5 and 100). To assign meaningful names or labels to the generated topics, we relied on the list of words that each topic is more likely to generate; we also read the first five representative papers for each topic, i.e., the papers that have the highest content in percentage associated with each topic. We proceeded iteratively to interpret the topics and assign them names (Croidieu and Kim 2018). First, the first two authors coded the topics independently, going back and forth between data and theory. They then discussed extensively the assigned codes, especially those whose assigned names were substantially different, until they reached an agreement. Table A1 in Appendix A lists all 33 topics, their numeric identifier, names, and the title of a well-known paper in which the topic is extensively used. Table 1 (below) is an extract from Table A1 and provides four examples. Aside from reporting the title of an exemplary paper for each example, the table shows five words most likely to be generated by each topic. For instance, papers dealing with Topic 3 (that we called *Action Patterns*) are likely to use words such as *Aspect*, *Ostensive*, *Performative*, *Pattern*, and *Stability* in their abstracts. A paper in our sample that makes large use of Topic 3 is Feldman and Pentland’s study “Reconceptualizing organizational routines as a source of flexibility and change” (2003).

**Table 1:** Selection of 4 of the 33 topics extracted from the article corpus. In parenthesis, we report the name that we assigned to each topic.

| Topic 3:<br>(Action patterns)  | Topic 7:<br>(Evolutionary theory)   | Topic 12:<br>(Innovation management)  | Topic 23:<br>(Knowledge transfer)   |
|--|---|---|---|
| Aspect<br>Ostensive<br>Performative<br>Pattern<br>Stability  | Evolution<br>Selection<br>Adaptation<br>Economics<br>Variation  | Innovation<br>Knowledge management<br>Innovative<br>Absorptive capacity<br>Internal                     | Market<br>Transfer<br>Replication<br>Growth<br>Assets   |
| Feldman and Pentland, 2003<br>“Reconceptualizing<br>organizational routines as a<br>source of flexibility and<br>change” | Hodgson 2013,<br>“Understanding<br>Organizational Evolution:<br>Toward a Research Agenda<br>using Generalized<br>Darwinism” | Lewin et al. 2011,<br>“Microfoundations of<br>internal and external<br>absorptive capacity<br>routines” | Szulanski and Jensen 2004,<br>“Overcoming stickiness: An<br>empirical investigation of<br>the role of the template in<br>the replication of<br>organizational routines” |

We used the results of the estimation to calculate for each abstract in the corpus a vector indicating the use of each topic in generating the abstract. In Figure 1, we report the topic composition for three articles: Parmigiani and Howard-Grenville’s “Routines revisited: Exploring the capabilities and practice perspectives” (2011), Szulanski and Jensen’s “Overcoming stickiness: An empirical investigation of the role of the template in the replication of organizational routines” (2004), and Dittrich et al.’s “Talking about routines: The role of reflective talk in routine change” (2016). The first article is a literature review on routines and we observe, as expected, an even distribution across multiple topics. The second article is a capability article focusing on *Knowledge transfer* (Topic 23), as clearly shown in the second graph. Finally, the third article is a practice article that analyzes routines as patterns of interdependent actions (Topic 3, *Action patterns*), as illustrated in the third graph of the figure.

**Figure 1:** Mixture of topics for three papers in the sample



**NOTE:** See Table A1 in Appendix A to retrieve the names corresponding to each of the 33 topics in the figure.

To study topics of interest for the two communities over time, we considered two time windows, each consisting of six consecutive years: the first window goes from 2005 to 2010, and the second window from 2011 to 2016. We chose 2011 as the watershed separating the two windows because it is the year of the publication of the two reviews by Parmigiani and Howard-Grenville and by Salvato and Rerup. These two review pieces are reference points for scholars, representing important milestones for the research field and future studies. Accordingly, we restricted our sample to the 533 articles that were published in 229 distinct journals during the two timeframes. We then divided the sample into two subsamples based on their attribution to either the capability or the practice community that resulted from the relational link analysis.

## **4. Results**

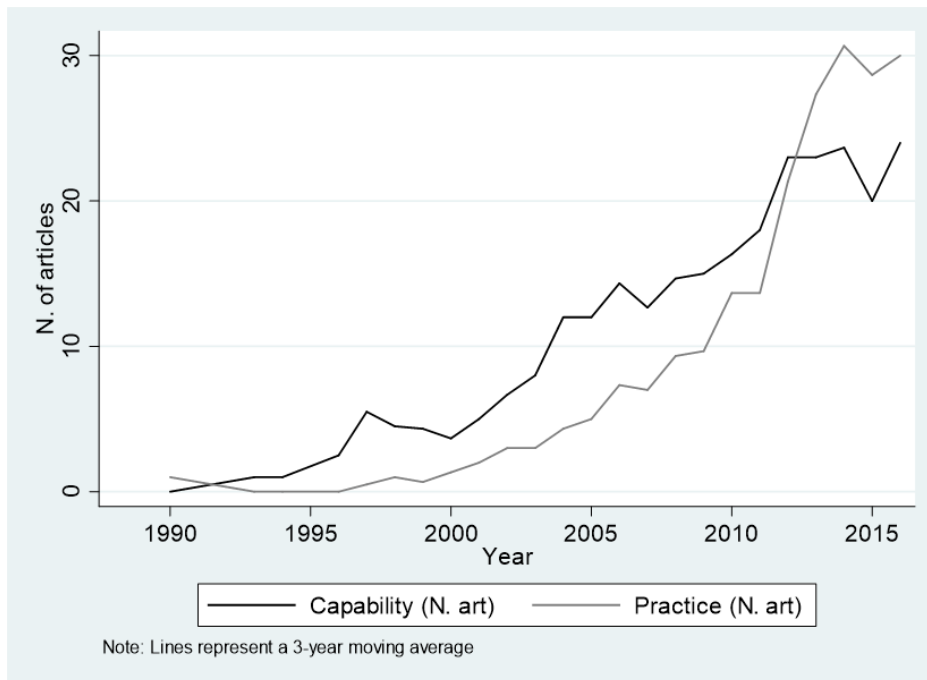
In this section, we report the results of our two analyses (explained in sections 3.2 and 3.3). The first analysis assesses the contributions of the two communities to the overall scholarship on organizational routines. The second analysis identifies the topics of interest for each community between 2005 and 2016, focusing specifically on those that have characterized the knowledge production of each community and topics that have created or fostered gaps between them.

### **4.1. Evolving Contributions of the Two Communities**

Figure 2 shows the number of articles attributed to each community. We find that the number of articles that each group published has grown steadily since the 1990s. Yet, the number of articles published by the practice community has grown faster than the capability community in the last decade. This faster growth led the practice community, albeit emerging later, to catch up and surpass the knowledge production of the capability community.

We interpret this result as evidence that the new conceptualization of routines emphasized by the practice community has gained momentum. This trend emerges from the progressive development and expansion of a group of scholars engaging in the analysis of the internal dynamics of routines that enable the mutual constitution of stability and change. This group has met regularly over the years and organized many events, initially arranged by Martha Feldman and Brian Pentland and more recently by new members of the community (e.g., symposiums at the Academy of Management Annual Meeting; tracks at the EGOS colloquium). By highlighting the benefits of looking at actions, participants, artifacts, and contexts and their interplay, the practice community has created a cohesive conversation and set the agenda for future research (Feldman, Pentland, D'Adderio, et al. 2021; Feldman, Pentland, D'Adderio, et al. 2021).

**Figure 2:** Number of articles attributed to the capability and practice communities (3-year moving average).



#### 4.2. Topic Evolution Across Communities

We surveyed the literature to identify evolutions in the research outputs between 2005 and 2016 and, jointly, we compared them across the two communities. We decided to focus on this time period because, whereas the capability perspective emerged in the 1980s, the practice perspective did not consolidate until the early 2000s. This means that earlier, scholars would only build on the first perspective. This is evident in the work of some prominent researchers that built on the literature on capabilities until the new lens emerged, prompting a shift in their theoretical background to a lens more appropriate for their work. For example, one of our representative scholars, Markus Becker (the only representative scholar belonging to both communities according to the classification described in section 3.2), progressively extended his research focus to include, not only capability-oriented studies (e.g., Becker et al. 2005), but also practice-oriented studies in the late 2000s and 2010s (e.g., Pentland et al. 2012). Another well-known scholar in the community, instead, Luciana D’Adderio, moved from capability-oriented studies to practice-oriented studies. While she initially built on the capability literature as the practice community was still in its early days (e.g., D’Adderio 2001), she then shifted to the practice theoretical lens, given her empirical focus on the internal dynamics of routines and the



artifacts that enable or constrain their enactment (e.g., D’Adderio 2011, 2014). For this reason, we explore in-depth the evolution of the two communities in the period from 2005 to 2016, when the two camps were well defined, and scholars could make a conscious choice on the community their research would engage with.

In terms of research evolution within each community, we observe that both groups largely persisted with the study of topics that had historically sparked scholars’ interest (see Tables B1 and B2 in Appendix B for details on the topics and their evolution). In terms of comparison between communities, we identify topics that are community-specific and topics that represent areas of divergence between the communities. Community-specific topics are topics that, across the two time windows, have mainly interested only one community; community-divergent topics are, instead, topics that emerge as distinctive for a community in the second time window and further foster parallel conversations.

Columns 1 and 2 in Table 3 show the average use of each significant topic by capability and practice articles, respectively. In Column 3, we calculate the difference between the use of each topic in the two communities. A positive difference means that the practice community is leading, while a negative difference means that the capability community is leading. Column 4 shows the percentage use of the topics by the practice community, taking as the reference point the use of the topic by the capability community. Finally, in Column 5, we calculate the p-value of the statistical test for the mean difference between Columns 1 and 2. While we report in Table 3 only the topics that exhibited statistically significant variations between the communities, Tables B3 and B4 in Appendix B report the results for all the 33 topics.

Looking at Column 4 of Table 3, we interpret a negative value of *% Difference* in both periods 2005-2010 and 2011-2016 as evidence that the capability community has consistently used a topic more than the practice community. On the contrary, if *% Difference* is positive in both periods, the practice community has consistently used the topic more than the capability community. We consider the formers as capability-specific topics (identified with *\*\*c* in Table 3) and the latter as practice-specific topics (identified with *\*\*p* in Table 3). Relying on the values of *% Difference*, we also identify topics used in the same proportion in the time window 2005-2010 but used significantly more by one

community in the period 2011-2016. Hence, we define capability-diverging topics as those topics that became distinctive for the capability community in 2011-2016 (identified with \*<sup>c</sup> in Table 3) and practice-diverging topics as those topics that became distinctive of the practice community in 2011-2016 (identified with \*<sup>p</sup> in Table 3).

Table 3 displays eight identified community-specific topics, one for the capability community (\*\*<sup>c</sup>) and seven for the practice community (\*\*<sup>p</sup>). Furthermore, the table displays nine diverging topics, seven that become characteristic of the capability community (\*<sup>c</sup>) in 2011-2016 and two that become characteristic of the practice community (\*<sup>p</sup>) in 2011-2016. Alongside community-specific and community-diverging topics, Table 3 also enables us to locate those topics used in different proportions in the time window 2005-2010 but used in the same proportion in the period 2011-2016. These topics, which are *Decision-Making*, *Construct nature*, and *Networks*, are converging topics. While our analysis also allows us to identify converging topics, they are less salient than community-specific and diverging topics for at least two reasons. First, while topics that are characteristic of a community or have created gaps between the two communities are a substantial number, we only find three converging topics. Second, given the concerns voiced by many scholars regarding the growing distance between the communities (Kay 2018; Parmigiani and Howard-Grenville 2011; Salvato and Rerup 2011), we believe that there is value in focusing on community-specific and diverging topics.

**Table 3:** Average use of topics by the practice and capability communities in the two time windows 2005-2010, 2011-2016.

| Topic (#. Name)                                | (1)<br>Capability (A) | (2)<br>Practice (B) | (3)<br>Difference<br>B-A | (4)<br>% Difference<br>(B-A)/A | (5)<br>p-value |
|--|-----------------------|---------------------|--------------------------|--------------------------------|----------------|
| <b>2005-2010</b> (98 articles) (69 articles)   |                       |                     |                          |                                |                |
| <u>Capability theoretical grounding</u>        |                       |                     |                          |                                |                |
| 2. Construct nature                            | 0.0324                | 0.0252              | -0.0072                  | -22.16%                        | 0.05           |
| 7. Evolutionary theory                         | 0.0414                | 0.0225              | -0.0190                  | -45.80%                        | 0.00           |
| <u>Organizational effects</u>                  |                       |                     |                          |                                |                |
| 1. Decision-Making                             | 0.0271                | 0.0220              | -0.0051                  | -18.69%                        | 0.08           |
| <u>Practice theoretical grounding</u>          |                       |                     |                          |                                |                |
| 3. Action patterns                             | 0.0234                | 0.0313              | 0.0080                   | 34.1%                          | 0.02           |
| 11. Sociomateriality                           | 0.0221                | 0.0367              | 0.0146                   | 66.13%                         | 0.00           |
| 19. Networks                                   | 0.0247                | 0.0405              | 0.0158                   | 64.22%                         | 0.01           |
| <u>Work organization</u>                       |                       |                     |                          |                                |                |
| 6. Mindful behavior                            | 0.0235                | 0.0425              | 0.0191                   | 81.21%                         | 0.00           |
| 25. Goal-oriented behavior                     | 0.0232                | 0.0356              | 0.0124                   | 53.34%                         | 0.01           |
| <u>Context-related internal dynamics</u>       |                       |                     |                          |                                |                |
| 8. Information systems                         | 0.0250                | 0.0325              | 0.0075                   | 29.93%                         | 0.02           |
| 17. Policies and regulations                   | 0.0282                | 0.0372              | 0.0090                   | 31.74%                         | 0.07           |
| 30. Accounting practices                       | 0.0301                | 0.0403              | 0.0102                   | 33.97%                         | 0.05           |
| <b>2011-2016</b> (156 articles) (210 articles) |                       |                     |                          |                                |                |
| <u>Capability theoretical grounding</u>        |                       |                     |                          |                                |                |
| 4. Dynamic capabilities* <sup>c</sup>          | 0.0431                | 0.0250              | -0.0181                  | -42.03%                        | 0.00           |
| 7. Evolutionary theory** <sup>c</sup>          | 0.0328                | 0.0218              | -0.0110                  | -33.40%                        | 0.00           |
| 27. Ordinary capabilities* <sup>c</sup>        | 0.0486                | 0.0277              | -0.0209                  | -42.96%                        | 0.00           |
| <u>Organizational effects</u>                  |                       |                     |                          |                                |                |
| 9. Technological innovation* <sup>c</sup>      | 0.0379                | 0.0272              | -0.0107                  | -28.30%                        | 0.00           |
| 12. Innovation management* <sup>c</sup>        | 0.0411                | 0.0273              | -0.0137                  | -33.47%                        | 0.00           |
| 24. Strategic alliances* <sup>c</sup>          | 0.0366                | 0.0250              | -0.0116                  | -31.70%                        | 0.02           |
| 10. Resource management* <sup>c</sup>          | 0.0298                | 0.0246              | -0.0052                  | -17.38%                        | 0.05           |
| 23. Knowledge transfer* <sup>c</sup>           | 0.0338                | 0.0235              | -0.0103                  | -30.61%                        | 0.00           |
| <u>Practice theoretical grounding</u>          |                       |                     |                          |                                |                |
| 3. Action patterns** <sup>p</sup>              | 0.0249                | 0.0442              | 0.0192                   | 77.08%                         | 0.00           |
| 11. Sociomateriality** <sup>p</sup>            | 0.0228                | 0.0387              | 0.0160                   | 70.08%                         | 0.00           |
| <u>Work organization</u>                       |                       |                     |                          |                                |                |
| 6. Mindful behavior** <sup>p</sup>             | 0.0232                | 0.0296              | 0.0064                   | 27.66%                         | 0.02           |
| 25. Goal-oriented behavior** <sup>p</sup>      | 0.0264                | 0.0336              | 0.0072                   | 27.28%                         | 0.06           |
| <u>Context-related internal dynamics</u>       |                       |                     |                          |                                |                |
| 8. Information systems** <sup>p</sup>          | 0.0248                | 0.0347              | 0.0099                   | 39.84%                         | 0.02           |
| 15. Service delivery* <sup>p</sup>             | 0.0259                | 0.0341              | 0.0082                   | 31.70%                         | 0.05           |
| 17. Policies and regulations** <sup>p</sup>    | 0.0251                | 0.0415              | 0.0164                   | 65.23%                         | 0.00           |
| 26. Workplace changes* <sup>p</sup>            | 0.0343                | 0.0412              | 0.0070                   | 20.30%                         | 0.07           |
| 30. Accounting practices** <sup>p</sup>        | 0.0258                | 0.0402              | 0.0145                   | 56.24%                         | 0.00           |

NOTE: We report only the topics whose difference in the average use between communities is statistically significant. Capability-specific topics are identified with \*<sup>c</sup>, Practice-specific topics with \*\*<sup>p</sup>, Capability-diverging topics with \*<sup>c</sup>, and Practice-diverging topics with \*<sup>p</sup>. Underlined headings are the names of topic families.

To aid the presentation of our comparative findings, we aggregate the topics into five overarching families. For the capability community, we identify two families, which we call “Capability theoretical grounding” and “Organizational effects”; for the practice community, we identify three families, namely “Practice theoretical grounding,” “Work organization,” and “Context-related internal dynamics.” The two families “Capability theoretical grounding” and “Practice theoretical grounding” include topics that deal with the theoretical underpinnings of the two communities. Specifically, they focus either on the interdependences between routines and capabilities (e.g., Felin and Foss 2011; Hodgson 2013) or on the performative entanglement of the constitutive elements of routines (actions, actors, materiality, and context) (e.g., D’Adderio 2014; Iannacci and Hatzaras 2012; Turner and Rindova 2012). The family “Organizational effects” includes topics that take an entitative approach to routines exploring their effects on critical organizational tasks, such as technological innovation (e.g., Karo and Lember 2016) or strategic alliances (e.g., Zollo et al. 2002). The family “Work organization” encompasses topics that deal with the role of routines in the organization of work, such as in the management of unexpected events (Frigotto and Zamarian 2015), as well as how work organization is affected and affects routines, such as the selection of routines based on participants’ goals (Nigam et al. 2016). Finally, the family “Context-related internal dynamics” encompasses topics that highlight relevant empirical settings explored by practice scholars to advance the understanding of the internal dynamics of routines, such as the implementation of information systems (e.g., Berente et al. 2016) or the enactment of accounting practices (e.g., van der Steen 2011).

Below, we discuss community-specific topics and community-diverging topics, drawing insights for the five families we identified.

#### **4.2.1 Capability-specific topics**

We identify *Evolutionary theory* (% Difference = -48.80% in 2005-2010 and -33.40% in 2011-2016) as a capability-specific topic, belonging to the family “Capability theoretical grounding.” Despite a relative decrease in the use of the topic between the first and second period (-20.87%, see Table B1 in Appendix B), *Evolutionary theory* remains a community-specific topic that capability scholars have strived to advance. In the period we surveyed, a critical debate emerged among capability scholars on

the evolutionary bases of organizational routines. Originally brought forward by Hodgson (2002), the debate concerned the relevance of evolutionary analogies and, especially, the Darwinian concepts of variation, retention, and selection. Darwinism emphasizes that evolution emerges when retention mechanisms are in place and variation is generated, and when variation and retention are selected. The debate interested the capability community across the two time windows as scholars questioned the usefulness of Darwinism for the study of routines. Hodgson (2002) initially proposed the concept of “generalized Darwinism” (originally labeled “universal Darwinism”) that emphasized how a wide range of phenomena uphold Darwin’s core principles. Among such phenomena, routines constitute an emblematic one: “the propensity of human beings to communicate, conform and imitate, making the replication or inheritance of customs, routines, habits and ideas a key feature of human socio-economic systems” (p. 270).

Further elaborated by Hodgson, joined by Knudsen (2006a, 2006b, 2008), in the years that followed, Darwinism attracted the attention of many scholars, some supporting the ontological commitment to Darwinism and others criticizing it (e.g., Buenstorf 2006). Some debates emerged due to the Darwinian conceptualization of routines as dispositions rather than behavioral patterns. Other disputes concerned the distinction between Darwinism and Lamarckism (including the intentional acquisition and inheritance of routines) and emphasized that Darwinism does not account for adaptation but solely for selection. Other criticisms relate to the exclusion of intentionality in Darwinism (for further discussion concerning the debate, see Aldrich et al. 2008; Hodgson 2013). As a whole, these studies have fed a growing debate on the theoretical foundations of routines among capability scholars.

#### **4.2.2 Practice-specific topics**

We find that multiple topics were persistently used by the practice community more than the capability community. These topics encompass the topics attributed to the families “Practice theoretical grounding,” i.e., *Action patterns* (+34.10% and +77.08%) and *Sociomateriality* (+66.13% and +70.08%), and “Work organization,” i.e., *Mindful behavior* (+81.21% and +27.66%) and *Goal-oriented behavior* (+53.34% and +27.28%). They also include most topics belonging to the family “Context-related internal dynamics,” i.e., *Information systems* (+29.93% and +39.84%), *Policies and regulations*

(+31.74% and +65.23%), and *Accounting practices* (+33.97% and +54.24%). We discuss the three families next.

We observe that conceptual and empirical work on the theoretical underpinning of the practice community (“Practice theoretical grounding” and “Work organization”) remained relevant for the community across the two periods. In the time windows we investigated, scholars have strived to provide systematic evidence on the foundations of routine dynamics drawing on practice theory that acknowledges the centrality of actions and analyzes how repetitive and recognizable action patterns operate and are generated (Bourdieu 1977, 1990; Giddens 1979). Simply put, the practice community has advanced the understanding of “routines as generative systems created through the mutually constitutive and recursive interaction between the actions people take [...] and the patterns these actions create and recreate” (Feldman and Orlikowski 2011, p. 1245).

We find two topics inherently connected to practice theory: *Action patterns* and *Sociomateriality*. Although it was always a practice-specific topic, the interest in *Action patterns* has increased significantly across the two time windows<sup>4</sup>, with a growing number of empirical studies taking a routine dynamics perspective to explain the dynamics of stability and change (e.g., Danner-Schröder and Geiger 2016; Dittrich et al. 2016; Iannacci and Hatzaras 2012). The growth of the topic as a specific area of inquiry can be traced to the momentum that routine dynamics has gained starting from the early 2000s (Feldman et al. 2016). The routine dynamics perspective draws attention to actions and their meaningful sequence to explain how routines work and contribute to stability and change (Feldman 2000, 2003; Feldman and Pentland 2003; Pentland and Feldman 2005). Routine dynamics distinguishes between performing (formerly called performative aspect)—i.e., the situated enactment of action patterns (Feldman 2016; Feldman, Pentland, D’Adderio, et al. 2021)—, and patterning (formerly called ostensive aspect)—i.e., the creation and recreation of recognized action patterns (Feldman 2016; Feldman, Pentland, D’Adderio, et al. 2021). Such distinction has guided recent progress in the field by unraveling how routines are “created through the mutually constitutive and recursive interaction

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<sup>4</sup> Table B2 in Appendix B reports the percentage variation of the use of the topic between the two time windows for the practice community. The increase of the use of the topic *Action patterns* within the practice community equals to +40.94% over the two time windows.

between the actions people take (performative aspect of routines) and the patterns these actions create and recreate (ostensive aspects of routines)” (Feldman and Orlikowski 2011, p. 1245). In the past decade, the practice community has published cohesive insights into the internal dynamics of routines (e.g., Aroles and McLean 2016; Turner and Rindova 2012). Scholars have made a significant step forward in unpacking the mechanisms that underpin the processes of performing and patterning, aided by a shift toward a “stronger processual account ... developed by attending to actions—the sayings and doings—that comprise routines” (Howard-Grenville et al. 2016, p. 4).

Alongside the study of routines as action patterns, practice scholars have dedicated growing attention to the performative role of materiality (D’Adderio 2008, 2011, 2021; Leonardi 2011), conceptualizing materiality and actions as inseparable in practice (Orlikowski 2007; Orlikowski and Scott 2008), and starting to unravel the agency of objects in the processes of patterning and performing (for a recent overview, D’Adderio 2021). By emphasizing that the relationship between stability and change depends on the entanglement of actions, human and non-human *actants* (i.e., physical and digital artifacts such as manuals, templates, and products) in social realities (D’Adderio 2008; Feldman 2000, 2003; Feldman and Pentland 2003; Howard-Grenville 2005; Pentland and Feldman 2005, 2008), scholars have brought to the fore the role of artifacts as “mediators” that “participate in the co-creation of knowledge and transformations of actions” (D’Adderio 2011, p. 211). In doing so, the practice community has provided valuable insights into “sociomaterial assemblages whose configuration shape routines and their outcomes in complex and emergent ways” (D’Adderio 2021). *Sociomateriality* entails an understanding of reality as an assemblage of people, objects, and context (Orlikowski and Scott 2008). As Latour (2004, p. 227) pointed out, “there exists no relation whatsoever between the material and the social world, because it is the division that is first of all a complete artefact.” Therefore, actions (and action patterns) can hardly be separated from the artifacts that surround them. When routines are enacted, non-human actants enable and constrain actors’ behavior and, as such, they influence how routines emerge, are enacted, and change over time (Baldessarelli et al. 2022; Bapuji et al. 2012; Berente et al. 2016; Cacciatori 2008, 2012; D’Adderio 2014).

Practice scholars’ knowledge production also extended beyond the consolidation and strengthening of practice theory with scholars researching two topics strongly related to the foundations

of the group: *Mindful behavior* and *Goal-oriented behavior*. We group these two topics into the family “Work organization” to signal that both relate to behaviors that are affected and affect the organization of collective work. On the one hand, practice scholars have endeavored to consolidate the idea that routines are effortful and emergent accomplishments (Feldman 2000; Pentland and Rueter 1994) encompassing mindful behavior. Despite the relative decrease of interest for the topic among scholars<sup>5</sup>, researchers have still enriched the empirical basis by shedding light on *Mindful behavior* (e.g., Frigotto and Zamarian 2015). These studies largely build on Levinthal and Rerup’s (2006) conceptualization of behavior as both mindful and mindless, where mindfulness is intended as the ability to manage unexpected events by relying on anticipation and resilience (Weick and Sutcliffe 2001). By conceptualizing mindfulness and mindlessness as a duality (Farjoun 2010) rather than a dualism, the two scholars suggested that one cannot exist without the other (Levinthal and Rerup 2006; see also Rerup and Levinthal 2014). Specifically, through a routine dynamics perspective that distinguishes between ostensive and performative aspects, Levinthal and Rerup took an important step forward in reconciling routines with mindfulness and solving a lost-standing debate in the literature (Ashforth and Fried 1988; Gersick and Hackman 1990; Hannan and Freeman 1984). Studies published afterward embraced this conceptualization and provided critical empirical evidence into how mindful interactions underpin the enactment, retention, and change of routines (e.g., Frigotto and Zamarian 2015; Valorinta 2009).

On the other hand, scholars have endeavored to understand the relationship between routines and the performance of organizational goals. Some studies have explored how the emergence and adaptation of routines influence key organizational goals, such as rapid patient transfer between hospitals for urgent procedures (Veinot et al. 2012) or the collective production of an event (Chen 2012). By way of example, Veinot et al.’s (2012) study illustrates that “community hospitals addressed the need for rapid ... patient transfers by routinizing the collective, interhospital work process” (p. 1800), which resulted in the reduction of uncertainty among key workers and coordination benefits that helped the delivery

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<sup>5</sup> See Table B2 in Appendix B assessing the use of the *Mindful behavior* topic by the capability community over time.



of appropriate health care to patients. Other studies, instead, have analyzed how organizational goals influence the selection and retention of routines. For example, Nigam et al. (2016) showed that role-based authority affects the selection of routines for change, while Hoff et al. (2006) illustrated how people follow the goals of established missions through the adherence to routines. Jointly, the studies that analyze *Goal-oriented behavior* unravel the complex relationship between routines and goals, highlighting different mechanisms that explain when and how goals benefit from routines, and when and how routines must adapt and be abandoned to achieve such goals.

Collectively, the “Practice theoretical grounding” and “Work organization” families emphasize that the practice community has striven to connect their empirical work from within the routines with the foundations of practice theory and to advance such theoretical perspective (Bender and Feldman 2015; Feldman and Orlikowski 2011; Feldman and Worline 2016), as well as to explain the relationship between routines and behavior in organizations.

As they were striving to contribute to our understanding of the theoretical grounding of routine dynamics, practice scholars have explored the internal dynamics of routines that lead to the emergence, change, and enactment of routines in different contexts. “Organizational routines have been studied in a wide variety of settings, including law, medicine, accounting, and engineering” (Pentland and Hærem 2015, p. 465) by zooming in on actions taken at specific times and in particular places (Feldman 2000; Howard-Grenville et al. 2016). Focusing on the critical question of “how routines are done” (Tsoukas 2019, p. 4), practice scholars have conducted empirical investigations, often grounded in longitudinal, qualitative studies (primarily ethnographic studies) in diverse contexts to provide a nuanced understanding of how routines contribute to stability and change. In particular, three topics in the “Context-related internal dynamics” family surfaced in our analysis: *Information systems*, *Accounting practices*, and *Policies and regulations*. Scholars have dedicated growing attention to the interactions between information systems as non-human actants and people enacting routines and have provided detailed accounts of how the implementation and use of information systems influence routines (Berente et al. 2016; Laumer et al. 2016). For example, Berente et al. (2016) observed that, during the implementation of the NASA enterprise information system, misalignments in routines manifested in technical failures, tensions, and power struggles that needed management and the dynamic adjustment

of routines. Scholars have also explored how policies and regulations are implemented, especially in educational settings (e.g., Cobb and Jackson 2012), and reflected on how physical artifacts (e.g., manuals) are taken up and influence the emergence and change of routines. Finally, by regarding accounting practices as organizational routines (Burns and Scapens 2000), researchers have systematically studied the internal dynamics that sustain patterning and performing in accounting contexts, such as invoice processing (e.g., Pentland et al. 2010, 2011), to explain how routines that may appear mindless and static, are constantly changing. Such in-depth explorations of different contexts have highlighted that seemingly mundane routines display significant differences within the same context and across contexts due to differences in how people enact them and recognize them as patterns of actions. These explorations also provide insights into how physical (e.g., written regulations and instruction manuals) and digital artifacts (e.g., information systems) affect and are affected by routines.

#### **4.2.3 Capability-diverging topics**

We find that capability scholars have integrated with more consistency than practice scholars two topics closely connected with the theoretical foundations of the community—i.e., *Dynamic capabilities* (-42.03% in 2011-2016) and *Ordinary capabilities* (-42.96%)—, as well as the family “Organizational effects”—i.e., *Technological innovation* (-28.30%), *Innovation management* (-33.47%), *Resource management* (-17.38%), *Knowledge transfer* (-30.61%), and *Strategic alliances* (-31.70%).

We observe that *Dynamic capabilities* (-42.03%) and *Ordinary capabilities* (-42.96%) are generating a gap between the two communities as capability scholars have dedicated significantly more attention to the topics than the practice community in the period 2011-2016. We explain this difference in the communities’ interest with the different theoretical foundations the scholars rely upon and engage with, as well as with the growing attention of capability scholars to the distinction between routines that enable the maintenance of the *status quo* and routines that aid change (Eisenhardt and Martin 2000; Kay 2018). In response to Salvato and Rerup’s (2011) claim that studies do not sufficiently “explain how behaviors that are clearly patterned and persistent [...] can facilitate the creation of novelty and human creativity” (Salvato and Rerup 2011, p. 473), scholars have attended more systematically to how routines enable both predictable and novel performances. By recognizing routines as the building blocks

of organizational capabilities (Collis 1994; Winter 2003), scholars have provided theoretically and empirically grounded accounts of when routines ensure stable and repetitive results and when they are mobilized to facilitate change (e.g., Dixon et al. 2014).

Alongside the study of the routines as fine-grained capabilities, scholars in the community have also engaged with the study of specific organizational effects afforded by routines. Specifically, we find five topics, all belonging to the family “Organizational effects,” that represent topics that the capability community has treated with significant interest in comparison to the practice community. In particular, we note two distinct types of topics: topics connected to the achievement of innovation performances, i.e., *Innovation management* (-33.47%), *Technological innovation* (-28.30%), and *Strategic alliances* (-31.70%), and topics that relate to the management of knowledge bases, i.e., *Resource management* (-17.38%) and *Knowledge transfer* (-30.61%).

On the one side, the capability community has revived its original interest in innovation, initially theorized by Nelson and Winter’s influential work (1982). Alongside the increased distinctiveness of the topics *Dynamic capabilities* and *Ordinary capabilities* that highlight how routines, as building blocks of capabilities, can aid stable and novel performances, scholars in the community have strived to provide compelling empirical evidence on how routines assist and/or are developed to support innovation and strategic efforts – that is, *Technological innovation*, *Innovation management*, and *Strategic alliances* (e.g., Aaltonen and Lanzara 2015; Helfat and Campo-Rembado 2016).

On the other side, the capability community has invested more in the period 2011-2016 than the practice community in the analysis of knowledge management, focusing primarily on the management of resources and the transfer of knowledge – that is, *Resource management* and *Knowledge transfer*. Scholars have explored how routines intervene in the development of different types of key resources, such as how routines enable the development of R&D resources (Carrick 2016) or how routines are instrumental to entrepreneurs who want to gradually accumulate and integrate knowledge and skills (Macpherson et al. 2015). Capability scholars also remained interested in a topic that historically had attracted empirical research (e.g., Szulanski and Jensen 2004): how routines affect knowledge transfer (Argote and Fahrenkopf 2016). Studies in the period we surveyed took a step forward in the analysis of when “transfer processes including routines for replication and brokering [...] are used by managers to

copy, transfer, and recombine resources, especially knowledge-based ones” (Eisenhardt and Martin 2000, p. 1107). Thus, for example, studies have analyzed how effectively routines are transferred across organizations and markets (e.g., Min and Mitsuhashi 2016) or how knowledge is transferred and refined at the network-level at each new routine performance (e.g., Hatani and McGaughey 2013).

#### ***4.2.4 Practice-diverging topics***

We find only two diverging topics that became distinctive for the practice community in the second time period, both belonging to the family “Context-related internal dynamics”: *Service delivery* (+31.70%) and *Workplace changes* (+20.30%).

In today’s service economy, researchers have increasingly focused on services as a rich research context to study the internal dynamics of routines. Services are processual in nature and require a longitudinal understanding of the dynamics surrounding their performance and change (e.g., Turner and Rindova 2012). Simultaneously, service success depends on the interactions among people as well as between people and (physical and digital) artifacts (Pentland and Feldman 2007). As a result, the delivery of various services has increasingly become a topic of interest for the practice community. Publications center on in-depth analyses of how services are delivered in practice and how they change, with studies empirically analyzing the dynamics of towel-changing routines (e.g., Bapuji et al. 2012), waste collection routines (e.g., Turner and Rindova 2012), and night rounds in intensive care units (Beane and Orlikowski 2015), among others. Beside *Service delivery*, we find a second topic that became characteristic of the practice community in the second time window: *Workplace changes*. Scholars of accounting and management have increasingly explored how changes that affect the workplace (e.g., new control systems, new concepts implementation) influence current routines and the creation of new ones, such as collaborative routines that enable human resources professionals to communicate (Rivera and Cox 2014).

To summarize, the study of the dynamics affecting specific contexts, such as services and workplace changes (alongside other contexts already explored in other studies), provides additional evidence on how seemingly mundane routines are subject to idiosyncrasies and change and how participants enact and adapt them mindfully. These findings illustrate that the practice community is

dedicating systematic attention to the socio-material contexts in which a large array of routines are enacted.

## **6. Conclusions**

Our study reviews the body of research on organizational routines and identifies topics that have attracted the interest of scholars, tracing their emergence and evolution over time. We outline the knowledge production of two communities of researchers — the capability community and the practice community (Kay 2018; Parmigiani and Howard-Grenville 2011). We provide a comprehensive and holistic understanding of how scholars have studied routines in recent years as the two communities grew rapidly.

To this end, we conducted a bibliometric analysis of peer-reviewed articles published in journals of management, economics, and organizational sociology to identify the knowledge production of the two communities and trace the topics of interest between 2005 and 2016. Specifically, we conducted a relational link analysis using articles' references to measure the communities' contribution to the routine literature. Then, we used an LDA algorithm for text analysis, an approach relatively novel to management studies for the analysis of large corpora of documents, to identify 33 topics that sparked scholars' attention in the field of organizational routines, and we studied which community engaged with them and how they did so. Our results highlight interesting trends.

First, we observe that, in the past decade, the knowledge production of the practice community has been growing faster than the one of the capability community. The latter emerged earlier, encouraged by the impressive body of research on ordinary and dynamic capabilities in the 1990s and early 2000s. The former, instead, started to gain traction in the early 2000s, and since then, scholars have increasingly employed practice theory as a lens to analyze organizational phenomena, including routines (Feldman and Worline 2016; Knorr Cetina et al. 2005). Researchers who have engaged with the practice community have contributed to and witnessed a prolific growth in the knowledge production and the consolidation of the community in the past decade.

Second, in the period that we analyzed in detail (2005-2016), while we observed that the research trajectories of the two communities did not change substantially, we also took a step forward. We

explored which topics generated parallel conversations between the communities in the decade we surveyed, focusing on community-specific and community-diverging topics. Our analysis of community-specific topics sheds light on the topics that have consistently attracted the attention of a community (in comparison to the other). Such topics concern the theoretical assumptions that lay the foundations for each community (i.e., evolutionary economics and sociological practice theories). While *Evolutionary theory* emerged as the only capability-specific topic, several topics concerning practice theory were community-specific topics for practice scholars (i.e., *Action patterns*, *Sociomateriality*, *Mindful behavior*, and *Goal-oriented behavior*). Also, alongside these topics and related to them, the practice community has analyzed the internal dynamics of routines in different research contexts. Thus, as areas of inquiry that have attracted the attention of the two groups without creating synergic research, community-specific topics have primarily interested the growth of the practice community in the period we analyzed. This undoubtedly results from the endeavor of practice scholars to establish a theoretically sound stream of research that “zooms in on routines” (Howard-Grenville et al. 2016) and explores how the entanglement of their constituting elements (actions, actors, artifacts, and context) influences their internal dynamics in many research contexts. Whereas the capability community emerged in the ‘80s and has long engaged with the effects of routines, the younger practice community strived to create a dedicated community of researchers unpacking the internal dynamics of routines. Practice theory has provided a suitable theoretical lens to study routines by foregrounding the role of micro-actions and highlighting how human and non-human actants interact with their contexts (Feldman et al. 2016; Howard-Grenville and Rerup 2017; Parmigiani and Howard-Grenville 2011).

Our analysis of diverging topics illuminates the topics that emerged as characteristics of a community in the second period (2011-2016). On the one hand, the capability community has strived to systematically address issues that scholars had brought to the fore following Nelson and Winter’s well-known book. Criticisms regarding the inertia and stability of routines (e.g., Hannan and Freeman 1984) gave rise to a body of research that advanced the role of routines within the larger discourse on dynamic and ordinary capabilities and that explained how routines could be sources of novelty. On the other hand, the practice community has expanded the empirical settings where the mutual constitution

of stability and change of routines is analyzed, focusing on action patterns in service delivery and in relation to workplace changes. As a whole, the analysis of diverging topics highlights the differences between the two communities: Whereas the capability community strives to advance the understanding of the effects of routines, the practice community seeks to provide detailed accounts of how routines unfold.

Collectively, our findings provide a detailed and up-to-date map of the research landscape of the two communities that emphasizes the importance that both groups have attributed to the theoretical foundations of the field. Although the communities may have not intentionally nourished parallel conversations, the distinct theories that lay the foundations for the communities inevitably create strains as scholars try to construct a synergic conversation. With the practice community initiating a change of “the grain size or granularity of analysis and moved the unity of analysis from the firm and the routines that constitute them to the routines and actions that constitute them” (Feldman 2016, p. 27), the two communities have progressively grown apart.

Nonetheless, while we recognize that the foundations of the two communities are different and challenging to integrate, capability and practice scholars are both striving to enhance our understanding of how organizations work, what they accomplish, and how knowledge and practices within such organizations are created, enacted, and made sense of. Thus, we suggest that studies that both explore how routines work (i.e., on their internal dynamics) and what they afford (i.e., their effects on the organizations) may contribute to integrating the research of the two communities. Specifically, although practice scholars have provided crucial insights into the functioning of routines, their focus on the internal dynamics may have overlooked the impact of routines on the larger organizational context (capability-diverging family “Organizational effects”). Simultaneously, while capability scholars have greatly contributed to proving the value of routines for firm performances, how routines in practice unfold to afford such performances remains still understudied (practice-diverging family “Context-related internal dynamics”). Therefore, we encourage scholars adopting a capability perspective to systematically analyze how performing and patterning enable the achievement of organizational (and higher-level) outcomes. And we encourage practice scholars to further unpack the “black box” of routines and analyze their impact on the whole organization and beyond (e.g., to encompass more

systematically institutional effects, Labatut et al. 2012; and political dynamics, Lazaric and Raybaut 2005).

In conclusion, similarly to Salvato (2021), we believe that, despite the differences between the two communities, “the walls that currently separate the two [communities] can be turned into bridges” (Salvato 2021). Our bibliometric study invites scholars to follow such an ambitious path and provide a more nuanced understanding of the complexity of organizations connecting micro- and macro-aspects of organizational routines.

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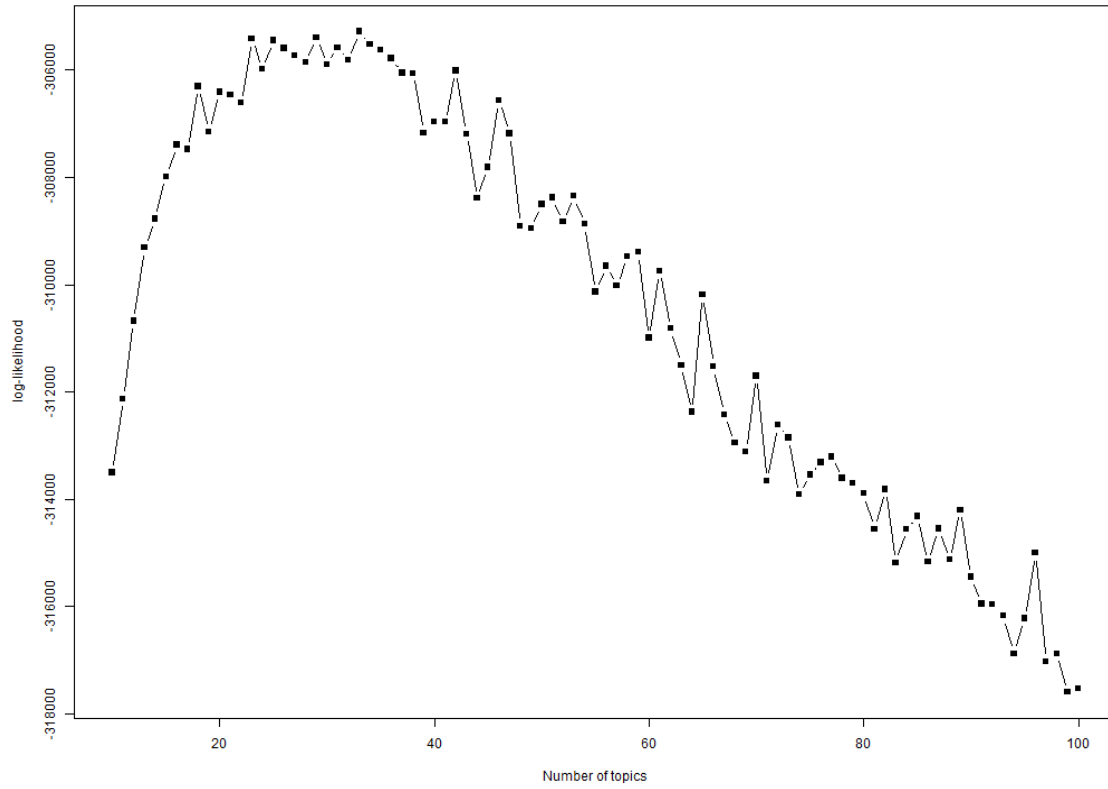
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## Appendix A

**Figure A1:** Optimization of the number of topics. Log-likelihood values of the Latent Dirichlet Allocation algorithm estimates according to the number of topics ranging from 5 to 100.



**Table A1:** Topics with representative papers. Column 1 shows the names attributed to the 33 topics generated by the LDA model; column 2 provides the title of an illustrative paper, i.e., a paper with a high percentage of content associated with the specific topic.

| Topic (#. Name)                     | Representative paper   |
|-------------------------------------|--|
| 1. <b>Decision-Making</b>           | Sutcliffe, K. M., & McNamara, G. (2001). Controlling decision-making practice in organizations. <i>Organization Science</i> , 12(4), 484-501.  |
| 2. <b>Construct nature</b>          | Becker, M. C. (2004). Organizational routines: a review of the literature. <i>Industrial and corporate change</i> , 13(4), 643-678.  |
| 3. <b>Action patterns</b>           | Feldman, M. S., & Pentland, B. T. (2003). Reconceptualizing organizational routines as a source of flexibility and change. <i>Administrative science quarterly</i> , 48(1), 94-118.                                |
| 4. <b>Dynamic capabilities</b>      | Lee, P. Y., Wu, M. L., Kuo, C. C., & Li, C. S. J. (2016). How to deploy multiunit organizations' dynamic capabilities?. <i>Management Decision</i> , 54(4), 965-980.   |
| 5. <b>Administrative behavior</b>   | Cohen, M. D. (2007). Perspective—Administrative behavior: Laying the foundations for Cyert and March. <i>Organization science</i> , 18(3), 503-506.  |
| 6. <b>Mindful behavior</b>          | Levinthal, D., & Rerup, C. (2006). Crossing an apparent chasm: Bridging mindful and less-mindful perspectives on organizational learning. <i>Organization science</i> , 17(4) 502-513.                             |
| 7. <b>Evolutionary theory</b>       | Hodgson, G. M. (2013). Understanding organizational evolution: Toward a research agenda using generalized Darwinism. <i>Organization Studies</i> , 34(7), 973-992.   |
| 8. <b>Information systems</b>       | Polites, G. L., & Karahanna, E. (2013). The embeddedness of information systems habits in organizational and individual level routines: development and disruption. <i>Mis Quarterly</i> , 221-246.                |
| 9. <b>Technological innovation</b>  | Gross, U. (2014). Fighting the fire: improvisational behavior during the production launch of new products. <i>International Journal of Operations &amp; Production Management</i> , 34(6), 722-749.               |
| 10. <b>Resource management</b>      | Kamoche, K. (1996). Strategic human resource management within a resource-capability view of the firm. <i>Journal of Management studies</i> , 33(2), 213-233.  |
| 11. <b>Sociomateriality</b>         | Leonardi, P. M. (2010). Digital materiality? How artifacts without matter, matter. <i>First monday</i> , 15(6).  |
| 12. <b>Innovation management</b>    | Lewin, A. Y., Massini, S., & Peeters, C. (2011). Microfoundations of internal and external absorptive capacity routines. <i>Organization science</i> , 22(1), 81-98.   |
| 13. <b>Performance and effects</b>  | Tzabbar, D., & Kehoe, R. R. (2014). Can opportunity emerge from disarray? An examination of exploration and exploitation following star scientist turnover. <i>Journal of Management</i> , 40(2), 449-482.         |
| 14. <b>Dynamic environment</b>      | Eisenhardt, K. M., Furr, N. R., & Bingham, C. B. (2010). CROSSROADS—Microfoundations of performance: Balancing efficiency and flexibility in dynamic environments. <i>Organization science</i> , 21(6), 1263-1273. |
| 15. <b>Service delivery</b>         | Rexvid, D., Evertsson, L., Forssen, A., & Nygren, L. (2015). The precarious character of routine practice in social and primary health care. <i>Journal of Social Work</i> , 15(3), 317-336.                       |
| 16. <b>Organizational structure</b> | Jacobides, M. G. (2007). The inherent limits of organizational structure and the unfulfilled role of hierarchy: Lessons from a near-war. <i>Organization Science</i> , 18(3), 455-477.                             |
| 17. <b>Policies and regulations</b> | Woulfin, S. L. (2015). Highway to reform: The coupling of district reading policy and instructional practice. <i>Journal of Educational Change</i> , 16(4), 535-557.   |

| Topic (#. Name)                        | Representative paper   |
|--|--|
| 18. <b>Organizational memory</b>       | Lazaric, N., & Denis, B. (2005). Routinization and memorization of tasks in a workshop: the case of the introduction of ISO norms. <i>Industrial and Corporate Change</i> , 14(5), 873-896.                                      |
| 19. <b>Networks</b>                    | Pentland, B. T., & Feldman, M. S. (2007). Narrative networks: Patterns of technology and organization. <i>Organization science</i> , 18(5), 781-795.   |
| 20. <b>Strategic micro-practices</b>   | Rouleau, L. (2005). Micro-practices of strategic sensemaking and sense giving: How middle managers interpret and sell change every day. <i>Journal of Management studies</i> , 42(7), 1413-1441.                                 |
| 21. <b>Business processes</b>          | Bercovitz, J., & Mitchell, W. (2007). When is more better? The impact of business scale and scope on long-term business survival, while controlling for profitability. <i>Strategic Management Journal</i> , 28(1), 61-79.       |
| 22. <b>Level of aggregation</b>        | Abell, P., Felin, T., & Foss, N. (2008). Building micro-foundations for the routines, capabilities, and performance links. <i>Managerial and decision economics</i> , 29(6), 489-502.  |
| 23. <b>Knowledge transfer</b>          | Szulanski, G., & Jensen, R. J. (2004). Overcoming stickiness: An empirical investigation of the role of the template in the replication of organizational routines. <i>Managerial and Decision Economics</i> , 25(6-7), 347-363. |
| 24. <b>Strategic alliances</b>         | Lavie, D., Kang, J., & Rosenkopf, L. (2011). Balance within and across domains: The performance implications of exploration and exploitation in alliances. <i>Organization Science</i> , 22(6), 1517-1538.                       |
| 25. <b>Goal-oriented behavior</b>      | Azad, B., & Faraj, S. (2008). Making e-Government systems workable: Exploring the evolution of frames. <i>The Journal of Strategic Information Systems</i> , 17(2), 75-98.   |
| 26. <b>Workplace changes</b>           | Hetzner, S., Gartmeier, M., Heid, H., & Gruber, H. (2009). The interplay between change and learning at the workplace. <i>Journal of Workplace Learning</i> .  |
| 27. <b>Ordinary capabilities</b>       | Huang, X., Kristal, M. M., & Schroeder, R. G. (2008). Linking learning and effective process implementation to mass customization capability. <i>Journal of Operations Management</i> , 26(6), 714-729.                          |
| 28. <b>Communities of participants</b> | Lindberg, A., Berente, N., Gaskin, J., & Lyytinen, K. (2016). Coordinating interdependencies in online communities: A study of an open source software project. <i>Information Systems Research</i> , 27(4), 751-772.            |
| 29. <b>Risk management</b>             | Kmec, P. (2011). Temporal hierarchy in enterprise risk identification. <i>Management Decision</i> , 49(9), 1489-1509.  |
| 30. <b>Accounting practices</b>        | van der Steen, M. (2011). The emergence and change of management accounting routines. <i>Accounting, Auditing &amp; Accountability Journal</i> , 24(4), 502-547.   |
| 31. <b>Performativity</b>              | D'Adderio, L., & Pollock, N. (2014). Performing modularity: Competing rules, performative struggles and the effect of organizational theories on the organization. <i>Organization Studies</i> , 35(12), 1813-1843.              |
| 32. <b>Team dynamics</b>               | Ramasubbu, N., Mithas, S., Krishnan, M. S., & Kemerer, C. F. (2008). Work dispersion, process-based learning, and offshore software development performance. <i>MIS quarterly</i> , 437-458.                                     |
| 33. <b>Workers' mobility</b>           | Aime, F., Johnson, S., Ridge, J. W., & Hill, A. D. (2010). The routine may be stable but the advantage is not: Competitive implications of key employee mobility. <i>Strategic Management Journal</i> , 31(1), 75-87.            |



## Appendix B

**Table B1:** Capability articles. Average use of the 33 topics in two periods, 2005-2010 vs. 2011-2016. In bold the topics for which the difference in the average contribution between the two time windows is statistically significant.

| Topic (#. Name)                        | (1)<br>2005-2010 (A)<br>(98 articles) | (2)<br>2011-2016 (B)<br>(156 articles) | (3)<br>Difference<br>(B-A) | (4)<br>% growth<br>(B-A)/A | (5)<br>p-value |
|--|---------------------------------------|--|----------------------------|----------------------------|----------------|
| 1. Decision-Making                     | 0.0271                                | 0.0284                                 | 0.0013                     | 4.81%                      | 0.71           |
| 2. Construct nature                    | 0.0324                                | 0.0312                                 | -0.0012                    | -3.77%                     | 0.74           |
| 3. Action patterns                     | 0.0234                                | 0.0249                                 | 0.0016                     | 6.73%                      | 0.51           |
| 4. Dynamic capabilities                | 0.0340                                | 0.0431                                 | 0.0091                     | 26.77%                     | 0.18           |
| 5. Administrative behavior             | 0.0305                                | 0.0275                                 | -0.0030                    | -9.81%                     | 0.41           |
| 6. Mindful behavior                    | 0.0235                                | 0.0232                                 | -0.0003                    | -1.33%                     | 0.88           |
| 7. Evolutionary theory                 | 0.0414                                | 0.0328                                 | -0.0086                    | -20.87%                    | 0.12           |
| 8. Information systems                 | 0.0250                                | 0.0248                                 | -0.0002                    | -0.63%                     | 0.94           |
| 9. Technological innovation            | 0.0368                                | 0.0379                                 | 0.0011                     | 2.90%                      | 0.84           |
| 10. Resource management                | 0.0310                                | 0.0298                                 | -0.0012                    | -3.83%                     | 0.76           |
| 11. Sociomateriality                   | 0.0221                                | 0.0228                                 | 0.0007                     | 2.99%                      | 0.82           |
| 12. Innovation management              | 0.0349                                | 0.0411                                 | 0.0062                     | 17.80%                     | 0.24           |
| 13. Performance and effects            | 0.0318                                | 0.0364                                 | 0.0046                     | 14.39%                     | 0.35           |
| 14. Dynamic environment                | 0.0289                                | 0.0265                                 | -0.0024                    | -8.23%                     | 0.47           |
| 15. Service delivery                   | 0.0237                                | 0.0259                                 | 0.0022                     | 9.24%                      | 0.42           |
| 16. Organizational structure           | 0.0320                                | 0.0271                                 | -0.0049                    | -15.18%                    | 0.16           |
| 17. Policies and regulations           | 0.0282                                | 0.0251                                 | -0.0031                    | -10.97%                    | 0.32           |
| 18. Organizational memory              | 0.0279                                | 0.0240                                 | -0.0039                    | -14.03%                    | 0.40           |
| 19. Networks                           | 0.0247                                | 0.0260                                 | 0.0014                     | 5.50%                      | 0.56           |
| 20. Strategic micro-practices          | 0.0316                                | 0.0312                                 | -0.0004                    | -1.11%                     | 0.91           |
| 21. Business processes                 | 0.0299                                | 0.0306                                 | 0.0007                     | 2.30%                      | 0.85           |
| <b>22. Level of aggregation</b>        | <b>0.0351</b>                         | <b>0.0279</b>                          | <b>-0.0072</b>             | <b>-20.43%</b>             | <b>0.02</b>    |
| 23. Knowledge transfer                 | 0.0342                                | 0.0338                                 | -0.0004                    | -1.31%                     | 0.93           |
| 24. Strategic alliances                | 0.0288                                | 0.0366                                 | 0.0078                     | 26.96%                     | 0.26           |
| 25. Goal-oriented behavior             | 0.0232                                | 0.0264                                 | 0.0032                     | 13.67%                     | 0.32           |
| 26. Workplace changes                  | 0.0381                                | 0.0343                                 | -0.0038                    | -10.09%                    | 0.35           |
| 27. Ordinary capabilities              | 0.0394                                | 0.0486                                 | 0.0091                     | 23.13%                     | 0.16           |
| <b>28. Communities of participants</b> | <b>0.0225</b>                         | <b>0.0264</b>                          | <b>0.0038</b>              | <b>17.01%</b>              | <b>0.08</b>    |
| 29. Risk management                    | 0.0298                                | 0.0341                                 | 0.0043                     | 14.50%                     | 0.48           |
| 30. Accounting practices               | 0.0301                                | 0.0258                                 | -0.0043                    | -14.32%                    | 0.21           |
| 31. Performativity                     | 0.0313                                | 0.0273                                 | -0.0040                    | -12.70%                    | 0.12           |
| 32. Team dynamics                      | 0.0331                                | 0.0314                                 | -0.0017                    | -5.23%                     | 0.65           |
| 33. Workers' mobility                  | 0.0334                                | 0.0270                                 | -0.0064                    | -19.10%                    | 0.21           |
|  | 1.0000                                | 1.0000                                 |                            |                            |                |

**Table B2:** Practice articles. Average use of the 33 topics in two periods, 2005-2010 vs. 2011-2016. In bold the topics for which the difference in the average contribution between the two time windows is statistically significant.

| Topic (#. Name)                   | (1)                            | (2)                             | (3)                 | (4)                 | (5)         |
|-----------------------------------|--------------------------------|---------------------------------|---------------------|---------------------|-------------|
|                                   | 2005-2010 (A)<br>(69 articles) | 2011-2016 (B)<br>(210 articles) | Difference<br>(B-A) | % growth<br>(B-A)/A | p-value     |
| 1. Decision-Making                | 0.0220                         | 0.0278                          | 0.0057              | 25.95%              | 0.19        |
| 2. Construct nature               | 0.0252                         | 0.0278                          | 0.0026              | 10.29%              | 0.41        |
| <b>3. Action patterns</b>         | <b>0.0313</b>                  | <b>0.0442</b>                   | <b>0.0128</b>       | <b>40.94%</b>       | <b>0.05</b> |
| 4. Dynamic capabilities           | 0.0281                         | 0.0250                          | -0.0031             | -11.08%             | 0.30        |
| <b>5. Administrative behavior</b> | <b>0.0352</b>                  | <b>0.0259</b>                   | <b>-0.0093</b>      | <b>-26.36%</b>      | <b>0.02</b> |
| <b>6. Mindful behavior</b>        | <b>0.0425</b>                  | <b>0.0296</b>                   | <b>-0.0130</b>      | <b>-30.49%</b>      | <b>0.02</b> |
| 7. Evolutionary theory            | 0.0225                         | 0.0218                          | -0.0006             | -2.77%              | 0.79        |
| 8. Information systems            | 0.0325                         | 0.0347                          | 0.0023              | 6.95%               | 0.73        |
| 9. Technological innovation       | 0.0302                         | 0.0272                          | -0.0030             | -9.98%              | 0.37        |
| 10. Resource management           | 0.0243                         | 0.0246                          | 0.0003              | 1.27%               | 0.91        |
| 11. Sociomateriality              | 0.0367                         | 0.0387                          | 0.0020              | 5.43%               | 0.75        |
| 12. Innovation management         | 0.0279                         | 0.0273                          | -0.0006             | -2.00%              | 0.92        |
| 13. Performance and effects       | 0.0266                         | 0.0321                          | 0.0055              | 20.64%              | 0.25        |
| 14. Dynamic environment           | 0.0223                         | 0.0283                          | 0.0060              | 26.84%              | 0.18        |
| 15. Service delivery              | 0.0294                         | 0.0341                          | 0.0047              | 16.10%              | 0.43        |
| 16. Organizational structure      | 0.0336                         | 0.0290                          | -0.0046             | -13.75%             | 0.18        |
| 17. Policies and regulations      | 0.0372                         | 0.0415                          | 0.0043              | 11.67%              | 0.51        |
| 18. Organizational memory         | 0.0279                         | 0.0261                          | -0.0018             | -6.52%              | 0.68        |
| 19. Networks                      | 0.0405                         | 0.0310                          | -0.0095             | -23.36%             | 0.10        |
| 20. Strategic micro-practices     | 0.0296                         | 0.0299                          | 0.0003              | 1.12%               | 0.94        |
| 21. Business processes            | 0.0312                         | 0.0278                          | -0.0034             | -10.81%             | 0.42        |
| 22. Level of aggregation          | 0.0313                         | 0.0291                          | -0.0022             | -7.13%              | 0.55        |
| 23. Knowledge transfer            | 0.0253                         | 0.0235                          | -0.0018             | -7.24%              | 0.61        |
| 24. Strategic alliances           | 0.0251                         | 0.0250                          | -0.0001             | -0.45%              | 0.98        |
| 25. Goal-oriented behavior        | 0.0356                         | 0.0336                          | -0.0020             | -5.65%              | 0.72        |
| 26. Workplace changes             | 0.0372                         | 0.0412                          | 0.0040              | 10.78%              | 0.45        |
| 27. Ordinary capabilities         | 0.0291                         | 0.0277                          | -0.0014             | -4.75%              | 0.71        |
| 28. Communities of participants   | 0.0247                         | 0.0289                          | 0.0041              | 16.75%              | 0.33        |
| 29. Risk management               | 0.0251                         | 0.0311                          | 0.0061              | 24.24%              | 0.20        |
| 30. Accounting practices          | 0.0403                         | 0.0402                          | 0.0000              | -0.08%              | 1.00        |
| 31. Performativity                | 0.0329                         | 0.0295                          | -0.0034             | -10.30%             | 0.32        |
| 32. Team dynamics                 | 0.0310                         | 0.0313                          | 0.0003              | 0.84%               | 0.93        |
| 33. Workers' mobility             | 0.0255                         | 0.0243                          | -0.0013             | -4.99%              | 0.68        |
|                                   | 1.0000                         | 1.0000                          |                     |                     |             |

**Table B3:** Average use of the 33 topics by the practice and capability communities in 2005-2010. In bold the topics for which the difference in the average contribution between the two communities is statistically significant.

| Topic (#. Name)                     | (1)<br>Capability (A)<br>(98 articles) | (2)<br>Practice (B)<br>(69 articles) | (3)<br>Difference<br>B-A | (4)<br>% Difference<br>(B-A)/A | (5)<br>p-value |
|-------------------------------------|--|--------------------------------------|--------------------------|--------------------------------|----------------|
| <b>1. Decision-Making</b>           | <b>0.0271</b>                          | <b>0.0220</b>                        | <b>-0.0051</b>           | <b>-18.69%</b>                 | <b>0.08</b>    |
| <b>2. Construct nature</b>          | <b>0.0324</b>                          | <b>0.0252</b>                        | <b>-0.0072</b>           | <b>-22.16%</b>                 | <b>0.05</b>    |
| <b>3. Action patterns</b>           | <b>0.0234</b>                          | <b>0.0313</b>                        | <b>0.0080</b>            | <b>34.1%</b>                   | <b>0.02</b>    |
| 4. Dynamic capabilities             | 0.0340                                 | 0.0281                               | -0.0059                  | -17.35%                        | 0.12           |
| 5. Administrative behavior          | 0.0305                                 | 0.0352                               | 0.0047                   | 15.38%                         | 0.41           |
| <b>6. Mindful behavior</b>          | <b>0.0235</b>                          | <b>0.0425</b>                        | <b>0.0191</b>            | <b>81.21%</b>                  | <b>0.00</b>    |
| <b>7. Evolutionary theory</b>       | <b>0.0414</b>                          | <b>0.0225</b>                        | <b>-0.0190</b>           | <b>-45.80%</b>                 | <b>0.00</b>    |
| <b>8. Information systems</b>       | <b>0.0250</b>                          | <b>0.0325</b>                        | <b>0.0075</b>            | <b>29.93%</b>                  | <b>0.02</b>    |
| 9. Technological innovation         | 0.0368                                 | 0.0302                               | -0.0066                  | -18.04%                        | 0.21           |
| 10. Resource management             | 0.0310                                 | 0.0243                               | -0.0067                  | -21.54%                        | 0.10           |
| <b>11. Sociomateriality</b>         | <b>0.0221</b>                          | <b>0.0367</b>                        | <b>0.0146</b>            | <b>66.13%</b>                  | <b>0.00</b>    |
| 12. Innovation management           | 0.0349                                 | 0.0279                               | -0.0070                  | -20.03%                        | 0.15           |
| 13. Performance and effects         | 0.0318                                 | 0.0266                               | -0.0052                  | -16.36%                        | 0.15           |
| 14. Dynamic environment             | 0.0289                                 | 0.0223                               | -0.0066                  | -22.73%                        | 0.13           |
| 15. Service delivery                | 0.0237                                 | 0.0294                               | 0.0057                   | 23.92%                         | 0.10           |
| 16. Organizational structure        | 0.0320                                 | 0.0336                               | 0.0016                   | 5.04%                          | 0.74           |
| <b>17. Policies and regulations</b> | <b>0.0282</b>                          | <b>0.0372</b>                        | <b>0.0090</b>            | <b>31.74%</b>                  | <b>0.07</b>    |
| 18. Organizational memory           | 0.0279                                 | 0.0279                               | 0.0000                   | 0.14%                          | 0.99           |
| <b>19. Networks</b>                 | <b>0.0247</b>                          | <b>0.0405</b>                        | <b>0.0158</b>            | <b>64.22%</b>                  | <b>0.01</b>    |
| 20. Strategic micro-practices       | 0.0316                                 | 0.0296                               | -0.0020                  | -6.31%                         | 0.64           |
| 21. Business processes              | 0.0299                                 | 0.0312                               | 0.0012                   | 4.06%                          | 0.83           |
| 22. Level of aggregation            | 0.0351                                 | 0.0313                               | -0.0038                  | -10.73%                        | 0.44           |
| 23. Knowledge transfer              | 0.0342                                 | 0.0253                               | -0.0090                  | -26.18%                        | 0.17           |
| 24. Strategic alliances             | 0.0288                                 | 0.0251                               | -0.0037                  | -12.89%                        | 0.45           |
| <b>25. Goal-oriented behavior</b>   | <b>0.0232</b>                          | <b>0.0356</b>                        | <b>0.0124</b>            | <b>53.34%</b>                  | <b>0.01</b>    |
| 26. Workplace changes               | 0.0381                                 | 0.0372                               | -0.0009                  | -2.37%                         | 0.86           |
| 27. Ordinary capabilities           | 0.0394                                 | 0.0291                               | -0.0104                  | -26.26%                        | 0.10           |
| 28. Communities of participants     | 0.0225                                 | 0.0247                               | 0.0022                   | 9.80%                          | 0.34           |
| 29. Risk management                 | 0.0298                                 | 0.0251                               | -0.0047                  | -15.85%                        | 0.32           |
| <b>30. Accounting practices</b>     | <b>0.0301</b>                          | <b>0.0403</b>                        | <b>0.0102</b>            | <b>33.97%</b>                  | <b>0.05</b>    |
| 31. Performativity                  | 0.0313                                 | 0.0329                               | 0.0016                   | 5.09%                          | 0.67           |
| 32. Team dynamics                   | 0.0331                                 | 0.0310                               | -0.0021                  | -6.23%                         | 0.69           |
| 33. Workers' mobility               | 0.0334                                 | 0.0255                               | -0.0079                  | -23.55%                        | 0.17           |
|                                     | 1.0000                                 | 1.0000                               |                          |                                |                |

**Table B4:** Average use of the 33 topics by the practice and capability communities in 2011-2016. In bold the topics for which the difference in the average contribution between the two communities is statistically significant.

| Topic (#. Name)                     | (1)<br>Capability (A)<br>(156 articles) | (2)<br>Practice (B)<br>(210 articles) | (3)<br>Difference<br>(B-A) | (4)<br>% Difference<br>(B-A)/A | (5)<br>p-value |
|-------------------------------------|---|---------------------------------------|----------------------------|--------------------------------|----------------|
| 1. Decision-Making                  | 0.0284                                  | 0.0278                                | -0.0007                    | -2.29%                         | 0.85           |
| 2. Construct nature                 | 0.0312                                  | 0.0278                                | -0.0034                    | -10.79%                        | 0.24           |
| <b>3. Action patterns</b>           | <b>0.0249</b>                           | <b>0.0442</b>                         | <b>0.0192</b>              | <b>77.08%</b>                  | <b>0.00</b>    |
| <b>4. Dynamic capabilities</b>      | <b>0.0431</b>                           | <b>0.0250</b>                         | <b>-0.0181</b>             | <b>-42.03%</b>                 | <b>0.00</b>    |
| 5. Administrative behavior          | 0.0275                                  | 0.0259                                | -0.0016                    | -5.80%                         | 0.55           |
| <b>6. Mindful behavior</b>          | <b>0.0232</b>                           | <b>0.0296</b>                         | <b>0.0064</b>              | <b>27.66%</b>                  | <b>0.02</b>    |
| <b>7. Evolutionary theory</b>       | <b>0.0328</b>                           | <b>0.0218</b>                         | <b>-0.0110</b>             | <b>-33.4%</b>                  | <b>0.00</b>    |
| <b>8. Information systems</b>       | <b>0.0248</b>                           | <b>0.0347</b>                         | <b>0.0099</b>              | <b>39.84%</b>                  | <b>0.02</b>    |
| <b>9. Technological innovation</b>  | <b>0.0379</b>                           | <b>0.0272</b>                         | <b>-0.0107</b>             | <b>-28.30%</b>                 | <b>0.00</b>    |
| <b>10. Resource management</b>      | <b>0.0298</b>                           | <b>0.0246</b>                         | <b>-0.0052</b>             | <b>-17.38%</b>                 | <b>0.05</b>    |
| <b>11. Sociomateriality</b>         | <b>0.0228</b>                           | <b>0.0387</b>                         | <b>0.0160</b>              | <b>70.08%</b>                  | <b>0.00</b>    |
| <b>12. Innovation management</b>    | <b>0.0411</b>                           | <b>0.0273</b>                         | <b>-0.0137</b>             | <b>-33.47%</b>                 | <b>0.00</b>    |
| 13. Performance and effects         | 0.0364                                  | 0.0321                                | -0.0043                    | -11.79%                        | 0.32           |
| 14. Dynamic environment             | 0.0265                                  | 0.0283                                | 0.0018                     | 6.80%                          | 0.57           |
| <b>15. Service delivery</b>         | <b>0.0259</b>                           | <b>0.0341</b>                         | <b>0.0082</b>              | <b>31.70%</b>                  | <b>0.05</b>    |
| 16. Organizational structure        | 0.0271                                  | 0.0290                                | 0.0018                     | 6.81%                          | 0.45           |
| <b>17. Policies and regulations</b> | <b>0.0251</b>                           | <b>0.0415</b>                         | <b>0.0164</b>              | <b>65.23%</b>                  | <b>0.00</b>    |
| 18. Organizational memory           | 0.0240                                  | 0.0261                                | 0.0021                     | 8.89%                          | 0.59           |
| 19. Networks                        | 0.0260                                  | 0.0310                                | 0.0050                     | 19.29%                         | 0.11           |
| 20. Strategic micro-practices       | 0.0312                                  | 0.0299                                | -0.0013                    | -4.19%                         | 0.67           |
| 21. Business processes              | 0.0306                                  | 0.0278                                | -0.0028                    | -9.27%                         | 0.31           |
| 22. Level of aggregation            | 0.0279                                  | 0.0291                                | 0.0012                     | 4.19%                          | 0.63           |
| <b>23. Knowledge transfer</b>       | <b>0.0338</b>                           | <b>0.0235</b>                         | <b>-0.0103</b>             | <b>-30.61%</b>                 | <b>0.00</b>    |
| <b>24. Strategic alliances</b>      | <b>0.0366</b>                           | <b>0.0250</b>                         | <b>-0.0116</b>             | <b>-31.70%</b>                 | <b>0.02</b>    |
| <b>25. Goal-oriented behavior</b>   | <b>0.0264</b>                           | <b>0.0336</b>                         | <b>0.0072</b>              | <b>27.28%</b>                  | <b>0.06</b>    |
| <b>26. Workplace changes</b>        | <b>0.0343</b>                           | <b>0.0412</b>                         | <b>0.0070</b>              | <b>20.30%</b>                  | <b>0.07</b>    |
| <b>27. Ordinary capabilities</b>    | <b>0.0486</b>                           | <b>0.0277</b>                         | <b>-0.0209</b>             | <b>-42.96%</b>                 | <b>0.00</b>    |
| 28. Communities of participants     | 0.0264                                  | 0.0289                                | 0.0025                     | 9.56%                          | 0.41           |
| 29. Risk management                 | 0.0341                                  | 0.0311                                | -0.0030                    | -8.69%                         | 0.53           |
| <b>30. Accounting practices</b>     | <b>0.0258</b>                           | <b>0.0402</b>                         | <b>0.0145</b>              | <b>56.24%</b>                  | <b>0.00</b>    |
| 31. Performativity                  | 0.0273                                  | 0.0295                                | 0.0022                     | 7.98%                          | 0.34           |
| 32. Team dynamics                   | 0.0314                                  | 0.0313                                | -0.0001                    | -0.23%                         | 0.97           |
| 33. Workers' mobility               | 0.0270                                  | 0.0243                                | -0.0028                    | -10.22%                        | 0.37           |
|                                     | 1.0000                                  | 1.0000                                |                            |                                |                |