

ORGANIZATIONAL ROUTINES: A REVIEW AND OUTLOOK ON PRACTICE-BASED MICRO-FOUNDATIONS

NINA KATRIN HANSEN

NinaKatrin.Hansen@wiso.uni-hamburg.de
University of Hamburg

RICK VOGEL

rick.vogel@zeppelin-university.de
University of Hamburg

ABSTRACT. The literature on routines in management and organization studies has witness a tremendous growth in the course of the last 25 years. We review this literature by conducting a co-citation analysis of 743 documents published by scholars in academic journals. Our results indicate three distinctive, yet interrelated, schools of thought which have mainly been advanced in nine core journals: Organization Theory, Competence Theory and Practice Theory. We outline each of these schools and discuss how they address micro-foundations of organizational routines. The Practice Theory School has begun to meet some crucial points of this research agenda. We conclude that this stream would benefit from an engagement with complementary and synergistic research, which has hitherto been unconnected to routines.

JEL Classification: O12, C81, D01, D23

Keywords: bibliometrics, co-citation analysis, journals, micro-foundations, organizational capabilities, organizational routines, two-mode network

1. Introduction

More than 25 years of research have passed since Nelson and Winter (1982) put the topic of organizational routines on ‘center-stage’ (Becker 2004). Ever since, organizational routines have been among the core concepts in evolutionary economics, organization theory and strategic management (Felin and Foss 2004). Although the existing literature is divergent, a core definition can be identified: ‘There is considerable agreement in the literature that organizational routines can be defined as repetitive, recognizable patterns of interdependent actions, carried out by multiple actors’ (Feldman and Pentland 2003, 95). Revolving around this notion, there is a fast-growing body of

literature which draws on the concept and further develops it in theoretical and empirical research. However, with the growing amount of related publications, many ambiguities and inconsistencies have been manifested in the routine literature (Becker 2004, Becker et al. 2005, Cohen et al. 1996, Feldman and Pentland 2003). This somewhat confusing state-of-the-art gives reason to review the theoretical evolution of organizational routines in the management and organization literature and to trace how the field has differentiated into discrete schools of thought since the concept entered the scientific stage.

In this article, we aim to do so. We provide a structured approach to the extant literature on organizational routines by conducting a co-citation analysis of 743 related documents published in the period from 1958 to 2009 in scholarly journals. Through the reduction of complexity by means of imaging and clustering methods, major patterns of theoretical development and emergent research priorities in the reviewed field become apparent. We identify and outline three schools of thought, each representing a theoretical tradition which is, despite some overlaps, to some extent distinct from the others: an Organization Theory School, a Competence Theory School and a Practice Theory School. Turning the perspective from past and present to future research, we discuss how complementary and synergistic research that has only been loosely tied to this field of research so far can contribute to further micro-foundations of the routine concept and how it can establish the missing theoretical link between the individual and the organizational level of analysis.

The remainder of the paper is, thereby, organized as follows: The next section represents the analytical part of the paper, providing a bibliometric review of organizational routines in the management and organization literature. At the beginning of this section, we briefly argue why the concept of organizational routines has entered a stage in which the application of bibliometric methods is useful. Additionally, we introduce the applied method of co-citation analysis. Furthermore, this section includes the documentation of the data on which our study is based, as well as its main results. In the section after next, we turn to a more detailed review of the detected schools of thought in order to capture the different approaches to organizational routines that render these schools distinct in the extracted citation network. In order to develop an agenda for future research, we subsequently discuss how a practice-based approach can respond to the recent call for further micro-foundations of organizational routines and capabilities.

2. Major Theoretical Traditions of Organizational Routines: A Co-Citation Analysis

In order to elucidate how the concept of routines is anchored in the management and organization literature, we have conducted a bibliometric study. Bibliometrics applies statistical methods to large-scale bibliographic databases in order to analyze scientific communication through formal publication channels (Leydesdorff 2001). It combines the history and sociology of science with informetrics. The reason for launching bibliometrics as a scientific sub-field (De Solla Price 1965, Garfield 1955, Pritchard 1969) is still, and more than ever, prevalent today: In the ‘publish or perish’ culture, it becomes increasingly impossible to keep track of the rapidly growing amount of scientific publications. Even within a special field, the effort it takes for researchers to stay updated in the face of overwhelming information available from new releases is challenging. Bibliometric methods provide a structured approach to extensive bodies of literature within which they indicate emerging patterns of communication. Most intriguingly, they can be applied to visualize scientific communities that would otherwise remain ‘invisible colleges’ (Crane 1972). The science maps resulting from bibliometric applications provide a ‘big picture’ that shows the main research trajectories in a certain field. However, due to the quantitative approach of bibliometrics, more fine-grained details are lost in the successive reduction of complexity. The results, thus, demand enrichment with thorough interpretations by experts.

To identify publications in the management and organization literature that refer to routines, we have gathered data from the Social Science Citation Index® (SSCI), which still has the highest coverage of citation data in the social sciences. In our data query, we searched for the term “routine” or “routines” in title, abstract and keywords of documents published until 2009, inclusively. Some authors, of course, do not refer to the notion of routine as a technical term, but since these items are not related to relevant literature in a systematic manner, they are successively eliminated at later stages of the analytical procedure. In order to sustain the relevance of selected documents for our review, the request was limited to journals assigned to the subject areas of ‘Management’ and ‘Business’ provided by SSCI. Since many journals fall into more than one subject category, research at the interface to other fields of specialization (such as psychology or sociology) is also considered. The final database of the bibliometric study consisted of 743 documents (including articles, reviews, editorial materials, proceedings papers, etc.) with 37,754 references to 16,240 sources.

To this dataset, we applied a co-citation analysis which is among the most common bibliometric imaging methods (Garfield et al. 1978, Griffith et al. 1974, Small 1973, Small and Griffith 1974). It has been successively applied to management and organization research (e.g., Di Stefano et al. 2010; Durisin

and Puzone 2009; Schildt et al. 2006). A co-citation is defined as the joint occurrence of two elements in the reference list of a publication. We focused on cited documents as units of our analysis, rather than e.g. authors, journals or countries. The basic assumption of the method is that any co-occurrence of documents in a bibliography reflects, in some respect or another, a textual similarity between them. From this perspective, a citing author consciously or unconsciously judges on the similarity of research publications by including these documents in, or excluding them from, the reference list of his or her own publication. This assumption may be wrong in an individual case because the relationship between two cited texts turns into a dissimilarity if one reference is confirmative and the other negational. However, both normative theories and empirical research on why authors actually cite a text (for an overview, see Bornmann and Daniel 2008) provide evidence that positive (confirmative) references far exceed negative (negational) ones. Since on large-scale databases, deviations from the major citing motivations only marginally shape the highly aggregated citation network, the similarity assumption on which co-citation analysis is built proves to be effective. As a result, frequently co-cited documents compose clusters which are relatively homogenous in terms of their content. In line with standard applications of co-citation analysis, we conducted the analysis in two steps each of which is associated with the application of a certain threshold. In the first step, we limited the analysis to documents which received 5 citations or more. Since citation frequency can be interpreted as a measure of impact, this threshold reduced the data to highly influential publications in the studied field. In the present case, 654 documents met our criterion. While these core publications only amount to 4.0% of all sources, they received 18.6% of all citations. In the second step, we focused on publications which were co-cited more than 12 times with at least two other documents. This threshold reduced the data to highly interrelated documents among the most influential publications. 42 publications met both of our criteria. The result was a square symmetrical matrix containing the co-citation frequency of all document pairs.

We further processed the similarity matrix of cited documents with two complementary methods in order to enhance the robustness of the results. For visualization purposes, we first applied network analysis and created a map of research on routines in the field of management and organization. The resulting network diagram depicts relevant publications (as nodes) and their relationships in terms of co-citations (as edges). To arrange the nodes in a two-dimensional space, we applied the spring embedder algorithm provided by the software package UCINET by Borgatti et al. (2002) which is similar to multidimensional scaling approaches. The graph layout algorithm optimizes distances between every pair of nodes. The distances between nodes are approximated by the path length, i.e. the number of edges between them. The shorter the mean path length of a node to others, the higher is its centrality

in the network. Various metric measures for each node's network centrality are documented in the Appendix. Second, we complemented the network analysis with a factor analysis, which is a routine clustering procedure in bibliometrics (McCain 1990). For this purpose, we converted the frequency counts contained in the raw data matrix to measures of relative document similarity and compiled a correlation matrix based on Pearson's coefficient. This procedure offers the advantage of taking the coupling 'profiles' of the documents into account rather than absolute counts of shared references (McCain 1990). We considered the main diagonal of the correlation matrix as missing values. The factor extraction by means of principal component analysis and screen tests was followed by Varimax rotation with Kaiser normalization. In case of mixed loadings, we discussed the publications and assigned them to the factor to which they fit best in terms of their content. The factor assignment and loading of each publication is documented in the Appendix.

The co-citation network of research on routines in the field of management and organization is depicted in Figure 1. The thickness of the edges in the network is proportional to the number of co-citations, while the node size varies with the number of received citations. We, furthermore, assigned different node symbols and shades to the extracted factors in order to combine the results of the applied methods. The factor extraction is documented in Table 1. We found three factors with a total variance explained of 88.6%. Thus, three distinct though interrelated theoretical traditions in the discourse on organizational routines can be identified. The first factor defines the smallest cluster in the network, containing 10 publications, but it has the highest explanatory power (44.2% variance explained). We refer to this factor as *Competence Theory* because articles that load on it are classics in the theory of the firm, more precisely in the Resource- (Amit and Schoemaker 1993, Barney 1991, Dierickx and Cool 1989, Prahalad and Hamel 1990, Wernerfelt 1984) and Knowledge-Based View (Kogut and Zander 1992, Nonaka 1994, Nonaka and Takeuchi 1995) as well as in the Dynamic Capability View (Eisenhardt and Martin 2000, Teece et al. 1997). The second factor explains 33.8% of the total variance and defines the largest cluster in the network, composed of 21 documents. In terms of their theoretical foundations, these works are much more heterogeneous than those loading on the first factor. We suggest *Organization Theory* an appropriate umbrella label because some of the most prominent approaches in this field are represented in the cluster, such as evolutionary (Nelson and Winter 1982) and behavioral theory (Cyert and March 1963, March and Simon 1958), organizational learning (Argyris and Schön 1978, Huber 1991, Levinthal and March 1993, Levitt and March 1988, March 1991, March et al. 1991), innovation and change (Cohen and Levinthal 1990, Gavetti and Levinthal 2000, Henderson and Clark 1990, Leonard-Barton 1992, Tushman and Anderson 1986, Tushman and Romanelli

1985), population ecology (Hannan and Freeman 1984), institutional theory (DiMaggio and Powell 1983) or organizational memory (Walsh and Ungson 1991). Finally, the third factor clusters 11 articles and explains 10.6% of the variance. This subgroup is, in terms of the publication years of assigned documents, the youngest in the field. It indicates the emergence of a distinct theoretical tradition of the studied concept because it includes core works on organizational routines (Cohen and Bacdayan 1994, Cohen et al. 1996, Feldman 2000, 2003, Feldman and Pentland 2003, Pentland and Rueter 1994, Zollo et al. 2002). However, the state of emancipation of this tradition is still precarious. This is not only indicated by the low loadings of these documents (see Appendix), but also by their intermixture with publications on the related concept of (dynamic) capabilities (Dosi et al. 2000, Zollo and Winter 2002).

Table 1: Factor Analysis

No	Sym- bol	Label	Factor Analysis		
			Eigenvalue	Variance Explained (%)	Cumulated Variance Explained (%)
1	▼	Competence Theory	19.015	44.221	44.221
2	△	Organization Theory	14.532	33.796	78.017
3	◆	Practice Theory	4.556	10.595	88.612

In a further step of analysis, we explored the field of research on routines with regard to its leading academic journals. For this purpose, we created a network that consists of two sets of nodes and, thus, offers the possibility of simultaneously exploring two levels of analysis and their interrelations. The first set of nodes was clusters of publications to which we collapsed the works previously subjected to the co-citation analysis (see Figure 1). These nodes represent the three identified schools of thought on the level of *cited* works. The node size varies with the number of documents contained in the respective cluster. The second type of nodes was journals from which we retrieved the citation data, thus, representing the level of *citing* documents. The node size is proportional to the number of articles that we selected from the accordant journal in our initial data query. A journal was tied to a school of thought if articles published in the journal refer to a certain number of works in the respective co-citation cluster. Again, the network was created by means of the spring embedder algorithm provided by Borgatti et al. (2002). Figure 2 depicts the resulting journal map.

Figure 1: Co-Citation Network

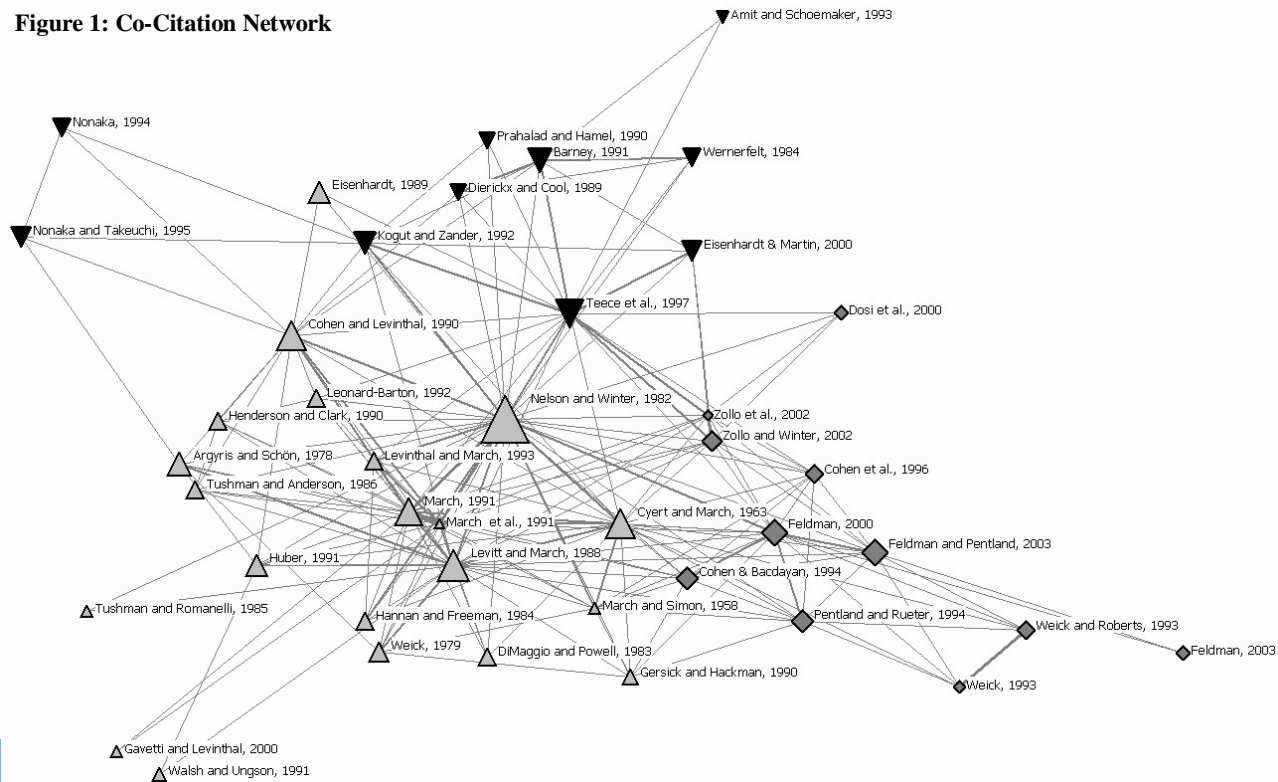
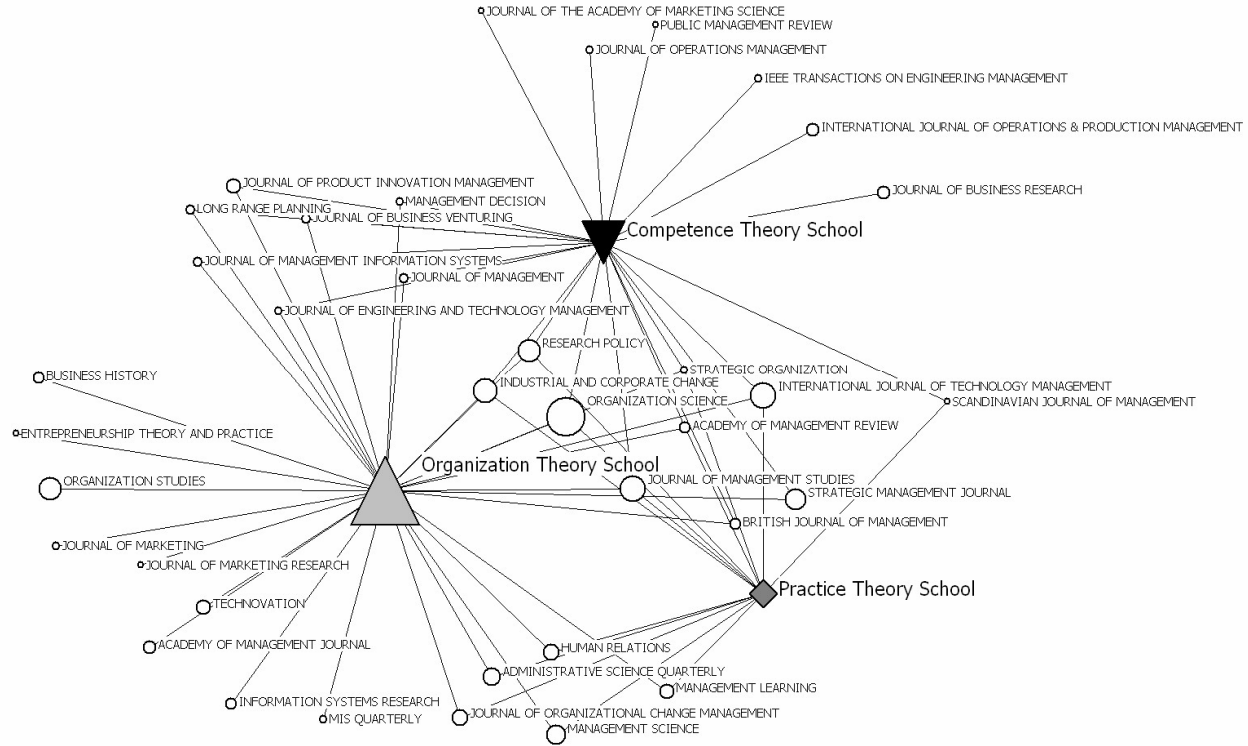


Figure 2: Two-Mode Network of Research Schools and Journals



On the level of the applied threshold (≥ 5 references), nine journals that give a forum for all three schools of thought emerge in the network core: *Academy of Management Review*, *British Journal of Management*, *Industrial and Corporate Change*, *International Journal of Technology Management*, *Journal of Management Studies*, *Organization Science*, *Research Policy*, *Strategic Management Journal*, *Strategic Organization*. Another seven journals advance both strategic and organizational thinking about routines (*Journal of Business Venturing*, *Journal of Engineering and Technology Management*, *Journal of Management*, *Journal of Management Information Systems*, *Journal of Product Innovation Management*, *Long Range Planning*, *Managing Decision*), while five journals connect the Organization and the Practice Theory School (*Administrative Science Quarterly*, *Human Relations*, *Journal of Organizational Change Management*, *Management Learning*, *Management Science*). Only one journal (*Scandinavian Journal of Management*) is a linking pin between the Strategy and the Practice Theory School. The other journals are exclusively devoted to either the Strategy or the Organization Theory School.

To conclude, although both the co-citation and the journal map give visual impressions of the dense interconnectedness of theoretical views on organizational routines, three schools can be delineated in the literature. Despite some overlaps (as signified by several cross-loadings of the analyzed publications and by shared journals), these clusters represent to some extent distinct approaches to organizational routines. In the next section, we review these schools of thought in more detail, thereby, enriching our review with further literature.

3. The Three Schools of Organizational Routines

3.1 The Organization Theory School

The largest school represents the theoretical tradition where the concept of organizational routines originates from. It includes the top-cited and most central works in the studied discourse (see Appendix), also figuring prominently in the broader field of organization theory (Cyert and March 1963, Levitt and March 1988, Nelson and Winter 1982). Due to its size, there is a considerable conceptual heterogeneity even within this school of thought. The extensive body of literature which continues the tradition of organization theory can be further differentiated along three dominant metaphors of organizational routines (Feldman and Pentland 2003): (1) routines as performance programs (Cyert and March 1963, March and Simon 1958), (2) routines as habits or skills of an organization (Nelson and Winter 1982, Simon 1945, Stene 1940), (3) routines as genes (Nelson and Winter 1982).

For the first metaphor of organizational routines, the works of March and Simon (1958) and Cyert and March (1963) are of particular importance. 'Standard operating procedures' (Cyert and March 1963) represent the archetypal example of '*performance programs*' (March and Simon 1958, Simon 1977) and serve as central precursor of the routine notion (Felin and Foss 2004). However, 'the focus of the Carnegie School is not on routines per se, but on the standardized practices, programs, and operating procedures that serve to economize on bounded rationality' (Gavetti et al. 2007, 526-527). This perspective highlights the coordination function of routine-based behavior: Routine programs have the power to coordinate and to control the complex organizational activities because they enable the simultaneous and consistent interactions of multiple actors (Becker 2004). Formal, time-independent routine programs define an exact action sequence in connection with a response to certain stimuli. Thus, formal 'if-then'-rules 'such as explicit task performance rules, records and reports' as well as formal 'planning rules' (Felin and Foss 2004, 7) predict organizational decisions ex ante and ensure the reliable reproduction of rational activity patterns (Cyert and March 1963). These rational activity patterns economize on the limited cognitive resources of individuals and relieve the hierarchy from cognitive efforts. Furthermore, the standardized practices of routine programs facilitate the stabilization of individual 'expectations, perceptions of the environment, the range of alternatives considered, and decision rules and premises' (Gavetti et al. 2007, 527). They enable the human agents to focus their attention on non-routine activities and to respond to recurring and familiar occurrences with a semi-conscious performance of routinized actions. In addition, routine programs reduce uncertainty and complexity: In insecure and especially pervasively uncertain situations routines enable the organizational members to be and remain capable of acting. They support rule governed and predictable behavior because they fix parameters and economize on cognitive resources and, thereby, set them free (Becker 2004). Organizational routines facilitate rationality gains that can be accomplished by utilizing learning effects and a hereupon established standardization (March 1991). In the passage of time, the recurring organizational activities 'become more finely tuned' and increasingly routinized so 'the firm is likely to become more and more "capable"' (Langlois 1992, 111). Besides the central concepts of performance programs (March and Simon 1958, Simon 1977) and standard operating procedures (Cyert and March 1963), 'scripts' (Goia and Poole 1984), 'heuristic programs' (Starbuck and Hedberg 1977) and 'industry recipes' (Spender 1994) can be assigned to the first subgroup of authors within the Organization Theory School.

Nelson and Winter's 'Evolutionary Theory of Economic Change' (1982) serves as theoretical basis for the second and the third routine metaphor that can be seen as a 'milestone' in this field of research (Becker 2004, Cohen et al. 1996, Feldman and Pentland 2003). The utmost importance of this work

is also reflected in its position in the co-citation network where it is placed as a unifying node at the very core (see Figure 1). As Stene (1940) and Simon (1945), Nelson and Winter (1982) conceptualize organizational routines as analogies of '*habits*' and '*skills*' of individuals (Cohen et al. 1996, 667). In applying the skill metaphor on the organizational level, Nelson and Winter perform a conceptual 'leap from individual skills to organizational routine' (Felin and Foss 2004, 14): 'Routines are the skills of an organization' (Nelson and Winter 1982, 124). 'By a "skill" we mean a capability for a smooth sequence of coordinated behavior that is ordinarily effective relative to its objectives, given the context in which it normally occurs' (Nelson and Winter 1982, 73). Routines foster a smooth organizational coordination of individual activities for at least two reasons: First of all, as a decision base they allow the participating organizational actors to form confident expectations of each other's behavior in future periods and second of all, the resulting decisions have a high degree of mutual fit (Becker 2005). Referring to Nelson (1991, 68), organizational success is based on a hierarchy of distinctive organizational '*skills*' – defined as '*practiced organizational routines*' – that reflect '*a set of things the organization is capable of doing confidently*'. This routine hierarchy consists of lower-order operative routines and higher-order '*decision procedures*' which shape the lower-order routines by defining what organizational members have to do in regard to their specific organizational role and determining the individuals' coordination. The routine metaphor in this conceptualization is characterized by two central aspects: a quasi automatic collective performance of routine activities and the embedded organizational capability to store a high amount of implicit knowledge (Polanyi 1967). In contrast to the first subgroup of authors, Nelson and Winter (1982) move the focus of analysis from the ordinary and repetitive routine activities to the notion of collective capability and exceptional organizational phenomena that determine organizational success.

The third metaphor, routines as *genes* of an organization, also arises from the work of Nelson and Winter (1982). This perspective refers to the emergent character of organizational routines that are selected and established by an evolutionary process (in form of variation, selection, and heredity) and determine the potential range of organizational activities. Organizational routines are conceptualized as '*genetic material*' and '*persistent feature of the organism*' (Nelson and Winter 1982, 14). Routines represent generic activity patterns that are recurrent and collective (Becker 2004, 645). They involve multiple actors (Feldman and Pentland 2003) that belong to several organizational units and are based at different places. In this context, organizational routines are especially regarded as a central collective knowledge repository (Nelson and Winter 1982). Nelson and Winter (1982) give an answer to the question where the knowledge of an organization can be preserved: in the organization's '*memory*' that is defined as routinization of organizational activities and the

most important retention bin of specific operational knowledge. To illustrate their concept of organizational routine as a basis of an organization's memory, Nelson and Winter (1982) presuppose a static situation in which the organization operates in a routine mode. 'The situation portrayed is unchanging or cyclically repetitive; it is an unrealistically quiet and static condition. We then gradually introduce into the picture more of the processes of change ...' (Nelson and Winter 1982, 98). In this 'steady state', all sub-processes are executed in a common way. This presupposes that all individuals are able to interpret relevant messages and instructions to accomplish their ordinary tasks according to the routine performance in a quasi-automatic and appropriate fashion. On the basis of the constituted coordination processes, routines provide the organizational participants with concrete instructions and establish an implicit 'truce' between organizational members who give orders and those who receive the instructions (Nelson and Winter 1982). To a certain degree, organizational members accept these instructions without conscious questioning (Becker 2004, 656). Referring to Nelson and Winter (1982), the coordinated whole of the individual activities constitutes the productive capability of the organization. Additionally, organizational actors maintain the collective capabilities by applying their skills within the scope of their specific organizational role (Nelson and Winter 1982, 103–104). Hence, organizational routines are no longer only seen as a central organizational coordination process, but, as the basal pattern of organizational processes.

Besides the illustrated differences between the three metaphors in the Organization Theory School, they mutually highlight a central feature of organizational routines: Their capacity to generate stability and, therefore, efficiency, predictability and legitimacy in organizational interactions (Becker 2004, Feldman and Pentland 2003). On the basis of their recurrence, organizational routines provide stability for two reasons: First of all, when routine results are satisfactory and no other way of problem solving has to be found, they spare the limited cognitive resources of involved actors as mentioned above. So if established routines do not have to be changed, existing contracts and common understandings do not have to be modified and transaction costs can be reduced (Becker 2004). Beside the reduction of costs, stability of organizational routines allows valuable feedback effects and so 'provides a baseline against which to assess changes, compare and learn' (Becker 2004, 659). However, although there are feedback processes within the reproduction of an organizational routine, negative feedback might be ignored by the performing agents. At worst, such 'defensive' routines (Argyris 1985, 1990) can lead to structural inertia (Hannan and Freeman 1984). Time pressure especially 'increases the likelihood of routine choices' and 'a preference for those routine responses which are rehearsed most often' (Becker 2004, 650). In summary, it can be stated that in the Organizational Theory School orga-

nizational routines are conceptualized as relatively stable and enduring features of organizations.

3.2 The Competence Theory School

A very important positive effect of organizational routines is their capability to save knowledge, highlighted by Nelson and Winter's (1982) concept of organizational memory. Organizational routines store the firm-specific production knowledge that is primarily implicit and collective, and enables organizations to perform distinct activities (e.g., Foss 1996, Langlois and Foss 1997, Winter 2003). Implicit organizational knowledge is especially regarded as the basis of strategic resources in the form of idiosyncratic organizational capabilities that meet the VRIN-attributes stated by Barney (1991). Several authors emphasize that organizational routines represent a 'key repository of organizational knowledge' and the 'building blocks of organizational capabilities' (e.g., Becker 2004, Dosi et al. 2008, Makadok, 2001, Nelson and Winter 1982, Teece et al. 1997). This notion serves as a starting point for the second cluster: the *Competence Theory School*. Albeit in terms of assigned publications, this factor is the smallest in the co-citation network and has the highest explanatory power. This finding indicates the coherence of the underlying theoretical tradition, forming a comparatively homogenous body of literature which is clearly separated from the other clusters in the network (see Figure 1).

As stated above, the central concept in the Competence Theory School – organizational capabilities – is founded on the broader concept of organizational routines (Winter 2003, 991): '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, 991). From this perspective, successful operating firms can be understood in terms of their routine hierarchy (Nelson 1991, 68) with three main levels of capability (Ambrosini and Bowman 2009) that reflect a 'hierarchy of rates of change' (Winter 2003, 992): (1) 'Zero-level' capabilities represent ordinary operational capabilities performed in a stationary process ('in equilibrium' with a stable production and sale of a certain product quantity for a constant customer target group) which allow a firm's short term survival. Operative capabilities can, thereby, be interpreted as 'core competences' (Prahalad and Hamel 1990) when they 'define a firm's fundamental business' (Teece et al. 1997, 516). (2) The second stage is defined as 'first-order' capabilities which involve a first order change in relation to the zero-level processes as in the case of new product development. (3) In contrast, higher-order capabilities represent the highest level of the capability hierarchy and can be seen as meta-routines to create, enhance or modify first-level capabilities that facilitate

higher-order change processes as opposed to an firm's 'ad hoc problem solving'. The strategic 'substance', thereby, relies on a firm's costly investments in activity patterning such as product development (Winter 2003).

Additionally, Nelson and Winter's fundamental concept of routine hierarchy has been prominently adopted by Teece and Pisano (1994) as well as Teece, Pisano and Shuen (1997) in their framework of 'dynamic capabilities' that aims to analyze 'the sources of wealth creation and capture' (Teece, Pisano and Shuen 1997, 509) in order to develop 'an expanded paradigm to understand how competitive advantage is achieved' (Teece et al. 1997, 515) in dynamic environments with rapid and unpredictable market change (Eisenhardt and Martin 2000). According to Teece and Pisano (1994), the historically developed dynamic capabilities represent the origin of a firm's competitive advantage. The concept of dynamic capabilities reflects Winter's first-order capabilities that change the zero-level routines and constitute a firm's ability to 'achieve new and innovative forms of competitive advantage' (Winter 2003, 516) in accordance with changing environments. Dynamic capabilities can be seen as routines for knowledge creation, integration, and replication such as product development, strategic decision making and alliancing routines that implement value-creating strategies (Eisenhardt and Martin 2000).

Against this theoretical backdrop, Eisenhardt and Martin aim to extend the understanding of dynamic capabilities and to enhance the resource-based perspective. They suggest that dynamic capabilities are neither 'conceptually vague nor tautological' (Eisenhardt and Martin (2000, 1106) as often criticized in the strategic management literature (e.g., Priem and Butler 2001, Williamson 1999) because their contribution to competitive advantage is indirect and their value creating ability lies in their capacity to reconfigure organizational resources and not in the capabilities themselves. Furthermore, Eisenhardt and Martin argue that dynamic capabilities exhibit a 'greater equifinality, homogeneity, and substitutability' (Eisenhardt and Martin 2000, 1106) than usually assumed in the resourced-based view of the firm. Additionally, they identify 'significant commonalities across firms' (Eisenhardt and Martin 2000, 1105) that can be seen as 'best practices' and differentiate between two general types of dynamic capabilities that are constituted in connection with different environmental dynamics: (1) Dynamic capabilities in moderately dynamic markets correspond to the traditional conceptualization of stable organizational routines (e.g., Cyert and March 1963, Nelson and Winter 1982) with predicable performance outcomes. Their evolution and learning mode is, thereby, guided by 'variation'. On the contrary, dynamic capabilities in high-velocity markets are guided by 'simple rules' (Eisenhardt and Sull 2001). They are 'highly experiential and fragile processes' and their outcomes are unpredictable (Eisenhardt and Martin 2000, 1105). In addition, their evolutionary development and learning mode is based on 'selection' rather than on variation.

The notion of two different types of ‘effective patterns of dynamic capabilities’ highlighted by Eisenhardt and Martin (2000, 1106) leads us to our next cluster – the *Practice Theory School* – where the differentiation and dynamics between (1) the structural patterns of organizational routines in form of formal and social rules and (2) the actual performances of organizational routines by human agents becomes the subject of analysis.

3.3 The Practice Theory School

The third school of thought has not yet entered the developmental stage of the two other schools. As the low loadings on this factor (see Appendix) indicate, the cluster has only begun to establish itself in the co-citation network. It reflects a more recent theoretical development in scholarship on organizational routines. In contrast to the other subgroups, most of the works assigned to the third factor specialize on routines, thus, establishing a genuine scholarly tradition of this concept. While the central theme in this school is organizational change, this is not a distinguishing feature because several authors in the Organizational Theory School (e.g., Cohen and Levinthal 1990, Tushman and Romanelli 1985) and in the Competence Theory School (e.g., Eisenhardt and Martin 2000, Teece et al. 1997) also focus on this topic. However, most authors who subscribe to the third theoretical tradition have a distinct understanding of how routines relate to change. While routines are commonly conceptualized as stable, offering resistance to change rather than being subject to it (Feldman 2003), it is only the third school that also considers them as the source of change. Feldman and Pentland (2003) suggest that organizational routines ‘cannot be understood as static, unchanging objects’ (Feldman and Pentland 2003, 95). However, from this perspective the focus of attention should not be directed towards ‘meta-routines’ or ‘routines for changing routines’ as highlighted in the dynamic capabilities framework, but rather to ‘something more basic: the inherent capability of every organizational routine to generate change, merely by its ongoing performance’ (Feldman and Pentland 2003, 94). Because tacit knowledge as central component of organizational routines evolves and its application continually changes, routines in particular are a source of endogenous change (Becker 2004) – as a ‘change that comes from within organizational routines’ (Feldman and Pentland, 2003: 112). Organizational routines are almost always ‘in flux’ (Becker 2005, 776) and play a central role for the flexibility of an organization (Pentland and Rueter 1994). They have a ‘dual nature’ (Feldman and Pentland 2003, 112); they are both: a source of stability *and* change (Becker 2004, Feldman and Pentland 2003, Feldman and Rafaeli 2002).

Beyond this topical interest in issues of change triggered by routines, there is also a growing theoretical consensus within the third school. Most works in this cluster draw on theories of social practices and are engaged

with the 'practice turn' in sociology (e.g., Bourdieu 1990, Giddens 1984, Schatzki et al. 2001). The few assigned publications that subscribe to other theoretical perspectives bridge the gap between practice- and competence-based accounts (Dosi et al. 2000, Zollo and Winter 2002, Zollo et al. 2002); their mediating role in the co-citation network is especially indicated by the high betweenness measures (see Appendix). Among the genuine practice-theoretical contributions to the discourse, Feldman's and Pentland's (2003) central aim is to offer a 'new ontology' of organizational routines that takes the specific process through which organizational routines change into account. Drawing upon a social-theoretical backdrop, organizational routines are conceptualized as 'social practices'. 'Social practices are routines: routines of moving the body, of understanding and wanting, of using things, interconnected in a practice' (Reckwitz 2002, 255). From a practice-based perspective, the concept of organizational routines encompasses two dimensions. On the one hand, practices guide the activities of human agents as their background knowledge and, on the other hand, they are the actual activity themselves carried out by human agents (Whittington 2006). In this connection, Pentland and Feldman (2005) consider different distinctions that can be applied to analyze the two aspects of organizational routines: structure versus agency (Giddens 1984), objective versus subjective (Bourdieu 1990), disposition versus behavior (Hodgson 2003). Feldman and Pentland (2003, 2005) themselves follow Latour's (1986) terminology and identify two interrelated dimensions of organizational routines: (1) an ostensive aspect and (2) a performative aspect. 'Like structure and agency, these two aspects are mutually constitutive' (Pentland and Feldman 2005, 795).

(1) The *ostensive aspect* of organizational routines represents an abstract idea or a pattern of a specific organizational routine that can 'be thought of as a narrative, or a script' (Pentland and Feldman 2005, 796): 'The ostensive aspect is the ideal or schematic form of a routine. It is the abstract, generalized idea of the routine, or the routine in principle' (Feldman and Pentland 2003, 101). This structural dimension refers to the existence of social structures – formal and social rules as well as authoritative and allocative resources (Giddens 1984) – that enable organizational members to orientate their work activities and account for their behavior and at the same time constrain their organizational activities.

(2) The *performative aspect* refers to the central role of agency and the actual 'enactment' of organizational routines by human agents at a certain time and space. Only the specific actions of organizational members 'bring the routine to life' (Feldman and Pentland 2003, 94). The performing individuals, thereby, refer to the structural dimension of organizational routines that guide their behavior and through this reproduce and change the ostensive aspects (Feldman and Pentland 2003, Pentland and Feldman 2005). The specific interaction of the two recursive and mutually constitutive dimensions of

organizational routines determines its flexibility and the degree to which a routine can be changed.

The Practice Theory School emphasizes the fact that organizational routines are not inert because the reproduction of the two dimensions of organizational routines and their processual character imply a high amount of internal dynamics (Becker 2004, Feldman and Pentland 2003, Pentland and Feldman 2005). '*All reproduction is necessarily production ... and the seed of change is there in every act which contributes towards the reproduction of any "ordered" form of social life*' (Giddens 1976, 102). The performance of organizational routines is, therefore, always improvisatory and as a result of adaptation processes, routines are 'continuously emerging' (Pentland and Feldman 2005, 794). There are many reasons for endogenous and incremental changes in organizational routines, especially the interdependencies of inter-related routines and between actors or a changing usage of artifacts that might result in a more substantial or even a gradual organizational change (Becker 2004, Becker et al. 2005). Due to the fact that at a certain moment of time environmental constellations will be complex, the probability that an exact reproduction of the routine can be performed in a subsequent iteration is very low. The ostensive aspects often take the form of general rules that govern the coordinated actions of a large number of organizational members have to be incompletely specified and, therefore, have to be interpreted by the performing individuals who adapt the established routines to local and situated demands (Becker 2004). So the focus of attention is switched, on the one hand, from the episodic to the *continuous* change of organizations and, on the other hand, from external pressure and the explicit change of routines through managerial decision making to their incremental and primarily *endogenous changes* triggered by the performing practitioners (Feldman 2000, Feldman and Pentland 2003, Pentland and Feldman 2005).

4. Conclusion and Further Research

In this paper, we have reviewed the management and organization literature on routines by providing a bibliometric study that allows for a visualization of otherwise 'invisible colleges' in an extensive field of research. By means of co-citation analysis, we have identified three schools which provide the major theoretical pillars of the routine concept. While the Competence Theory School is a small yet cohesive cluster, the Organization Theory School is larger and more diverse in terms of theoretical perspectives. Although our analysis has indicated the separation of these predominant schools in the citation patterns of the scholarly community, they keep being interrelated to a considerable extent. In particular, the seminal work of Nelson and Winter (1982) is still a unifying node in the core of the bibliometric network where

it serves as a shared point of reference for authors in both clusters. Furthermore, a number of scholarly journals bring together the different streams of research, thus, contributing to the convergence of the field.

Departing from these theoretical foundations, however, both the Competence Theory School and the Organization Theory School have hitherto only dealt with micro-foundations of organizational routines to a marginal extent, thus, widely neglecting the link between the individual and organizational level of analysis that is necessary to take individual-level antecedents and micro-mechanisms of human action into account. As Felin and Foss (2004, 2005, 2006, 2009; 2011; for replies see Hodgson and Knudsen 2011; Pentland 2011; Winter 2011) state, these explanatory shortcomings can be traced back to the dominance of collectivistic routine concepts and their theoretical extrapolation from aggregated firm-level routine constructs to aggregated firm-level outcomes such as organizational capabilities or firm performance (see also Abell et al. 2008, Felin and Hesterley 2007, Gavetti 2005). 'Individuals are rounded out' in a collectivistic perspective because 'routines and capabilities are treated as real social facts' (Felin and Foss 2005, 443) and no attention is paid to the nested individual action and interaction (Felin and Hesterley 2007). As a consequence, the origins and individual-level foundations of organizational routines and the explanation of how they exactly influence the performance and competitive advantage of firms remain underdeveloped. This approach to the micro-level brings issues of power, choice behavior, decision-making, motivation, individual's preferences and self-selection back into the picture and leads to the question of 'who' constitutes the organization: 'How things are done in organizational settings, both in terms of structure and overall efficiency or creativeness, is a function of *who* is doing' (Felin and Foss 2004, 21).

In considering the 'who' questions, the Practice Theory School of organizational routines can be seen as the first step towards further micro-foundations of the routine concept. This perspective conceptualizes organizational routines as 'social practices' and explicitly considers *two* central dimensions of organizational routines – structure *and* agency –, thereby, linking the macro- and the micro-perspective. However, this emergent school is still small and has not yet left adolescence in terms of internal coherence. Therefore, this approach would benefit from complementary and synergistic research which has been unconnected to organizational routines so far. For example, the strategy-as-practice (s-as-p) approach (Jarzabkowski 2005, Jarzabkowski et al. 2007, Jarzabkowski and Spee 2009, Johnson et al. 2003, Whittington, 1997, 2006) emerges as an alternative to the macro-level focused strategy research that has dominated the management literature for over the last three decades (Johnson et al. 2003). Its central aim is to overcome the theoretical reduction of strategy to 'a few causally related variables' (Jarzabkowski et al. 2007, 6) and to emphasize the role of human action and strategy practitioners that

construct, shape and enact strategies through their day-to-day activities. From this perspective, strategy 'is not something that an organization *has* but something its members *do*' (Jarzabkowski et al. 2007, 6) The s-as-p approach may advance the concept of routines by meeting crucial points of a research agenda for further micro-foundations as highlighted by Felin and Foss (2009, 163): '(1) the origins of routines, (2) intentionality and exceptions, and (3) aggregation and emergence'. In taking the structural, contextual and cognitive 'activity configurations' as central units of the analysis the s-as-p approach captures the *origins* of organizational routine and capability accumulation 'as something immanent in purposive action that draws on broader (both historically and culturally) tendencies and predispositions' (Regnér 2008, 575) beyond economic contexts and an isolated consideration of dynamic capabilities. S-as-p may also consider the *intentionality*, rationality, creativity and imagination of the acting individuals and, thus, explain the initial conditions in which managers and employees respond to new situations and unexpected environmental problems. Based on their beliefs and expectations managers have to deal with '*exceptions*' by making fateful decisions that lead to specific organizational activities which subsequently become routinized over time (Felin and Foss 2009, 164). Therefore, it accounts for the co-existing logics of stability and change that are shaped and carried out by multiple strategists. Finally, a practice-based perspective contributes to an enhanced understanding of the co-evolution of structure and agency and the question how individual-level interactions *emerge and aggregate* to collective routine behavior, thereby, enhancing the explanation of the 'macro-micro' link and fostering an understanding of routines as 'multi-level mechanisms' (Vromen 2011). Although s-as-p refers to the social-theoretical backdrop which is eponymous for the Practice Theory School of organizational routines, both schools have hitherto drawn on each other to a very little extent. Future theoretical and empirical research on organizational routines should, therefore, take up the challenge to get involved with the rapidly growing s-as-p perspective. This engagement would offer worthwhile opportunities for cross-fertilizations particularly with regard to micro-foundations of organizational routines.

REFERENCES

- Abell, P., Felin, T. and Foss, N.J. (2008), "Building Micro-foundations for the Routines, Capabilities, and Performance Links," *Managerial and Decision Economics* 29: 489–502.
- Ambrosini, V. and Bowman, C. (2009), "What Are Dynamic Capabilities and Are They a Useful Construct in Strategic Management?" *International Journal of Management Reviews* 11: 29–49.
- Amit, R. and Schoemaker, P.J.H. (1993), "Strategic Assets and Organizational Rent," *Strategic Management Journal* 14: 33–46.

- Argyris, C. (1985), *Strategy, Change and Defensive Routines*. Pitman: Boston, MA.
- Argyris, C. (1990), *Overcoming Organizational Defenses: Facilitating Organizational Learning*. Prentice Hall: Englewood Cliffs, NJ.
- Argyris, C. and Schön, D.A. (1978), *Organizational Learning: A Theory of Action Perspective*. Addison-Wesley: Reading, MA [et al.].
- Balogun, J., Jarzabkowski, P. and Seidl, D. (2007), "Strategy as Practice Perspective," in Jenkins, M., Ambrosini V. and Collier, N. (eds.), *Advanced Strategic Management: A Multi-Perspective Approach*. Basingstoke, Hampshire: Palgrave Macmillan, 196–211.
- Barney, J. (1991), "Firm Resources and Sustained Competitive Advantage," *Journal of Management* 17: 99–120.
- Becker, M.C. (2004), "Organizational Routines: A Review of the Literature," *Industrial and Corporate Change* 13: 643–677.
- Becker, M.C. (2005), "A Framework for Applying Organizational Routines in Empirical Research: Linking Antecedents, Characteristics and Performance Outcomes of Recurrent Interaction Patterns," *Industrial and Corporate Change* 14: 817–846.
- Becker, M.C., Lazaric, N., Nelson, R.R. and Winter, S.G. (2005), "Applying Organizational Routines in Understanding Organizational Change," *Industrial and Corporate Change* 14: 775–791.
- Borgatti, S.P., Everett, M.G. and Freeman, L.C. (2002), *Ucinet for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.
- Bornmann, L. and Daniel, H.-D. (2008), "What Do Citation Counts Measure? A Review of Studies on Citing Behavior," *Journal of Documentation* 64: 45–80.
- Bourdieu, P. (1972), *Esquisse d'une Théorie de la Pratique, Précédé de Trois Etudes d'Ethnologie Kabyle*. Genève: Droz.
- Bourdieu, P. (1990), *The Logic of Practice*. Stanford, CA: Stanford University Press.
- Cohen, M. D. and Bacdayan, P. (1994), "Organizational Routines Are Stored as Procedural Memory – Evidence from a Laboratory Study," *Organization Science* 5: 554–568.
- Cohen, M. D., Burkhart, R., Dosi, G., Egidi, M., Marengo, L., Warglien M. and Winter S.G. (1996), "Routines and Other Recurring Action Patterns of Organizations: Contemporary Research Issues," *Industrial and Corporate Change* 5: 653–688.
- Cohen, W.M. and Levinthal, D.A. (1990), "Absorptive Capacity – A New Perspective on Learning and Innovation," *Administrative Science Quarterly* 35: 128–152.
- Collis, D.J. (1994), "Research Note: How Valuable Are Organizational Capabilities?" *Strategic Management Journal* 15: 143–152.
- Crane, D. (1972), *Invisible Colleges: Diffusion of Knowledge in Scientific Communities*. Chicago, IL: University of Chicago Press.
- Cyert, R.M. and March, J.G. (1963), *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Davis-Blake, A. and Pfeffer, J. (1989), "Just a Mirage: The Search for Dispositional Effects in Organizational Research," *Academy of Management Review* 14: 385–400.
- De Solla Price, D.J. (1965), "The Science of Science," in Platt, J.R. (ed.), *New Views on the Nature of Man*. Chicago, IL: University of Chicago Press, 47–70.

Di Stefano, G., Peteraf, M. and Verona, G. (2010), "Dynamic Capabilities Deconstructed: A Bibliographic Investigation into the Origins, Development, and Future Directions of the Research Domain," *Industrial & Corporate Change* 19: 1187–1204.

Dierickx, I. and Cool, K. (1989), "Asset Stock Accumulation and Sustainability of Competitive Advantage," *Management Science* 35: 1504–1511.

DiMaggio, P.J. and Powell, W.W. (1983), "The Iron Cage Revisited – Institutional Isomorphism and Collective Rationality in Organizational Fields," *American Sociological Review* 48: 147–160.

Dosi, G., Nelson, R.R. and Winter, S.G. (2000), *The Nature and Dynamics of Organizational Capabilities*. Oxford: Oxford University Press.

Dosi, G., Faillo, M. and Marengo, L. (2008), "Organizational Capabilities, Patterns of Knowledge Accumulation and Governance Structures in Business Firms: An Introduction," *Organization Studies* 29: 1165–1185.

Durisin, B. and Puzone, F. (2009), "Maturation of Corporate Governance Research, 1993–2007: An Assessment," *Corporate Governance – An International Review* 17: 266–291.

Eisenhardt, K.M. and Martin, J.A. (2000), "Dynamic Capabilities: What Are They?" *Strategic Management Journal* 21: 1105–1121.

Eisenhardt, K.M. and Sull, D.N. (2001), "Strategy as Simple Rules," *Harvard Business Review* 79: 106–116.

Feldman, M.S. (2000), "Organizational Routines as a Source of Continuous Change," *Organization Science* 11: 611–629.

Feldman, M.S. (2003), "A Performative Perspective on Stability and Change in Organizational Routines," *Industrial and Corporate Change* 12: 727–752.

Feldman, M.S. and Pentland, B.T. (2003), "Reconceptualizing Organizational Routines as a Source of Flexibility and Change," *Administrative Science Quarterly* 48: 94–118.

Felin, T. and Foss, N.J. (2004), "Organizational Routines: A Sceptical Look," DRUID Working Paper, Copenhagen Business School, Copenhagen.

Felin, T. and Foss, N.J. (2005), "Strategic Organization: A Field in Search of Micro-foundations," *Strategic Organization* 3: 441–455.

Felin, T. and Foss, N.J. (2006), "Individuals and Organizations: Thoughts on a Micro-foundations Project for Strategic Management and Organizational Analysis," in Ketchen, D. and Bergh, D. (eds.), *Research Methodology in Strategy and Management*. Oxford: JAI Press, 253–288.

Felin, T. and Foss, N.J. (2009), "Organizational Routines and Capabilities: Historical Drift and a Course-correction toward Microfoundations," *Scandinavian Journal of Management* 25: 157–167.

Felin, T. and Foss, N.J. (2011), "The Endogenous Origins of Experience, Routines, and Organizational Capabilities: The Poverty of Stimulus," *Journal of Institutional Economics* 7: 231–256.

Felin, T. and Hesterley, W.S. (2007), "The Knowledge-based View, Nested Heterogeneity, and New Value Creation: Philosophical Considerations on the Locus of Knowledge," *Academy of Management Review* 32: 195–218.

Foss, N.J. (1996), "Capabilities and the Theory of the Firm," DRUID Working Paper, Copenhagen Business School, Copenhagen.

Foss, N.J. (2007), "The Emerging Knowledge Governance Approach: Challenges and Characteristics," *Organization* 14: 29–52.

Garfield, E. (1955), "Citation Indexes for Science – New Dimension in Documentation through Association of Ideas," *Science* 122: 108–111.

Garfield, E., Malin, M.V. and Small, H.C. (1978), "Citation Data as Science Indicators," in Elkana, Y., Lederberg, J., Merton, R.K., Thackray, A. and Zuckerman, H. (eds.), *Toward a Metric of Science: The Advent of Science Indicators*. New York: Wiley, 179–207.

Gavetti, G. (2005), "Cognition and Hierarchy: Rethinking the Microfoundations of Capabilities' Development," *Organization Science* 16: 599–617.

Gavetti, G. and Levinthal, D. (2000), "Looking Forward and Looking Backward: Cognitive and Experiential Search," *Administrative Science Quarterly* 45: 113–137.

Giddens, A. (1976), *New Rules of Sociological Method: A Positive Critique of Interpretative Sociologies*. London: Hutchinson.

Giddens, A. (1984), *The Constitution of Society: Outline of the Theory of Structuration*. Cambridge: Polity Press.

Goia, D.A. and Poole, P.P. (1984), "Scripts in Organizational Behavior," *Academy of Management Review* 9: 449–459.

Griffith, B.C., Small, H.C., Stonehill, J.A. and Dey, S. (1974), "The Structure of Scientific Literatures II: Towards a Macro- and Microstructure for Science," *Science Studies* 4: 339–365.

Hannan, M.T. and Freeman, J. (1984), "Structural Inertia and Organizational-change," *American Sociological Review* 49: 149–164.

Henderson, R.M. and Clark, K.B. (1990), "Architectural Innovation – The Reconfiguration of Existing Product Technologies and the Failure of Established Firms," *Administrative Science Quarterly* 35: 9–30.

Hodgson, G.M. (2003), "The Mystery of the Routine: The Darwinian Destiny of an Evolutionary Theory of Economic Change," *Revue Economique* 54: 355–384.

Hodgson, G.M. and Knudsen, T. (2011), "Poverty of Stimulus and Absence of Cause: Some Questions for Felin and Foss," *Journal of Institutional Economics* 7: 295–298.

Huber, G.P. (1991), "Organizational Learning: The Contributing Processes and the Literatures," *Organization Science* 2: 88–115.

Jarzabkowski, P. (2003), "Strategic Practices – An Activity Theory Perspective on Continuity and Change," *Journal of Management Studies* 40: 23–55.

Jarzabkowski, P. (2004), "Strategy as Practice – Recursiveness, Adaptation, and Practices-in-use," *Organization Studies* 25: 529–560.

Jarzabkowski, P. (2005), *Strategy as Practice – An Activity-Based Approach*. London: SAGE.

Jarzabkowski, P., Balogun, J. and Seidl, D. (2007), "Strategizing: The Challenges of a Practice Perspective," *Human Relations* 60: 5–27.

Jarzabkowski, P. and Spee, A.P. (2010), "Strategy-as-practice: A Review and Future Directions for the Field," *International Journal of Management Reviews* 11: 69–95.

Joas, H. (1996), *The Creativity of Action*. Chicago, IL: University of Chicago Press.

Johnson, G., Melin, L. and Whittington, R. (2003), "Micro-strategy and Strategizing," *Journal of Management Studies* 40, 3–22.

Kogut, B. and Zander, U. (1992), "Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology," *Organization Science* 3: 383–397

Langlois, R.N. (1992), "Transaction-cost Economics in Real Time," *Industrial and Corporate Change* 1: 99–127.

Langlois, R.N. and Foss, N. (1997), "Capabilities and Governance: The Rebirth of Production in the Theory of Economic Organization," DRUID Working Paper. Copenhagen Business School: Copenhagen.

Latour, B. (1986), "The Powers of Association," in Law, J. (ed.), *Power, Action and Belief*. London: Routledge and Kegan Paul, 264–280.

Leonard-Barton, D. (1992), "Core Capabilities and Core Rigidities – A Paradox in Managing New Product Development," *Strategic Management Journal* 13: 111–125.

Levinthal, D.A. and March, J.G. (1993), "The Myopia of Learning," *Strategic Management Journal* 14: 95–112.

Levitt, B. and March, J.G. (1988), "Organizational Learning," *Annual Review of Sociology* 14: 319–340.

Leydesdorff, L. (2001), *The Challenge of Scientometrics: The Development, Measurement, and Self-Organization of Scientific Communications*. Parkland: Universal Publications.

Makadok, R. (2001), "Toward a Synthesis of the Resource-based and Dynamic-capability View of Rent Creation," *Strategic Management Journal* 22: 387–401.

March, J.G. (1991), "Exploration and Exploitation in Organizational Learning," *Organization Science* 2: 71–87.

March, J.G. and Simon, H.A. (1958), *Organizations*. New York: Wiley.

March, J.G., Sproull, L.S. and Tamuz, M. (1991), "Learning from Samples of One or Fewer," *Organization Science* 2: 1–13.

McCain, K.W. (1990), "Mapping Authors in Intellectual Space – A Technical Overview," *Journal of the American Society for Information Science* 41: 433–443.

Murmann, J.P., Aldrich, H., Levinthal, D. and Winter S.G. (2003), "Evolutionary Thought in Management and Organization Theory at the Beginning of the New Millennium," *Journal of Management Inquiry* 12: 22–40.

Nelson, R.R. (1991), "Why Do Firms Differ, and How Does It Matter?" *Strategic Management Journal* 12: 61–74.

Nelson, R.R. and Winter, S.G. (1982), *An Evolutionary Theory of Economic Change*. Cambridge, MA: Belknap Press of Harvard University Press.

Nonaka, I. (1994), "A Dynamic Theory of Organizational Knowledge Creation," *Organization Science* 5: 14–37.

Nonaka, I. and Takeuchi, H. (1995), *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.

Orlikowski, W. (2002), "Knowing in Practice: Enacting a Collective Capability in Distributed Organizing," *Organization Science* 13: 249–273.

Pentland, B.T. (2011), "The Foundation Is Solid, if You Know Where to Look: Comment on Felin and Foss," *Journal of Institutional Economics* 7: 279–293.

Pentland, B.T. and Feldman, M.S. (2005), "Organizational Routines as a Unit of Analysis," *Industrial and Corporate Change* 14: 793–815.

Pentland, B.T. and Rueter, H.H. (1994), "Organizational Routines as Grammars of Action," *Administrative Science Quarterly* 39: 484–510.

Polanyi, M. (1962), *Personal Knowledge*. Chicago, IL: University of Chicago Press.

Polanyi, M. (1967), *The Tacit Dimension*. New York: Doubleday.

Prahalad, C.K. and Hamel, G. (1990), "The Core Competence of the Corporation," *Harvard Business Review* 68: 79–91.

Priem, R.L. and Butler, J.E. (2001), "Is the Resource-based 'View' a Useful Perspective for Strategic Management Research?" *Academy of Management Review* 26: 22–40.

Pritchard, A. (1969), "Statistical Bibliography or Bibliometrics," *Journal of Documentation* 25: 348–349.

Reckwitz, A. (2002), "Towards a Theory of Social Practice: A Development in Cultural Theorizing," *European Journal of Social Theory* 5: 243–263.

Regnér, P. (2008), "Strategy-as-practice and Dynamic Capabilities: Steps towards a Dynamic View of Strategy," *Human Relations* 61: 565–588.

Salvato, C. (2003), "The Role of Micro-strategies in the Engineering of Firm Evolution," *Journal of Management Studies* 40: 83–108.

Schatzki, T.R., Knorr-Cetina, K. and Savigny, E. v. (eds.) (2001), *The Practice Turn in Contemporary Theory*. London: Routledge.

Schildt, H.A., Zahra, S.A. and Sillanpaa, A. (2006), "Scholarly Communities in Entrepreneurship Research: A Co-citation Analysis," *Entrepreneurship Theory and Practice* 30: 399–415.

Simon, H.A. (1945), *Administrative Behavior*. New York: Free Press.

Simon, H.A. (1955), "A Behavioral Model of Rational Choice," *Quarterly Journal of Economics* 69: 99–118.

Simon, H.A. (1977), *The New Science of Management Decision*. Englewood Cliffs, NJ: Prentice Hall.

Small, H.C. (1973), "Co-citation in the Scientific Literature: A New Measure of the Relationship between Two Documents," *Journal of the American Society of Information Science* 24: 265–269.

Small, H.C. and Griffith, B.C. (1974), "The Structure of Scientific Literatures I: Identifying and Graphing Specialities," *Science Studies* 4: 17–40.

Spender, J.-C. (1994), "Organizational Knowledge, Collective Practice and Penrose Rents," *International Business Review* 3: 353–367.

Starbuck, W.H. and Hedberg, B.L.T. (1977), "Saving an Organization from a Stagnating Environment," in Thorelli, H.B. (ed), *Strategy + Structure = 3D Performance: The Strategic Planning Imperative*. Bloomington, IN: Indiana University Press, 249–258.

Stene, E. (1940), "An Approach to the Science of Administration," *American Political Science Review* 34: 1124–1137.

Sztompka, P. (1991), *Society in Action: The Theory of Social Becoming*. Chicago, IL: University of Chicago Press.

Teece, D.J. and Pisano, G. (1994), "The Dynamic Capabilities of Firms: An Introduction," *Industrial and Corporate Change* 3: 537–556.

Teece, D.J., Pisano, G. and Shuen, A. (1997), "Dynamic Capabilities and Strategic Management," *Strategic Management Journal* 18: 509–533.

Tushman, M.L. and Anderson, P. (1986), "Technological Discontinuities and Organizational Environments," *Administrative Science Quarterly* 31: 439–465.

Tushman, M.L. and Romanelli, E. (1985), "Organizational Evolution: A Metamorphosis Model of Convergence and Reorientation," *Research in Organizational Behavior* 7: 171–222.

Vromen, J.J. (2011), "Routines as Multilevel Mechanisms," *Journal of Institutional Economics* 7: 175–196.

Walsh, J.P. and Ungson, G.R. (1991), "Organizational Memory," *Academy of Management Review* 16: 57–91.

Wernerfelt, B. (1984), "A Resource-based View of the Firm," *Strategic Management Journal* 5: 171–180

Whittington, R. (1997), *What Is Strategy – and Does It Matter?* London: Thomson Business Press.

Whittington, R. (2003), "The Work of Strategizing and Organizing: For a Practice Perspective," *Strategic Organization* 1: 119–127.

Whittington, R. (2004), "Strategy after Modernism – Recovering Practice," *European Management Review* 1: 62–68.

Whittington, R. (2006), "Completing the Practice Turn in Strategy Research," *Organization Studies* 27: 613–634.

Williamson, O.E. (1999), "Strategy Research: Governance and Competence Perspectives," *Strategic Management Journal* 20: 1087–1108.

Winter, S.G. (2011), "Problems at the Foundation? Comments on Felin and Foss," *Journal of Institutional Economics* 7: 257–277.

Winter, S.G. (2003), "Understanding Dynamic Capabilities," *Strategic Management Journal* 24: 991–995.

Zollo, M., Reuer, J.J. and Singh, H. (2002), "Interorganizational Routines and Performance in Strategic Alliances," *Organization Science* 13: 701–713.

Zollo, M. and Winter, S.G. (2002), "Deliberate Learning and the Evolution of Dynamic Capabilities," *Organization Science* 13: 339–351.

© Nina Katrin Hansen, Rick Vogel

Appendix: Documents in Co-Citation Analysis

1	2	3	4	5	6	7	8	9
No. Document		Times Cited	Factor Analysis		Network Analysis (Normalized Centrality Measures)			
			Factor	Loading	Degree	Closeness	Betweenness	Eigen-vector
1	Wernerfelt, 1984	40	1	0.945	9.756	48.235	0.000	7.451
2	Amit and Schoemaker, 1993	20	1	0.939	4.878	41.000	0.000	3.247
3	Barney, 1991	57	1	0.931	19.512	51.899	1.090	11.528
4	Dierickx and Cool, 1989	35	1	0.926	12.195	50.000	0.063	9.392
5	Prahalad and Hamel, 1990	30	1	0.909	7.317	48.810	0.000	7.156
6	Kogut and Zander, 1992	52	1	0.904	24.390	55.405	3.418	16.820
7	Nonaka, 1994	42	1	0.855	7.317	40.594	0.000	3.635
8	Teece et al., 1997	71	1	0.765	51.220	67.213	10.684	33.610
9	Eisenhardt and Martin, 2000	47	1	0.701	14.634	50.617	0.169	11.769
10	Nonaka and Takeuchi, 1995	48	1	0.598	9.756	41.414	0.107	4.779
11	Tushman and Romanelli, 1985	23	2	0.951	4.878	47.126	0.000	6.659
12	DiMaggio and Powell, 1983	41	2	0.941	12.195	50.617	0.000	14.978
13	Argyris and Schön, 1978	59	2	0.933	19.512	52.564	1.073	17.056
14	Hannan and Freeman, 1984	42	2	0.932	14.634	51.250	0.000	16.464
15	March, 1991	71	2	0.920	51.220	67.213	5.673	37.900
16	March et al., 1991	12	2	0.920	51.220	67.213	5.673	37.900
17	Levitt and March, 1988	86	2	0.917	63.415	73.214	12.408	43.527
18	Huber, 1991	49	2	0.913	19.512	53.947	0.877	18.607
19	Tushman and Anderson, 1986	40	2	0.903	14.634	51.250	0.000	15.385
20	Levinthal and March, 1993	40	2	0.901	19.512	54.667	0.081	20.661
21	Nelson and Winter, 1982	135	2	0.878	80.488	83.673	26.683	49.043
22	Gavetti and Levinthal, 2000	18	2	0.847	4.878	41.000	0.000	5.453
23	Eisenhardt, 1989	51	2	0.839	7.317	48.810	0.000	8.026
24	Henderson and Clark, 1990	36	2	0.794	17.073	51.899	0.020	16.580
25	Cohen and Levinthal, 1990	77	2	0.683	43.902	63.077	8.044	28.925
26	Weick, 1979	43	2	0.645	17.073	51.250	0.140	16.417
27	Cyert and March, 1963	76	2	0.644	53.659	68.333	8.225	39.844
28	Leonard-Barton, 1992	36	2	0.597	17.073	52.564	0.036	17.803
29	Walsh and Ungson, 1991	25	2	0.560	4.878	43.158	0.000	4.470
30	March and Simon, 1958	17	2	0.465	26.829	55.405	0.410	24.664
31	Gersick and Hackman, 1990	35	2	0.137	19.512	52.564	0.147	18.127
32	Zollo et al., 2002	7	3	0.943	29.268	56.944	0.911	26.299
33	Zollo and Winter, 2002	39	3	0.943	29.268	56.944	0.911	26.299
34	Dosi et al., 2000	21	3	0.862	9.756	48.235	0.000	9.729
35	Cohen et al., 1996	34	3	0.437	24.390	53.947	0.266	21.604
36	Feldman, 2000	61	3	0.373	41.463	61.194	6.003	32.292
37	Feldman and Pentland, 2003	56	3	0.349	29.268	55.405	2.660	22.078
38	Feldman, 2003	18	3	0.296	4.878	38.679	0.000	3.911
39	Cohen and Bacdayan, 1994	44	3	0.227	26.829	55.405	0.292	25.043
40	Pentland and Rueter, 1994	43	3	0.177	26.829	54.667	1.008	21.157
41	Weick and Roberts, 1993	32	3	0.063	12.195	43.158	0.000	8.943
42	Weick, 1993	14	3	0.063	12.195	43.158	0.000	8.943

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.