The Routine Concept in Organization Theory and Strategic Management: 
A Co-Citation Analysis

NINA KATRIN HANSEN*
University of Hamburg
Faculty of Economics and Social Sciences
Department of Business and Economics
Chair for Human Resource Management
Von-Melle-Park 5
D-20146 Hamburg
Germany
Phone +49.40.42838.3315
E-Mail: NinaKatrin.Hansen@wiso.uni-hamburg.de

RICK VOGEL
University of Hamburg
Faculty of Economics and Social Sciences
Department of Business and Economics
Chair of Organization and Management
Von-Melle-Park 5
20146 Hamburg
Germany
Phone +49.40.42838.7017
E-Mail: Rick.Vogel@uni-hamburg.de

* Corresponding author.

Paper to be presented at
the 4th International Conference on Organizational Routines
“Organizational routines between change and stability:
Linking empirical research to recent theoretical debates”
Nice, June 11-12 2010

Abstract
In this article we review the management and organization literature on routines and delineate how practice-based approaches can advance the micro-foundations of dominating collectivistic concepts. By conducting a co-citation analysis of 743 related documents published between 1958 and 2009 in scholarly journals, major patterns of theoretical development and emergent research priorities become apparent. We identify three distinctive, yet interrelated, schools of thought: Organization Theory, Strategic Management and Practice Theory. While the first two schools have not intensively investigated the micro-foundations of organizational routines so far the Practice Theory School provides some promising starting points in this regard. We argue that this stream of research would gain even more momentum if complementary and synergistic research which has hitherto been unconnected to organizational routines were considered. We show how a strategy-as-practice approach can inform the concept of organizational routines by meeting crucial points of a research agenda for further micro-foundations.

Keywords
bibliometrics; co-citation analysis; micro-foundations; organizational routines; review; strategy-as-practice
The Routine Concept in Organization Theory and Strategic Management: A Co-Citation Analysis

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 & 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 Strategic Management School and a Practice Theory School. Turning the perspective from past and present to future research, we discuss how a fourth school – the Strategy-as-Practice School – 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 empirical 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. The final section of the paper is a brief conclusion.

**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 subfield (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
A 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., forthcoming; 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 inconsciously 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. 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 scree 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 11 publications, but it has the highest explanatory power (44.2% variance explained). We refer to this factor as *Strategic Management* 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 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 behavioural 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, 2000; Zollo and Winter, 2002).

Although the co-citation network gives a visual impression of the dense interconnectedness of theoretical views on organizational routines, three schools can be delineated in the literature by means of a complementary factor analysis. Despite some overlaps (as signified by several cross-loadings of the analyzed publications), 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.

**The three schools of organizational routines**

*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 & 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. ‘However, the concept of routine, as separable from decision making, was not part of the original Carnegie School foundation, but an outgrowth of Nelson and Winter’s (1982) influential reinterpretation’ (Gavetti et al., 2007: 526).

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 & 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),
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’ (p. 68). 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: 103f.). 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 organizational routines are conceptualized as relatively stable and enduring features of organizations.

**The Strategic Management 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 **Strategic Management 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 Strategic Management 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’ (p. 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 (2003) first-order capabilities that change the zero-level routines and constitute a firm’s ability to ‘achieve new and innovative forms of competitive advantage’ (p. 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 (2000) 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’ (p. 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 (2000) argue that dynamic capabilities exhibit a ‘greater equifinality, homogeneity, and substitutability’ (p. 1106) than usually assumed in the resourced-based view of the firm. Additionally, they identify ‘significant commonalities across firms’ (p. 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 predicatable 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.

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 Strategic Management 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).

Most (albeit not all) works in the third school draw on ‘theories of social practices’ (e.g., Bourdieu, 1990; Giddens, 1984; Schatzki et al., 2001) as result of an increased engagement of organizational and management scholars with the ‘practice turn’ (Schatzki et al., 2001) in sociology (Whittington, 1997, 2006). 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 behaviour
(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; for recent empirical investigations of this relationship see for example Bruns, 2009 as well as Essén, 2008).

(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 interrelated 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).

Towards further micro-foundations of organizational routines: The Strategy-as-Practice School

Call for further micro-foundations

Against the backdrop of the multitude of literature on organizational routines, Felin and Foss (2004, 2005, 2006, 2009) identify central theoretical problems in the current state of the art. They trace these explanatory shortcomings 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 (Foss, 2007; see also Regnér, 2008). Due to the fact that organizational routines and capabilities lack an individual-level theoretical ‘anchor’, definitional and operational problems persist in the existing literature and routines ‘can be virtually anything at the organizational level’ (Felin and Foss, 2005: 444). Furthermore, there is a conflict between a collectivistic mode of theorizing and recent attempts of individual-level measurement in form of a ‘data-theory disconnect’ (Felin and Foss, 2005: 444). These terminological and operational problems of the routine construct, however, result from ‘a more fundamental problem’: Its lack of profound ‘micro-foundations’ (Felin and Foss, 2004: 2). ‘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.

Referring to Felin and Foss (2004), the problem of missing micro-foundations of the routine concept can be traced back to Nelson and Winter’s (1982) seminal and most cited work. Although their Evolutionary Theory has been assigned to the Organization Theory School in our bibliometric analysis (see Figure 1), it is a founding contribution to the capabilities-based view in the Strategic Management School as well (Abell et al., 2008: 293). In contrast to earlier behavioralist works on organizational routines (Cyert and March, 1963; March and Simon, 1958) that methodologically take an individualistic approach to organizations and are based on Simon’s (1955) individual level assumption of ‘bounded rationality’, Nelson and Winter (1982) go ‘beyond behavioralism’ (Felin and Foss, 2004: 5). In their routine concept, Nelson and Winter (1982) link the bounded rationality of human agents with the notion of ‘skills’ and the storage of tacit knowledge. Nevertheless, they ground their ‘theory of endogenous firm-level heterogeneity’ (Felin and Foss, 2004: 8) rather
on the concept of ‘skills’ than on ‘bounded rationality’ and use this analogy to establish a link between the individual and organizational level of behavior. However, this ‘link is developed in a metaphorical (rather than theoretical) manner’ (p. 9) and has been literally adopted by succeeding generations of routine scholars (Felin and Foss, 2005).

Additionally, after Nelson and Winter (1982), routine scholars both in the Organization Theory and in the Strategic Management School have applied a ‘strong form’ of collectivism (Felin and Foss, 2005: 442). In terms of a historical ‘theoretical drift’, subsequent routine scholars have moved the focus of attention ‘(1) from the individual to the collective level, (2) from intentional behavior to unintentional behavior, and (3) from the observable to the non-observable dimension’ (Felin and Foss, 2009: 157). As opposed to behavioralism, organizational routines are no longer seen as ‘concrete, explicit rules’ as a product of human agents’ conscious design. Instead, the affiliated collectivistic routine concept highlights the quasi-automatic ‘non-intentional, tacit, emergent, and non-observable’ dimensions (p. 6; see also Felin and Foss, 2009) and to a great extent disregards the importance of individual ‘cognition and organizational hierarchy’ (Gavetti, 2005: 599). Since then, scholars of the Organization Theory and the Strategic Management School have been adopting the problems of collectivistic theorizing, ignoring central individual-level considerations and blinding out ‘that it is individuals rather than organizations that act and behave’ (Felin and Foss, 2004: 15). Felin and Foss (2004, 2005) emphasize that organizational theorists and strategic management scholars often interpret organizations as ‘strong situations’ (Davis-Blake and Pfeffer, 1989) with ‘homogeneous’ and ‘malleable’ organizational members that are ‘randomly distributed into organizations’ (Felin and Foss, 2004: 21; Felin and Hesterley, 2007: 196).

However, the origins and heterogeneity of organizational routines as a source of competitive advantage and drivers of individual-level and organizational-level outcomes cannot be reduced to context-specific and path-dependent previous routines or meta-routines resulting from heterogeneous environmental influences, distinctive initial circumstances or a
firm’s idiosyncratic history and experience (Felin and Foss, 2004, 2005). The argument that ‘firms tend to do what they have done before’ is not satisfactory (Felin and Foss, 2004: 20, with reference to Kogut and Zander, 1995: 425). Instead, the theoretical analysis of an organization’s capability heterogeneity has to start with the analysis of individual-level considerations and mechanisms because after all organizations ‘are made up of individuals’ that matter (Felin and Foss, 2005: 441). Individuals that join organizations as organizational members enter the firm equipped with distinctive a priori knowledge and dispositions as well as individual ‘experiences, characteristics, talents, and abilities’ (Felin and Foss, 2004: 15) that ‘cannot be brushed aside’ (p. 16).

From a more individualistic perspective (see for example Abell et al., 2008; Felin and Foss, 2006; Felin and Hesterley, 2007; Gavetti, 2005), organizational routines and capabilities can be seen as shaped by the cognition, abilities and actions of human agents that influence the organizational capability development and heterogeneity. The individuals and not the organization as an abstract collective construct react to different environmental constellations in a specific organizational role. Their skills and services represent the ‘key differential input’ that leads to varieties in firm-level outcomes and competitive advantage that are ‘nested within the individual-level’ (Felin and Foss, 2004: 22). This perspective 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: ‘The deep structure providing the antecedent to collective surface structure is what we label the “who” question’ (p. 20). ‘How things are done in organizational settings, both in terms of structure and overall efficiency or creativeness, is a function of who is doing’ (p. 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. Starting from this practice-theoretical backdrop, the ‘who’ question raised by Felin and Foss (2004, 2005) leads us directly to a recently established micro-perspective in the management field: the Strategy-as-Practice School. Although this approach (Jarzabkowski, 2005; Jarzabkowski et al., 2007; Johnson et al., 2003; Whittington, 1997, 2006) 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. In the following, we outline how the Strategy-as-Practice School can contribute to the concept of organizational routines by enhancing its micro-foundations.

Starting from the ‘who’ question: The Strategy-as-Practice School

In the Strategy-as-Practice School, the central unit of analysis is not the routine concept itself but the ‘strategy practitioners’ and their day-to-day ‘strategizing’. 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), the central aim of strategy-as-practice scholars 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’ (p. 6). Instead of being the property of an organization, strategy ‘is conceptualized as a situated, socially accomplished activity’ (p. 7). Johnson, Melin and Whittington (2003), who shift scientific attention to the micro-level phenomena, introduce the term of ‘strategizing’ to describe the ‘doing of strategy’. In this view, a successful strategy is not a static capability or a stable disposition of an organization as seen in today’s management literature; strategy rather implicates a dynamic component: It is an activity that can be better described as a process of strategizing and as an ‘ongoing social accomplishment, constituted
and reconstituted as actors engage the world in practice’ (Orlikowski, 2002: 249). The theoretical starting point of a strategy-as-practice approach can, thus, be directly linked to the ‘who’ question raised by Felin and Foss (2004, 2005): Its ‘central research interest focuses on explaining who strategists are, what they do and why and how that is consequential in socially accomplishing strategic activity’ (Jarzabkowski et al., 2007: 19). Strategists make, shape and execute the firm’s strategy (Whittington, 2006) and related organizational assets that provide for competitive advantage such as organizational routines and capabilities.

Against this general theoretical backdrop, a strategy-as-practice perspective offers central contributions to current strategy ‘content research’ such as the resource-based and capabilities-based view of the firm with its macro-level routine constructs: A strategy-as-practice approach can shed light on the ‘dynamic process’ (Regnér, 2008: 565) through which organizational routines and capabilities come into being and on the ‘underlying organizational and managerial activities and mechanisms’ that ‘still remain unclear’ (p. 566). In the following, we will show how the three areas for future research on the micro-foundations of organizational routines – ‘(1) the origins of routines, (2) intentionality and exceptions, and (3) aggregation and emergence’ (p. 163) – highlighted by Felin and Foss (2009) can be underpinned by practiced-based arguments.

(1) The development of a causal understanding of the origins of organizational routines and capabilities is fundamental and their existence should not be taken for granted (Felin and Foss 2009 with reference to Winter in Murmann, Aldrich, Levinthal and Winter, 2003: 29 as well as Zollo and Winter, 2002: 341). A theoretical understanding of underlying mechanisms such as the acting individuals’ decisions and choices that are subject to their beliefs, expectations and creativity is fundamental for future strategic management research that is concerned with intentional firm heterogeneity and superior firm performance. Therefore, the focus of analysis should lie on nested individual-levels and antecedents (Felin and Foss, 2009; Felin and Hesterley, 2007) of organizational routines and capabilities rather
than on their pre-determination by environmental conditions. In this connection, a strategy-as-practice approach emphasizes the recursive constitution of strategy formulation (as result of manager’s intentional deliberation) and strategy formation (as result of aggregated and emergent managerial activity on various organizational levels) (Jarzabkowski, 2005; Regnér, 2008). The process of strategy formation and capability build-up is seen as being shaped by a firm-specific configuration of multiple factors: formal and informal organizational structures, symbolic, socio-cultural and material contexts, certain organizational members with unique cognitive frames and interests that are intertwined in interdependent organizational interactions (Regnér, 2008). In taking these structural, contextual and cognitive ‘activity configurations’ as central units of the analysis the strategy-as-practice 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.

(2) To locate the choice-related origins of organizational routines and capabilities, the initial conditions have to be considered in which managers and employees respond to new situations and unexpected environmental problems that require the intentionality, rationality, creativity and imagination of the acting individuals. 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). A strategy-as-practice approach can, thereby, account for ‘co-existing strategy logics’ of repeated activity patterns based on actors’ ‘habituated tendencies and internalized dispositions’ (Chia and MacKay, 2007: 217), on the one hand, and the innovative behavior of individual actors, on the other hand. Strategy-as-practice, thus, has the potential to address both: the question of organizational stability as well as individual ‘creativity and imagination’ (Regnér, 2008: 579). ‘This is because this approach is characterized by the fundamental

Furthermore, the strategy-as-practice perspective calls for a broader conceptualization of who a strategist is than offered by the dominant definitions in the strategic management literature. A strategy-as-practice research agenda goes beyond top managers, their decision making and the formulation of strategies. It considers multiple strategists as relevant and focuses on the implementation of strategies through a wider group of important individuals on the level of middle management and the operational base as well as peripheral and external actors like strategy consultants and investment bankers. So the strategy-as-practice perspective refocuses on the human agents and the social dynamics of strategizing to analyze what strategy practitioners actually do while they enact collective constructs such as firm strategies or organizational capabilities (Jarzabkowski et al., 2007). The focus on multiple strategists and their interactions can, thereby, facilitate the analysis of individual creativity, imagination and chance underlying organizational capability build-up and development (Regnér, 2008).

(3) Finally, to answer the question how individual decision-making and choice behavior emerge and aggregate within organizational interactions (Felin and Foss, 2009), the understanding of the macro-micro-link has to be strengthened. Intended and unintended feedback loops between interdependent actions of individuals lead to the emergence of organizational routines and a specific social order: e. g. Toyotas’ production workers that refer to established ‘total quality’ rules and as a result tacitly aggregate their tasks into new organizational routines (Campbell-Hunt, 2007). A practice-based perspective can, thus, account for the ‘strategic co-evolution’ (Regnér, 2008: 577) of ‘structural properties and agential actions’ (p. 582). In the constitution of organizational contexts and structures (macro) – that enable and restrict the intentional and creative actions of organizational members
(micro) –, individuals draw upon firm-specific rules and resources and, thus, bring these structures to life (Giddens, 1984). ‘As a result, it is possible for’ the Strategy-as-Practice School ‘to synthesize the constraining and enabling sides of capabilities and practices’ (Regnér, 2008: 577) and to underpin the macro-level routine and capability concepts with an analysis of the endogenous origins on the individual- and group-level.

Conclusion

In this paper, we have reviewed the management and organization literature on routines and have delineated how practice-based approaches can advance the concept by further micro-foundations. Due to the fast-growing number of publications on organizational routines, we applied a bibliometric approach which 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 Strategic Management 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. Departing from these theoretical foundations, however, both the Strategic Management Schools 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.
In contrast, works in the third cluster – the Practice Theory School – have recently introduced a practice-based approach which provides some promising starting points for theoretically more thorough micro-foundations of organizational routines. This emergent school is still small and has not yet left adolescence in terms of internal coherence. Therefore, we have argued that this approach would benefit from complementary and synergistic research in the Strategy-as-Practice School which has been unconnected to organizational routines so far. We have shown how this approach can advance the concept of routines by meeting crucial points of a research agenda for further micro-foundations: In terms of origins, it facilitates the analysis of situated activity configurations of organizational routines and capabilities and underlying social and managerial mechanisms. In highlighting the choice-related origins of routines and capabilities, it draws attention to the actor’s intentionality and creativity in dealing with unexpected problems and exceptional phenomena. A strategy-as-practice approach especially accounts for 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. Future theoretical and empirical research on organizational routines should, therefore, take up the challenge to get involved with the rapidly growing strategy-as-practice perspective.
<table>
<thead>
<tr>
<th>No</th>
<th>Symbol</th>
<th>Label</th>
<th>Factor Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eigenvalue</td>
</tr>
<tr>
<td>1</td>
<td>▼</td>
<td>Strategic Management</td>
<td>19.015</td>
</tr>
<tr>
<td>2</td>
<td>△</td>
<td>Organization Theory</td>
<td>14.532</td>
</tr>
<tr>
<td>3</td>
<td>♦️</td>
<td>Practice Theory</td>
<td>4.556</td>
</tr>
</tbody>
</table>
Figure 1: Co-Citation Network
Appendix: Documents in Co-Citation Analysis

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


