Knowledge Management in Strategic Alliances: A Review of Empirical Evidence

Matthias Meier

Freie Universität Berlin, Institute of Management, Garystr. 21, D-14195 Berlin, Germany
Corresponding author email: matthias.meier@fu-berlin.de

Knowledge-related and organizational learning processes in alliances have received much attention throughout the last 25 years. The field has generated a rapidly growing body of empirical evidence on how knowledge is managed in alliances. However, the sphere is highly complex, fragmented, incoherent, and heterogeneous in terms of the theoretical approaches applied. This paper presents an integrative and organizing framework for the empirical literature on knowledge management in strategic alliances. It illustrates how the knowledge management outcomes of knowledge creation, transfer and application are determined by four distinct sets of factors: knowledge characteristics, partner characteristics, partner interaction, and active knowledge management. Based on this framework, this review analyses and integrates empirical evidence in order to identify where findings converge and where results conflict. So far, research has focused strongly on singular interrelations between these four sets of factors and the transfer of knowledge. Conversely, the questions of how knowledge is created, retained, retrieved and applied and how the interplay of the different factors affects knowledge management in strategic alliances remain widely unexplored. The review concludes with a summary of the current state of the art in empirical research and discusses some promising avenues for future investigation.

Introduction

Over the past 25 years, the number of strategic alliances has grown considerably (e.g. Anand and Khanna 2000; Dyer et al. 2004; Grant and Baden-Fuller 2004). In the same vein, the number of related studies in the management literature has increased tremendously. Various motives for firms entering into alliances have been discussed: in order to gain market power, reduce and share risks and costs, increase efficiency, and access and acquire external knowledge (Bleeke and Ernst 1991; Grant and Baden-Fuller 2004; Hennart 1988; Kogut 1988; Osland and Yaprak 1995; Powell 1987). As knowledge emerges as a central resource critical to the development of capabilities, products and services, alliances are being recognized increasingly as an organizational form to acquire and internalize the knowledge needed in the quest for competitive advantage (Grant 1996b; Inkpen 1996; Kale et al. 2000; Simonin 2004; Spender 1996). Therefore, scholars have asserted that processes such as the creation, transfer and application of knowledge contribute significantly to alliance survival, and organizational and alliance performance (e.g. Hamel 1991; Inkpen and Beamish 1997; Kogut and Zander 1992; Lyles and Salk 1996; Nonaka 1994; Steensma and Lyles 2000; Tsang et al. 2004).

Knowledge management in alliances has thus become a critical management task (Collins and Hitt...
2006), and a key research area within the alliance literature (Hamel 1991; Inkpen and Crossan 1995; Kale et al. 2000; Khanna et al. 1998; Lane et al. 2001; Mowery et al. 1996; Simonin 2004). This literature is characterized by a wide array of empirical contexts, theoretical perspectives and methods. For example, theories include the resource-based view, the knowledge-based view, technology management, economics of innovation, transaction cost economics and the organizational learning perspective (Kale et al. 2000; Mowery et al. 1996; Spender and Grant 1996). Owing to the interdisciplinary nature of the phenomenon, the field is cross-disciplinary, complex and fragmented, and in need of a coherent framework to map it.

The purpose of this paper is to develop an integrative framework which organizes existing empirical evidence on knowledge management in strategic alliances. Furthermore, this paper aims to identify areas of convergence, areas of divergence and salient research gaps.

The paper is set out in four sections. First, a framework is developed to organize the literature and empirical evidence on knowledge management in alliances. Secondly, the search methodology applied in this review is outlined. Thirdly, an overview of key aspects of knowledge management emerging from empirical work is provided. Areas of convergence are summarized, and ambiguous findings are translated into promising research questions. Finally, the last section provides an overview of the key findings and an outlook on future research.

The framework

Knowledge resources have become critical for the achievement of competitive advantage in today’s highly dynamic business environment (e.g. Collins and Hitt 2006). In particular, the resource-based view (Barney 1991) highlights the central role of intangible resources in gaining a competitive advantage. Extending the resource-based view, the knowledge-based view of the firm focuses especially on knowledge as the strategically most important resource (Grant 1996b). At the core of a knowledge-based theory of the firm is the idea that firms are platforms for the creation and application of knowledge (Spender 1996). Inkpen (2000, p. 1020) builds on this idea and states that ‘the essence of the firm is its ability to create, transfer, assemble, integrate, and exploit knowledge assets, a process that has come to be known as knowledge management’.

In the literature, knowledge management is described using varying sets of knowledge processes. However, these definitions differ only slightly, in terms of number and the labelling of processes rather than in the underlying concepts (Alavi and Leidner 2001). Thus, a classification of knowledge processes has to be viewed as more informative than definitive, since processes are interlaced and not easily separable.1 For didactic reasons, this review uses a classification into knowledge creation, transfer and application. This classification comprehends knowledge management across the entire value chain and provides a categorization suitable to organize existing empirical evidence on the topic in hand. While knowledge creation and application have been the central processes in formulating the knowledge-based theory of the firm (cf. Spender 1996), knowledge transfer has been at the focus of existing alliance research (cf. Grant and Baden-Fuller 2004).

The notion of knowledge creation is associated with the development of new or novel knowledge (e.g. Argote et al. 2003; Spender and Grant 1996; Teece 1998). Nonaka (1994) depicts knowledge creation from an organizational perspective as an amplification process in which individuals create knowledge that disseminates throughout the organization. In the alliance context, knowledge creation describes the joint development of new knowledge by alliance partners (cf. Inkpen 1996; Khanna et al. 1998; Lubatkin et al. 2001; Reid et al. 2001). Compared with this, knowledge transfer refers to the transmission process whereby existing knowledge is transferred within or across firm boundaries (e.g. Collins and Hitt 2006). While organizations receive knowledge through knowledge creation and transfer (cf. de Holan and Phillips 2004), knowledge application describes how such knowledge is embedded and used to create value (Grant 1996a; Lane et al. 2001).

In an era of increasing globalization and knowledge-based competition, strategic alliances are

---

1The attributional problem described here is common for the academic discussion of knowledge management. For example, the organizational learning reasoning understands knowledge processes in a more integrative manner and does not always clearly distinguish processes (e.g. Inkpen and Crossan 1995). In the remainder of this review, I will interpret on the substantive ideas captured by the reviewed studies rather than on the (arbitrary) labels found in these works.
discussed as an important vehicle for these knowledge management processes (Hamel 1991; Khanna et al. 1998). Although firms enter alliances for a variety of reasons (see e.g. Kale et al. 2000), this review focuses on learning and knowledge-related aspects and understands strategic alliances as voluntary arrangements between firms with the objective of jointly creating, transferring or applying knowledge to commercial ends.²

So far, research on knowledge management in alliances has attempted primarily to explain the outcomes of related knowledge management processes. But what are knowledge management outcomes? Reid et al. (2001) cite the accumulation of knowledge assets such as patents, new products or technologies as one possible embodiment of knowledge creation in alliances.³ Hence, knowledge outcomes manifest themselves in knowledge assets and are, according to Teece (1998), the underpinnings of firm competences, which in turn make firms capable of offering products and services to the market. Thus, knowledge management outcomes assess the extent to which knowledge management processes result in the accumulation or dissolution of knowledge assets.

There is a broad consensus that intra- and interorganizational knowledge outcomes are basically determined by three sets of factors: the characteristics of knowledge, those of the alliance partners, and those of their interaction and relationship (cf. Argote et al. 2003; Inkpen 2002; Simonin 1999b, 2004; Szulanski 1996). While this well-established classification deals in particular with the question of what factors influence knowledge management outcomes, more and more attention is now being given to the mechanisms that affect knowledge management outcomes, i.e. the question of how and why certain contextual factors affect organizational learning and knowledge management outcomes (cf. Argote et al. 2003). If knowledge management is understood as a conscious co-ordination and monitoring of knowledge processes (cf. Inkpen 2000), the means and measures implemented describe how firms actively manage knowledge. The governance choice (Kale et al. 2000) and a wide range of specific organizational routines, control and co-ordination mechanisms (e.g. Berdrow and Lane 2003) thus constitute a fourth set of factors, which has not been covered by the established categorization so far. The way in which firms achieve strategic and operational integration, how they develop a valuable alliance relationship, and how mechanisms vary according to the knowledge type handled are of utmost interest for practitioners and academics, however. To include this action-oriented aspect, these factors are incorporated under the heading of ‘Active Knowledge Management’.

In conclusion, this article proposes a framework that organizes empirical evidence around the two dimensions of knowledge management outcomes and determinants of knowledge management outcomes (Figure 1).⁴ This framework functions as a point of departure and clearly outlines the purpose of this review. The primary goal of this review is thus to investigate the empirically examined determinants affecting knowledge management outcomes in strategic alliances. The next section outlines the methodology applied in the review.

Methodology

Although a significant number of articles have been published on knowledge management in strategic alliances, there is still no systematic and comprehensive overview. Basically, this article follows the principles for systematic review suggested by Tranfield et al. (2003). In order to provide a systematic, transparent and replicable methodology, the review follows a number of stages:

(1) An initial list of keywords based on the author’s prior experience was discussed with a review panel of three experienced academics in the field of knowledge management and alliance

---

²While Gulati (1998, p. 293) broadly defines ‘strategic alliances as voluntary arrangements between firms involving exchange, sharing, or co-development of products, technologies or services’, this review adopts a knowledge-based perspective and refers to the respective underlying knowledge processes.
³Nonaka et al. (2006) cite routines, know-how, concepts, patents, technologies, designs and brands as possible examples for knowledge assets.
⁴The framework presented in this article is to a large extent inspired by the framework of Argote et al. (2003), which organizes the literature on learning and knowledge management in organizations. Due to the different research interest of this article, in particular, the review of empirical evidence on knowledge management in strategic alliances and for didactic reasons, the framework presented here is a revised version and partly differs from the original framework.
research. This discussion yielded a total of 25 keywords.  

(2) Search strings were constructed with the keywords identified in Stage (1) and discussed with the review panel. This discussion resulted in a total of 110 search strings. Examples are: ['Alliance*' AND 'knowledge access*'], ['Interorgan* AND 'knowledge creat*'], ['Joint venture*' AND 'knowledge appl*'], ['Cooperation' AND 'knowledge transfer'], ['Dyad*' AND 'learning'].

(3) The review was limited to peer-reviewed journal articles, i.e. leaving out books, book chapters and conference proceedings. As the IJMR stands for authoritative statements on research in the field of business and management (Armstrong and Wilkinson 2007), the review panel suggested honouring this claim by confining the search to high-quality journals in the domain of business and management. Following Armstrong and Wilkinson (2007), the Social Science Citation Index (SSCI) was used to identify journals for inclusion. Journals listed in the subject categories business and management of the ISI Web of Knowledge with a 5-Year-Impact-Factor bigger than 1.5 were included (for journals established later than 2003, a cut-off value of 1 for the current Impact Factor was chosen). This selection yielded a list of 83 journals.

(4) The EBSCO host (Business Source Premier) was the main database for the literature search. Journals not available on EBSCO were either searched manually or via ScienceDirect. The search strings developed in Stage (2) were used to search for the title, abstract and author-provided keywords. A total of 365 articles were retrieved.

(5) The 365 articles were reviewed in order to develop exclusion and inclusion criteria for the review (cf. Pittaway et al. 2004). These (see Appendixes 1 and 2) were discussed with the review panel and subsequently used to review the initial list. The titles and abstracts of the 365 articles were reviewed against the exclusion (229 articles excluded) and inclusion criteria (67 articles excluded), leaving 71 articles as relevant.

(6) In order to assess the search strategy and to counter its one-dimensionality, the citation records of the 10 most frequently cited articles (total citations within the EBSCO host) were reviewed. This procedure yielded 684 additional articles for revision. The articles were reviewed according to the exclusion and inclusion criteria (Appendixes 1 and 2). At this stage, conceptual and theoretical articles were excluded, and only articles with an empirical basis were kept. This procedure provided ten additional articles, one case study and nine quantitative empirical studies.

---

Keywords identified by the review panel: alliance, co-operation, collaboration, dyad, exploitation/exploration, interorganizational, joint venture, knowledge access, knowledge acquisition, knowledge activity, knowledge activist, knowledge application, knowledge connection, knowledge creation, knowledge flow, knowledge generation, knowledge governance, knowledge management, knowledge retaining, knowledge retention, knowledge sharing, knowledge stock, knowledge transfer, learning

---

*In cases where the title and abstract were not informative enough to include or exclude the article straightaway, articles were downloaded and assessed in detail.*
Altogether, the search methodology yielded a total of 81 articles, of which 22 are conceptual/theoretical in nature, four provide exploratory analysis, 11 rely on qualitative methods, and 44 articles contain quantitative methods. Furthermore, a number of additional articles cited in the reviewed studies are included, as they contribute essential concepts that are necessary to make sense of the evidence base and to structure the research findings.

Besides an organizing framework, Figure 1 also offers a concise overview of the main areas of research in the field. While Figure 2 provides a detailed grid that classifies the empirical findings of the reviewed articles into the framework, Figure 1 aggregates the research on the interrelations between knowledge management outcomes and the determinants reviewed. The circles in Figure 1 represent the number of studies which have analysed these particular interrelations. For example, the first circle in the second row illustrates that 16 studies contain analyses on the influence of knowledge type on knowledge transfer. Furthermore, a detailed analysis of Figure 2 provides information on every single study and their respective research design (i.e. explorative, qualitative, quantitative). It becomes obvious that research has focused strongly on the outcome of knowledge transfer. Here, in particular, scholars have analysed how partner characteristics, partner interactions and measures of active knowledge management influence knowledge transfer. Although a lot of theoretical thinking has been devoted to the interrelation between different knowledge types and knowledge management outcomes, empirical verification clearly lags behind. Figure 2 further demonstrates that the different research designs are not biased towards a certain interrelationship, but are relatively similarly distributed across the research areas.

To sum up, only a fraction of the articles reviewed empirically examine the way in which knowledge is created and applied in alliances. Instead, the main interest centres on how the partner characteristics, their interaction and the actions they take to manage knowledge can influence knowledge transfer in alliances relationships.

In the following, the four sets of determinants: ‘knowledge characteristics’, ‘partner characteristics’, ‘partner interaction’ and ‘active knowledge management’ are used to group the discussion of the studies. First, the four sub-sections aim to analyse and synthesize the key findings. Secondly, this analysis is used to derive promising research questions.

**Knowledge management in alliances – Empirical evidence**

**Knowledge characteristics**

The interest in defining and classifying knowledge dates back to early Greek philosophers such as Aristotle and Plato (e.g. Grant 1996a; Spender 1996). Ever since, knowledge has been an elusive concept and a broad range of different classifications has been proposed in management research (Birkinshaw et al. 2002). Rooted in resource-based logic, the theory of Reed and DeFillippi (1990) allows for an aggregation of the pertinent knowledge characteristics, based on the concept of causal ambiguity. The causal ambiguity of a firm’s skills and resources raises barriers to imitation and, thus, contributes to competitive advantage. Furthermore, in terms of knowledge, it describes the inability of firms to understand and imitate the knowledge constituting the competitive advantage of a competitor (cf. Reed and DeFillippi 1990; Simonin 1999a,b; Szulanski 1996). In the literature, the knowledge dimensions of tacitness, complexity and specificity are discussed as sources of competitive advantage and ambiguity (Reed and DeFillippi 1990).

The distinction between tacit and explicit knowledge goes back to Polanyi (1966). He describes explicit knowledge as knowledge that can be codified in a formal and systematic language, while tacit knowledge is non-verbalizable, intuitive and unarticulated. Nonaka (1994) elaborates on this further, maintaining that tacit knowledge is context-specific, difficult to articulate, personally bounded, and deeply rooted in action. Since highly explicit knowledge is easy to codify, its transfer is comparatively easy. By contrast, the organizational embeddedness of tacit knowledge makes codification difficult, thus impeding its transfer (Kogut and Zander 1992). Zander and Kogut (1995) find that the degree of knowledge codification and teachability determines how fast capabilities can be transferred. In basic terms, tacitness determines the ease of knowledge transfer (Grant et al. 2002). Rooted in resource-based logic, the theory of Reed and DeFillippi (1990) allows for an aggregation of the pertinent knowledge characteristics, based on the concept of causal ambiguity. The causal ambiguity of a firm’s skills and resources raises barriers to imitation and, thus, contributes to competitive advantage. Furthermore, in terms of knowledge, it describes the inability of firms to understand and imitate the knowledge constituting the competitive advantage of a competitor (cf. Reed and DeFillippi 1990; Simonin 1999a,b; Szulanski 1996). In the literature, the knowledge dimensions of tacitness, complexity and specificity are discussed as sources of competitive advantage and ambiguity (Reed and DeFillippi 1990).

The distinction between tacit and explicit knowledge goes back to Polanyi (1966). He describes explicit knowledge as knowledge that can be codified in a formal and systematic language, while tacit knowledge is non-verbalizable, intuitive and unarticulated. Nonaka (1994) elaborates on this further, maintaining that tacit knowledge is context-specific, difficult to articulate, personally bounded, and deeply rooted in action. Since highly explicit knowledge is easy to codify, its transfer is comparatively easy. By contrast, the organizational embeddedness of tacit knowledge makes codification difficult, thus impeding its transfer (Kogut and Zander 1992). Zander and Kogut (1995) find that the degree of knowledge codification and teachability determines how fast capabilities can be transferred. In basic terms, tacitness determines the ease of knowledge transfer (Grant et al. 2002). Rooted in resource-based logic, the theory of Reed and DeFillippi (1990) allows for an aggregation of the pertinent knowledge characteristics, based on the concept of causal ambiguity. The causal ambiguity of a firm’s skills and resources raises barriers to imitation and, thus, contributes to competitive advantage. Furthermore, in terms of knowledge, it describes the inability of firms to understand and imitate the knowledge constituting the competitive advantage of a competitor (cf. Reed and DeFillippi 1990; Simonin 1999a,b; Szulanski 1996). In the literature, the knowledge dimensions of tacitness, complexity and specificity are discussed as sources of competitive advantage and ambiguity (Reed and DeFillippi 1990).

The distinction between tacit and explicit knowledge goes back to Polanyi (1966). He describes explicit knowledge as knowledge that can be codified in a formal and systematic language, while tacit knowledge is non-verbalizable, intuitive and unarticulated. Nonaka (1994) elaborates on this further, maintaining that tacit knowledge is context-specific, difficult to articulate, personally bounded, and deeply rooted in action. Since highly explicit knowledge is easy to codify, its transfer is comparatively easy. By contrast, the organizational embeddedness of tacit knowledge makes codification difficult, thus impeding its transfer (Kogut and Zander 1992). Zander and Kogut (1995) find that the degree of knowledge codification and teachability determines how fast capabilities can be transferred. In basic terms, tacitness determines the ease of knowledge transfer (Grant et al. 2002). Rooted in resource-based logic, the theory of Reed and DeFillippi (1990) allows for an aggregation of the pertinent knowledge characteristics, based on the concept of causal ambiguity. The causal ambiguity of a firm’s skills and resources raises barriers to imitation and, thus, contributes to competitive advantage. Furthermore, in terms of knowledge, it describes the inability of firms to understand and imitate the knowledge constituting the competitive advantage of a competitor (cf. Reed and DeFillippi 1990; Simonin 1999a,b; Szulanski 1996). In the literature, the knowledge dimensions of tacitness, complexity and specificity are discussed as sources of competitive advantage and ambiguity (Reed and DeFillippi 1990).
<table>
<thead>
<tr>
<th>Study</th>
<th>Methodology</th>
<th>Creation</th>
<th>Transfer</th>
<th>Application</th>
<th>Knowledge Characteristics</th>
<th>Partner Characteristics</th>
<th>Partner Interaction</th>
<th>Active Knowledge Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beamish &amp; Berdrow (2003)</td>
<td>EX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Becerra, Lunan &amp; Huener (2008)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berdrow &amp; Lane (2003)</td>
<td>QL</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chen (2004)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collins &amp; Hitt (2006)</td>
<td>QL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dhanaraj, Lyles, Steenma &amp; Tihanyi</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evanghelista &amp; Hau (2009)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faems, Janssens, &amp; van Looy (2007)</td>
<td>QL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gil &amp; de la Fé (1999)</td>
<td>QL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Griffith, Zeybek &amp; O'Brien (2001)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grunwald &amp; Kieser (2007)</td>
<td>QL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hau &amp; Evanghelista (2007)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inkapen (1996)</td>
<td>QL</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inkapen (2005)</td>
<td>QL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inkapen &amp; Dinur (1998)</td>
<td>QL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inkapen &amp; Pien (2006)</td>
<td>QL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Janowicz-Panaitan &amp; Noorderhaven (2008)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jiang &amp; Li (2008)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jiang &amp; Li (2009)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kale, Singh &amp; Perlmutter (2000)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lam (1997)</td>
<td>QL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lane &amp; Lubatkin (1998)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lane, Salk &amp; Lyles (2001)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lee &amp; Cavusgil (2006)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lee, Johnson &amp; Grewal (2008)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Li, Liu, Li &amp; Wu (2008)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lyles &amp; Salk (1996)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mowery, Oxley &amp; Silverman (1996)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muthusamy &amp; White (2005)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nielsen (2007)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nootbeboom, Haverbeke, Duysters, Gilsing &amp; van den Oord (2007)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norman (2004)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxley &amp; Wada (2009)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rindfleisch &amp; Moorman (2001)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shenkar &amp; Li (1999)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Si &amp; Bruton (2005)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simonin (1997)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simonin (1999a)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simonin (1999b)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simonin (2004)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steenma &amp; Lyles (2000)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steenma, Tihanyi, Lyles &amp; Dhanaraj (2005)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taylor (2005)</td>
<td>EX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thue Anh, Baughn, Mith Haag &amp; Neupert (2006)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tsang (2002)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tsang, Nguyen &amp; Erramilli (2004)</td>
<td>QN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yan &amp; Child (2002)</td>
<td>EX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** EX = Explorative; QL = Qualitative; QN = Quantitative.
Knowledge Management in Strategic Alliances

Complexity arises if a wide range of knowledge is integrated into organizational routines, technologies, and individual- or team-based experiences (cf. Grant 1996a; Reed and DeFillippi 1990). Zander and Kogut (1995, 79) argue that knowledge ‘is more complex when it draws upon distinct and multiple kinds of competencies’. Specificity is essentially borrowed from transaction cost economics and refers to investments in skills and resources which are specific to certain transaction relations (cf. Reed and DeFillippi 1990). In a similar way to tacitness, both complexity and specificity contribute to the ambiguity of knowledge, which in turn impedes the transfer of knowledge.

Although qualitative research confirms the hindering effect of tacitness on knowledge transfer (e.g. Hamel 1991; Inkpen 2000; Inkpen and Pien 2006), a widely accepted instrument of measurement is still lacking (cf. Becerra et al. 2008). However, several studies have provided original scales to measure knowledge tacitness (cf. Becerra et al. 2008; Chen 2004; Hau and Evangelista 2007; Simonin 1999a,b, 2004). Chen’s (2004) study finds support for the assumption that the degree of tacitness determines how easily knowledge is transferred. In contrast, Simonin (1999a,b, 2004) argues and provides evidence that tacitness does not have a direct influence on knowledge transfer, but is mediated by knowledge ambiguity. Although Simonin (1999a,b, 2004) proposes a mediation model, his work reaffirms the importance of knowledge tacitness as a decisive factor, which complicates the transfer of knowledge in alliances. In comparison, specificity is found to be insignificant, and the influence of complexity varies according to certain moderators (Simonin 1999a,b). Knowledge complexity increases ambiguity in younger alliances, for companies with lower levels of collaborative know-how and for firms allocating fewer resources to the knowledge transfer process. Therefore, Simonin (1999b) argues that firms are capable of actively facilitating knowledge transfer by reducing the complexity associated with knowledge.

So far, research has been preoccupied with tacitness as a knowledge characteristic (cf. Dyer and Nobeoka 2000; Grant 1996a,b; Thuc Anh et al. 2006), and the way in which the complexity and specificity of knowledge directly affects knowledge management processes has remained relatively unclear. The difficulty in constructing appropriate instruments of measurement for knowledge characteristics such as tacitness, complexity, and specificity is explained by their interrelations with ambiguity. Knowledge that is embedded in various levels of an organization (cf. Inkpen and Dinur 1998), difficult to articulate, deeply rooted in action, complex and specific evades straightforward detection.

Although a mutually exclusive distinction of knowledge into a tacit and an explicit dimension supports theoretical argumentation, the extreme types of completely tacit or explicit knowledge will be the exception (cf. Grant 1996a,b; Inkpen and Dinur 1998). Knowledge always incorporates both aspects to a certain degree. Dhanaraj et al. (2004) and Evangelista and Hau (2009) find that the transfer of explicit knowledge is accompanied by the transfer of tacit knowledge. What are the theoretical implications stemming from knowledge characterized by a medium level of tacitness?

Comparatively little research has been conducted on the direct relationship between knowledge characteristics and knowledge transfer. However, existing evidence is contradictory. On the one hand, tacit knowledge promises competitive advantage (Lyles and Salk 1996; Thuc Anh et al. 2006) and therefore represents a major motive for alliances. On the other hand, tacit knowledge is difficult to transfer and inherently impedes capitalizing on the alliance. We are in need of more research to consolidate previous results and to further understanding of how knowledge characterized by different combinations of the aforementioned characteristics affects knowledge management in alliances.

Furthermore, research has examined knowledge transfer from a relatively general perspective. Informants are asked almost exclusively to evaluate – on relatively global scales – the extent to which technology, know-how or capabilities are transferred (cf. Lyles and Salk 1996). A more precise survey of single knowledge assets as confined entities of knowledge (see e.g. Szulanski 1996) would allow a more precise elaboration of the effects of knowledge characteristics on knowledge management processes.

Partner characteristics

A large amount of research effort has been invested into analysing how the characteristics of the alliance partners influence knowledge management outcomes. Besides relatively general factors such as firm size or nationality, scholars have discussed knowledge-related alliance motives (Grant and Baden-Fuller 2004), as well as learning intention and
absorptive capacity of partners (Hamel 1991) as specific factors having an influence on knowledge management outcomes.

Knowledge-related alliance motives. There is broad consensus among scholars that alliances serve as a conduit for inter-organizational knowledge creation, transfer and application (see, e.g. Inkpen and Crossan 1995; Kale et al. 2000; Khanna et al. 1998; Lane and Lubatkin 1998; Lane et al. 2001; Larsson et al. 1998; Lyles and Salk 1996; Mowery et al. 1996; Simonin 1999a,b, 2004). In their studies Larsson et al. (1998) and Grant and Baden-Fuller (2004) identify different research streams that explain why firms enter into alliances. While Grant and Baden-Fuller (2004) differentiate between the desires to access or acquire knowledge from the partner, Larsson et al. (1998) distinguish between the joint creation of completely new knowledge and the transfer of existing knowledge among partners. Thus, firms seem to be motivated either by the purpose of creating new knowledge jointly, transferring existing knowledge between partners, or combining existing complementary knowledge via joint knowledge application.9

The studies of Mowery et al. (1996) and Rothaermel and Deeds (2004) provide some empirical evidence to support these assumptions. Mowery et al.' s (1996) study reveals that knowledge bases of alliance partners either significantly converge or diverge during the relationship. The authors conclude that partners are motivated either by a desire to transfer knowledge (converging knowledge bases) or to increase knowledge specialization (diverging knowledge bases) and recombine their specific knowledge. Similarly, Rothaermel and Deeds (2004) find that knowledge-related alliance motives differ during different product development stages.

The insight that knowledge-related alliance motives differ might help explain better the ‘puzzle’ of so-called learning races (e.g. Kale et al. 2000; Khanna et al. 1998). Alliance partners might only face a serious trade-off between co-operation and competition if both are primarily motivated to transfer the partner’s existing knowledge.

Pérez-Nordtvedt et al. (2008) show that firms in possession of valuable tacit knowledge are particularly attractive as alliance partners. In addition, firms seem to be well aware of their attractiveness due to their tacit knowledge (Norman 2002). Norman’s (2002) study illustrates that firms are more protective about their knowledge as tacitness increases. Hence, co-operation might turn into competition if one firm is overly persistent in appropriating tacit knowledge from its partner while not sharing its own proprietary knowledge (cf. also Khanna et al. 1998). This relation might even be intensified if alliance partners are competitors in the same market. In contrast, joint knowledge creation and complementary application will exert lesser competitive pressures on the alliance, as partners are less concerned with unintended knowledge transfer. Grunwald and Kieser (2007) show that the software product development alliances in their case study are motivated by the recombination of the existing knowledge of alliance partners and that knowledge transfer is reduced to a minimum.

A future research question is that of how knowledge management differs with respect to the knowledge-related motives of partners. Knowledge-related alliance motives might have a signalling effect on the partner. Norman’s (2002) study provides some evidence that firms perceiving the high learning intents of their partners are in turn more protective of their knowledge. Investigation into how firms co-ordinate potentially unbalanced learning motives represents an exciting research field. Distinguishing different knowledge-related motives also has important methodological implications. Researchers need to be clear about the dependent variables of interest, since the success of co-specialization alliances is not how much knowledge has been transferred, but how successful alliance partners have been in jointly applying existing knowledge.

Learning intent. While the motives described above are the reasons for entering into alliances (Beamish and Berdrow 2003), learning intent describes the degree of determination to acquire (Tsang 2002) and internalize certain knowledge and skills from the partner and is thus a precondition of knowledge transfer in the post-formation alliance management phase (Hamel 1991). Norman (2002, pp. 180–181) defines learning intent as ‘the desire of the partner to gain access to and learn from the focal firm’. Pérez-Nordtvedt et al. (2008) demonstrate that

---

9Grant and Baden-Fuller (2004) present the example of the alliance between Daimler and Swatch to illustrate that alliances can also be motivated by the combination of existing knowledge bases, without necessarily having the desire to acquire the knowledge of the alliance partner. Cf. also Hau and Evangelista (2007) and Dussauge et al. (2000).
the degree of learning intent depends on the potential contribution of the partner’s knowledge to the firm’s own competitive advantage. This desire translates into the amount of resources that a firm is willing to contribute to knowledge-related processes. Consequently, the learning intent will affect knowledge management outcomes (Beamish and Berdrow 2003).

Pérez-Nordtvedt et al. (2008), Hau and Evangelista (2007) and Simonin (1999b) show that higher learning intent facilitates the transfer of knowledge. But how does a higher degree of learning intent lead to a more efficient and effective transfer of knowledge?

Wu and Cavusgil (2006) find that firms with a stronger learning intent are generally more committed to an alliance relationship. The learning intent of a firm is reflected in the commitment of the top management to deploy resources to the knowledge transfer process (Beamish and Berdrow 2003; Norman 2002; Simonin 2004; Tsang et al. 2004; Wu and Cavusgil 2006). Tsang (2002) analyses whether the learning intent of firms actually determines how many resources are deployed to the transfer process. In contrast to theoretical predictions, he finds that learning intent has only weak effects on resource allocation. In a similar vein, Simonin’s (2004) study provides no evidence that learning intent influences how resources are allocated to knowledge management practices. However, he finds a significantly positive effect of learning intent on knowledge transfer.

While previous findings focus on the link between learning intent, management commitment and the allocation of resources to the transfer process, Norman (2002, 2004) provides a look at learning intent from the other side. The results of her study illustrate the fact that excessively high degrees of learning intent may have counterproductive effects on knowledge transfer. Firms which perceive the learning intent of their partner as high are more protective of their knowledge and will restrict communication and knowledge flows. Recapitulating these findings suggests that the relationship between learning intent and knowledge transfer may follow an inverted U-shaped logic. If the learning intent is very low, firms will not devote resources to knowledge transfer – and knowledge transfer remains negligible. Further increases in learning intent will stimulate knowledge transfer to a maximum, until additional increases eventually lead to a restriction of communication and protection of knowledge, as the partner perceives the learning intent of its counterpart as a potential threat. Both Tsang (2002) and Simonin (2004) find that, despite the top management’s commitment to knowledge transfer, commitment does not influence resource allocation. Future research should focus on the major agents who translate top management’s learning intent into knowledge management practices (Nonaka et al. 2006). From this perspective, failure to reach knowledge-related goals might be explained by an unsuccessful implementation of the knowledge management agenda rather than by insufficient top management commitment. A breeding ground for this idea is Simonin’s (2004) study, which discloses an additive effect of top management commitment and learning agenda on knowledge transfer, while the hypothesized mediated relationship (commitment → agenda → transfer) finds no support.

Absorptive capacity. While learning intent describes the motivation and willingness of an organization to deploy resources to knowledge management, absorptive capacity describes the organization’s ability to learn from the partner (Steensma and Lyles 2000). In their seminal paper, Cohen and Levinthal (1990, p. 128) define a firm’s absorptive capacity as ‘the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends’ 10 Empirically, absorptive capacity has been approximated by R&D spending (Cohen and Levinthal 1990) in various studies. However, results concerning its impact on knowledge management outcomes are somewhat mixed. Schoenmakers and Duysters (2006) find a weak effect of R&D spending on knowledge transfer in alliances, while no effect is found by Mowery et al. (1996). Mowery et al. (1996) introduce some alternative measurements for absorptive capacity and find a positive effect of pre-alliance knowledge overlap on knowledge transfer. Based on these findings, Dyer and Singh (1998) argue that the capacity to absorb external knowledge varies as a function of the respective alliance partner. They assume that a firm’s absorptive capacity depends on its pre-alliance knowledge overlap with the partner and on the interaction routines between the partners. Lane and Lubatkin (1998) also advocate the idea of a relative absorptive capacity and argue that an overlap in basic

---

10 For a comprehensive overview on the concept of absorptive capacity see Lane et al. (2006) and Zahra and George (2002).
knowledge supports mutual understanding and eventually joint knowledge creation and transfer. Furthermore, they argue that knowledge creation and transfer are determined by the degree of dissimilarity in specialized knowledge, since completely identical bases of specialized knowledge would not offer potential for the transfer of unknown knowledge. Lane and Lubatkin (1998) find empirical evidence that an overlap in basic knowledge facilitates knowledge creation and transfer, whereas the assumption that similar specialized knowledge reduces the potential for knowledge transfer is not confirmed. Thuc Anh et al. (2006) replicate Lane and Lubatkin’s (1998) design, but do not find a significant effect of knowledge overlap on knowledge transfer. In a similar way to the logic of Lane and Lubatkin (1998), Schoenmakers and Duysters (2006) argue that the interrelation of absorptive capacity and knowledge transfer follows an inverted u-shaped relationship. As long as knowledge overlap is small, firms undergo difficulties in transferring knowledge because they lack an adequate level of absorptive capacity. As the knowledge bases become more similar, the potential to be exposed to new knowledge decreases. Schoenmakers and Duysters (2006) find support for the inverted u-shaped relationship, which basically indicates that the degree of knowledge complementarity between alliance partners determines how much knowledge can be potentially transferred. Moreover, Nooteboom et al. (2007) provide empirical evidence that the inverted u-shaped logic also holds true for the knowledge outcome of joint knowledge creation. Contrary to the aforementioned studies, the studies of Chen (2004) and Hau and Evangelista (2007) employ subjective survey measures to capture directly the way in which firms assess their absorptive capacity. Their results reaffirm the important role of absorptive capacity as a facilitator of knowledge transfer in alliances.

Apart from offering an explanation emerging from the particular knowledge endowments of the alliance partners, Lane and Lubatkin (1998) identify further, more organizational dimensions of absorptive capacity. They examine how organizational similarity and an overlap in the firms’ dominant logics influence knowledge management outcomes. Lane and Lubatkin (1998) assume that firms with similar organizational structures and dominant logics resemble each other in the way that they manage knowledge. They do not find evidence that similar organizational structures facilitate the joint creation and transfer of knowledge. However, partners with similar dominant logics achieve significantly higher degrees of joint knowledge creation and transfer in their alliance. In a further development of the original idea, Lee et al. (2008) assume a u-shaped relationship instead of a linear one between dominant logic overlap and knowledge management outcomes. Their data support the assumption. Therein lies a further, as yet unanswered, question which has practical importance: How do firms cultivate the capacity to absorb new external knowledge? Dyer et al. (2001), Ireland et al. (2002), Lee et al. (2008) and Nielsen (2007) give reason to believe that allying know-how supports knowledge transfer. Firms capable of internalizing the lessons learned from past alliances will be more capable of managing knowledge (Simonin 1997).

The existing quantitative empirical literature on absorptive capacity turns out to broadly confirm the importance of overlap in knowledge and dominant logic in explaining the joint creation and transfer of knowledge. However, scholars have only recently begun to measure absorptive capacity with original multi-item scales; results unanimously support the positive absorptive capacity–knowledge transfer relation. However, absorptive capacity is by no means a carte blanche for knowledge transfer. Norman (2002) finds that firms which perceive the absorptive capacity of their partners as high are more protective of their knowledge. Future research has to take this two-sided effect into account.

From a methodological point of view, existing measurement approaches are problematic. Researchers frequently rely on patent data and measure knowledge overlap by cross-citation patterns. This approach entails assigning the same values to both alliance partners. If both alliance partners possess the same mutual absorptive capacity, how do we explain disproportional knowledge transfer among partners? Existing research seems to overlook additional dimensions of absorptive capacity. Simonin (2004) finds that firms with a ‘double-loop’ learning culture are more capable of transferring knowledge. A potential starting point for future research is the conceptual model of Kandemir and Hult (2005) regarding the impact of learning culture on knowledge management in alliances. Researchers need to think of absorptive capacity as a multifaceted construct.

Prominent controls: Firm size and cultural differences. A wide range of other partner characteristics have been included in prior research, often as control
variables. Among these characteristics, firm size and cultural differences have been subjects of a lively debate. Therefore, this review synthesizes the major findings on these prominent control variables.

Larger firms are more likely to engage in more comprehensive interaction, boundary-spanning activities (Muthusamy and White 2005), and in more sophisticated protection mechanisms (Norman 2002), as they possess more resources deployable to knowledge management. Findings on the influence of firm size on knowledge management outcomes and the respective theoretical explanations are highly diverse. Norman (2004) finds that relatively larger firms transfer less knowledge and simultaneously lose more knowledge to their smaller partners in alliances. In contrast, Mowery et al. (1996), Chen (2004) and Muthusamy and White (2005) do not find evidence that firm size enables us to predict knowledge management outcomes. How can the varying results be explained? It is quite conceivable that the strategic importance (cf. Lee et al. 2008; Tsang 2002) of the alliance relationship determines whether or not larger firms put their superior absorptive capacity and resources into action. For instance, Norman (2002) and Simonin (2004) demonstrate that larger firms are better capable of protecting their proprietary knowledge. Based on these findings, additional efforts will be needed to analyse how firm size constrains the arsenal of practices, structures and actions applied to the knowledge management process.

Whereas firm size is associated with absorptive capacity and knowledge protection issues, cultural differences and misunderstandings are linked to the communication between partners. Increasingly, firms are searching for new knowledge across national and cultural borders (Bhagat et al. 2002). Alliances can provide access to new markets and critical local knowledge as demonstrated by Makino and Delios (1996). However, alliances between partners from different national and/or cultural backgrounds face particular knowledge management challenges. Communication between partners is complicated by differences in language, opinions, beliefs and geographic distance (e.g. Kale et al. 2000; Lane and Lubatkin 1998; Mowery et al. 1996; Simonin 1999b; Thuc Anh et al. 2006). Simonin (1999b) reveals that cultural distance among partners impedes knowledge transfer, as it complicates understanding. Similarly, Mowery et al. (1996) find that cross-border alliances are inferior to alliances with partners of the same nationality in transferring knowledge. Lane et al. (2001) find only partial support for the hampering effect of cultural misunderstandings on knowledge transfer.

In contrast to these findings, Kale et al. (2000) and Nielsen (2007) do not find a negative effect of cultural/national differences on knowledge management outcomes. Lane et al.’s (2001) and Simonin’s (1999b) studies offer some advice on how to interpret the contradictory findings. Both studies provide indications that alliance partners are able to bypass the hampering influence of cultural/national differences if their organizations are flexible and willing to invest into knowledge management. Thus, the impeding effect of cultural/national differences does not necessarily constitute a given fact, but can be overcome with appropriate knowledge management efforts. Another influencing factor might be the type of knowledge. Lam’s (1997) study illustrates that the cultural embeddedness of knowledge might impede knowledge transfer across national borders. Evangelista and Hau (2009) verify this argumentation and find that cultural distance has a stronger negative effect on the transfer of tacit than of explicit knowledge.

Future research could explore the concrete knowledge management practices which are implemented to bridge cultural differences. Since prior research has relied on rough proxy measures of cultural differences, understanding is still limited. Prior theoretical work (e.g. Bhagat et al. 2002; Child and Markoczy 1993) provides a possible starting point for a more fine-grained analysis of the influence of dissimilar cultural contexts on knowledge management in alliances. For instance, Bhagat et al. (2002) develop a cluster to categorize alliance partners along two cultural dimensions (individualism vs collectivism and horizontal vs vertical cultures). They assume that the interrelation between knowledge type and knowledge transfer effectiveness is moderated by the relative compatibility of the partners’ clusters.

**Partner interaction**

Besides learning intent and absorptive capacity, Hamel (1991) describes openness as a strong determinant of knowledge management outcomes in alliances. By definition, openness refers to the interaction of alliance partners. It represents the willingness and ability of partners to communicate freely, share knowledge, and risk unintended knowledge transfers (Inkpen 2000; Lane et al. 2001; Steensma and Lyles 2000). According to Inkpen (2000), rela-
tionship openness is determined by the level of competitive overlap and trust among alliance partners, which is influenced in particular by the level of conflict in the relationship (Lyles and Salk 1996).

**Competitive overlap.** The competitive overlap between alliance partners creates both positive and negative incentives regarding the willingness and ability to transfer knowledge. High competitive overlap will generally induce firms to be more protective about their knowledge, because unintended knowledge transfer to the partner might endanger their own competitive advantage (Khanna et al. 1998), whereas the positive incentive builds upon the idea of absorptive capacity. Knowledge bases of competitors are more likely to resemble each other, and the potentially negative incentive might thus be counterbalanced by an increased ability to understand and absorb the partner’s knowledge (Inkpen 2000; Kale et al. 2000).¹¹ To test these assumptions, researchers employ control variables such as SIC codes to check market or industry affiliation (e.g. Chen 2004; Dhanaraj et al. 2004; Mowery et al. 1996; Muthusamy and White 2005; Pérez-Nordtvedt et al. 2008). Mowery et al. (1996) find that firms in so-called learning alliances experience lower knowledge transfer if they are competitors on their end-product markets. In accordance with an absorptive capacity based argumentation, Schoenmakers and Duysters (2006) find that firms from the same industry are significantly better at transferring knowledge, Chen (2004) and Muthusamy and White (2005), however, do not find this effect of industry affiliation on joint knowledge creation and transfer.

There are two possible explanations for the contradictory results. First, the degree of competitive overlap seems to be important. The competitive overlap will be different in alliances with a common industry background compared with alliances with partners active in a common market. Park and Russo (1996) show that alliances between direct competitors are more likely to fail compared with alliances among partners which share a similar industry background but do not compete directly (see also Faems et al. 2007). The latter partnerships seem to benefit from an adequate level of absorptive capacity while simultaneously experiencing less competitive pressure resulting in a lower level of knowledge protection. This lower level of knowledge protection in turn leads to more knowledge transfer (Nielsen 2007).

Second, so far competitive overlap has been considered in isolation, thereby neglecting a potential interaction with trust. Rindfleisch and Moorman (2001) illustrate that trust in alliances among direct competitors is weaker than that between partners who do not compete on the same market. Future research needs to incorporate competitive overlap and trust simultaneously.

**Trust.** Trust contributes to openness in alliance relationships in three ways. First, trust directly influences the willingness to risk vulnerability (Inkpen 2000) and the confidence that the partner will not act opportunistically (cf. Gulati 1995; Lane et al. 2001). Second, trust mitigates the negative influence of competitive overlap between partners. Third, trust increases proximity between alliance partners, which allows firms to interact more closely (e.g. Collins and Hitt 2006). Proximity and close interaction are supportive of knowledge transfer, as they create a common identity and communication protocol among alliance partners (Dhanaraj et al. 2004). In general, scholars argue that trustworthy, respectful, socially embedded relationships between alliance partners contribute to knowledge transfer (e.g. Berdrow and Lane 2003; Inkpen 2000; Lane et al. 2001; Lee and Cavusgil 2006). Empirical evidence on this positive relationship is unequivocal (Becerra et al. 2008; Kale et al. 2000; Lane et al. 2001; Lee and Cavusgil 2006; Muthusamy and White 2005; Norman 2004; Pérez-Nordtvedt et al. 2008). Rindfleisch and Moorman (2001) provide additional evidence and report a positive effect of relational capital on knowledge application.

Muthusamy and White (2005) go deeper into the issue of how different types of trust contribute to knowledge management outcomes. Trust in the abilities of the partner and in its integrity contributes to joint knowledge creation and transfer, while benevolence-based trust does not show a significant effect.

While trust appears to be a good predictor of general knowledge management outcomes, Becerra et al. (2008), Dhanaraj et al. (2004) and Evangelista and Hau (2009) can provide quantitative empirical evidence for the argument (Collins and Hitt 2006; Inkpen and Dinur 1998; Kale et al. 2000) that trust is particularly important for the transfer of tacit

---

¹¹This phenomenon is discussed with diverse notions such as learning dilemma (Larsson et al. 1998), learning race (Khanna et al. 1998) or boundary paradox (Norman 2002).
knowledge, as it creates the necessary proximity between partners.

However, the mutual relationship between trust and knowledge management outcomes is subject to dynamic change (cf. Inkpen and Currall 2004). Cross-sectional analyses are insufficient to capture this change. As trust between alliance partners increases, the transfer of tacit knowledge in particular becomes easier; this might lead to a shift in power relations. As one partner ‘outlearns’ the other, the bargaining power will shift and result in less trust and more control (Inkpen and Beamish 1997; Inkpen and Currall 2004). In learning alliances, openness continually changes. Future research should address the question of whether and how alliance partners in learning alliances stabilize their relationships. Kale et al. (2000) give reason to believe that firms can actively engage in such trust building activities.

Conflict. Conflict between alliance partners is a detrimental force. Conflict not only contributes to alliance failure (Stensma and Lyles 2000), it also reduces the level of trust between partners and eventually impedes knowledge transfer (e.g. Tsang et al. 2004). Tsang et al. (2004) verify empirically that intensity of conflict reduces knowledge transfer. How alliance partners manage conflict in the relationship is therefore a central question. Kale et al. (2000) analyse joint conflict management processes and find evidence for a positive effect on both the level of trust between alliance partners and the transfer of knowledge. As such, joint conflict management seems to function as a trust-building mechanism and as a knowledge transfer practice in its own right. Berdrow and Lane (2003), Chen (2004), and Collins and Hitt (2006) reaffirm these findings: firms that frequently engage in partner interaction, which in turn is characterized by a high level of communication quality and perceived fairness in the resolution of conflicts, are found to transfer more knowledge within alliances.

Overall, the empirical results confirm the view that trust fosters knowledge management in alliances, because firms are less suspicious of their partners. Conflict management (Kale et al. 2000) and adjustment (Chen 2004) can be perceived as deliberate trust-building mechanisms rather than unintentional or emerging constructs. However, further research is clearly needed to understand the trust-building interactions that are most effective in supporting different knowledge management outcomes.

Prior ties. While the previously discussed studies focus on the actual alliance relationship, Inkpen (1996) directs attention to the pre-alliance relationship between the alliance partners. He argues that top management involvement and prior ties contribute to a trustworthy climate in subsequent relationships. Muthusamy and White (2005) report a positive and significant effect of prior ties on joint knowledge creation and transfer. To the contrary, Kale et al. (2000) and Norman (2002) do not find that prior ties influence knowledge management outcomes in the alliance relationship. The study of Schoenmakers and Duysters (2006) is more fine-grained and distinguishes between prior ties and prior equity-based ties. The authors find partial evidence that prior alliances with the same partner positively influence knowledge transfer. Surprisingly, the seemingly stronger prior equity-based ties exert a significant negative effect on subsequent knowledge transfer. Schoenmakers and Duysters (2006) argue that the negative effect stems from an over-embeddedness of the partners’ knowledge bases.

Results regarding prior ties vary strongly. If we accept that firms are not less protective if they know each other from prior relationships (Kale et al. 2000; Norman 2002; Sampson 2004) and are more capable of absorbing knowledge from a well-known partner at the same time (Dhanaraj et al. 2004; Muthusamy and White 2005; Nielsen 2007; Schoenmakers and Duysters 2006), we can conclude that prior ties contribute to absorptive capacity, but are no guarantee for a subsequent trustworthy relationship.

Active knowledge management

The popularity of resource- and knowledge-based approaches (e.g. Grant 1996a,b) has directed the research focus towards the ability of firms to create, transfer and apply knowledge, thereby providing an alternative explanation for their existence (Teece 1998). Nowadays, the management of knowledge assets is at least as important as the management of physical assets (Lane and Lubatkin 1998). Two streams of research classify the work on how firms purposefully manage knowledge processes in alliances. The first stream focuses on the governance structure that is decided upon during the formation phase of an alliance relationship (cf. Reid et al. 2001). The second stream refers to the particular mechanisms that firms use to govern knowledge processes (Dyer and Singh 1998). While the governance
form of an alliance defines the organizational frame in which knowledge-related processes occur (cf. Kogut 1988), knowledge management practices describe the mechanisms that firms use intentionally to influence knowledge management outcomes (cf. Gray 2001).

**Alliance governance.** The contractual organization of alliances ranges from unilateral contractual agreements to equity-based alliances (e.g. Oxley 1997). Although a wide range of governance forms exist, the distinction between equity and non-equity-based alliances prevails (e.g. Das and Teng 1998; Gulati 1995; Inkpen 2000). The transaction cost literature suggests that equity-based alliances have the potential to align interests among alliance partners, offering opportunities for intended knowledge transfer and simultaneous protection against unintended knowledge leakage (Kale et al. 2000). Organizational embeddedness of equity-based alliances is argued to create more knowledge transfer opportunities and facilitate especially the transfer of tacit knowledge, and has become ‘conventional wisdom’ by now (Kogut 1988). This ‘wisdom’ is confirmed by Chen (2004) and Mowery et al. (1996), who find that equity-based alliances are superior to contract-based alliances in knowledge transfer. Furthermore, Chen (2004) has determined that equity-based alliances are better in transferring tacit knowledge in comparison with explicit knowledge. His study shows that tacit knowledge is most efficiently transferred in equity-based alliances (see also Shenkar and Li 1999), while explicit knowledge is more efficiently transferred in contract-based alliances. Oxley and Wada (2009) reaffirm previous findings and increase our understanding of how equity-based joint ventures contribute to knowledge transfer. According to these findings, equity-joint ventures positively influence intended knowledge transfer while limiting the leakage of knowledge that is not related to the alliance relationship (see also Norman 2004).

In contrast to these results, neither Kale et al. (2000) nor Muthusamy and White (2005) find any effect of alliance governance form on knowledge creation or transfer and the capacity to protect knowledge. Schoenmakers and Duysters (2006) gain mixed results. They find that a current equity-based alliance has no effect on knowledge transfer, while prior repeated equity ties even negatively influence knowledge transfer. Schoenmakers and Duysters (2006) present a possible explanation for the heterogeneous findings and argue that, although strong ties are beneficial to knowledge transfer, alliance partners who have become ‘over-embedded’ because of prior equity alliances reach a knowledge transfer threshold. Sampson’s (2004) discussion follows a similar logic: firms respond to demanding knowledge transfer goals by engaging in equity-based alliances. However, at a very high level of knowledge diversity, firms lack an adequate level of absorptive capacity, which makes hierarchical governance forms obsolete. A non-linear effect is quite conceivable: when the partners’ knowledge bases are very different, knowledge transfer is difficult because of a lack of absorptive capacity. With very similar knowledge bases, there is hardly any potential for the transfer of new knowledge. Moderate degrees of knowledge similarity are thus needed for equity-based alliances to pay off. Chen (2004) provides justification for this reasoning, as he shows that knowledge transfer is jointly determined by the governance form, the type of processed knowledge, and the firm’s absorptive capacity. While existing research almost exclusively examines how the governance form of an alliance influences knowledge transfer, Jiang and Li (2009) also examine the influence of the governance form on knowledge creation. Besides reaffirming the positive link between the equity-based form and knowledge transfer, their study shows that an equity-based governance structure positively influences knowledge creation.

To sum up, the reviewed studies indicate that the choice of alliance governance form is not a simple decision that determines knowledge management outcomes, but a relatively complex decision problem. For example, Mowery et al. (1996) and Oxley and Sampson (2004) have criticized the fact that a singular focus on the governance form ignores complementary mechanisms such as relational capital, trust or alliance scope. To gain further insights, future research must incorporate these concepts. The question of how governance form, trust and alliance scope complement each other represents a promising research field. In this respect, the case study by Faems et al. (2007) provides the insight that governance mechanisms (i.e. specific knowledge-related contract clauses) can be important to initiate knowledge transfer, even if an equity-based alliance structure is present.

However, research from a knowledge management perspective on governance choices remains a promising area, as the question of the trade-off between the costs of different governance forms and their benefits for knowledge management is seldom addressed (cf.
Chen 2004; Inkpen 2000), and empirical studies are still missing. If co-specialization alliances are motivate solely by complementary knowledge bases, there is no need for a governance form particularly conducive to knowledge transfer. Thus, one could assume that co-specialization alliances are more likely to be contract based. Future research on governance forms needs to incorporate a multitude of influencing factors in order to obtain a more comprehensive understanding of how governance forms influence knowledge management outcomes.

Knowledge management practices. The decision for a certain governance form is a fundamental and hardly reversible choice that occurs at the beginning of the relationship. The term ‘knowledge management practices’ captures the organizational routines, control and co-ordination mechanisms, and systems that firms use to manage knowledge management outcomes (cf. Gray 2001). In general, prior research shows that firms actively and purposefully engaging in knowledge management practices are more effective at transferring knowledge.

Inkpen (1996, 2000) ascertains that personnel transfer, technology sharing, alliance–parent interaction, linkages between parents, and alliance strategies function as knowledge connections between alliance partners. Other knowledge management practices identified as beneficial to knowledge transfer are advisory systems, alliance liaison offices, learning networks, the delegation of expatriates, mutual visits/plant tours, training programmes and on-site meetings (Berdrow and Lane 2003; Collins and Hitt 2006; Inkpen 2005; Inkpen and Pien 2006).

Lyles and Salk (1996) analyse a number of different knowledge management practices. They argue that articulated goals create organizational commitment and a point of reference in decision processes for organizational members. They further assume that knowledge transfer is enhanced by active involvement such as knowledge transfer agendas, technological and managerial knowledge contribution, emotional support, labour division between partners, and personnel training. Overall, the positive effect of articulated goals, delegation of expatriates, and active involvement on knowledge transfer has been supported. Hau and Evangelista (2007), Thuc Anh et al. (2006) and Tsang et al. (2004) expanded on Lyles and Salk’s (1996) study, and reaffirmed many of their findings. Tsang (2002) finds, in more general terms, that the involvement and overseeing effort of a parent firm’s alliance managers supports the transfer of knowledge.

So far, comparatively little is known about how different knowledge management practices are orchestrated to manage different types of knowledge. Inkpen and Dinur (1998) suggest that different knowledge types are transferred more effectively between alliance partners with different knowledge management practices. For instance, social networks among alliance partners are created to establish personal ties that function as knowledge connections to facilitate the transfer of tacit knowledge. The case of GM’s and Toyota’s NUMMI project is a viable illustration (Inkpen 2005). Collins and Hitt (2006) similarly argue that frequent communication, on-site meetings and partner visits help to build the necessary relational capital to transfer tacit knowledge. Since knowledge tacitness also stems from its cultural embeddedness (Lam 1997), one could think of expatriates as translators of such knowledge. By contrast, explicit knowledge is transferred via technology sharing practices (Inkpen and Dinur 1998).

Although case study research on knowledge management practices provides evidence that more personal and direct face-to-face interaction facilitates the transfer of tacit knowledge, the field lacks quantitative empirical verification of this assumption. The study of Evangelista and Hau (2009) provides some preliminary insights. They find that the commitment of top management has a greater positive influence on the transfer of explicit knowledge than on the transfer of tacit knowledge. Another interesting research question arising in this context stems from Simonin (1999b). He finds that alliance partners are able to reduce the tacitness and complexity associated with knowledge by dedicating resources to the transfer process. With regard to future research, studies should take notice of the investments in different knowledge management practices and analyse which practices are used to reduce the tacitness, complexity and specificity of knowledge. For instance, Revilla et al. (2005) argue that firms blend different knowledge management practices into distinct knowledge management styles, depending on the knowledge management objectives aspired to.

---

12In a study on IJV failure, Steensma and Lyles (2000) partly reaffirm the results of Lyles and Salk (1996) concerning active involvement. They find that higher levels of managerial support by the parent firm positively influence learning on the IJV level.
Another emergent research stream is concerned with the factors that influence the effectiveness of knowledge management practices. Lane et al. (2001) and Tsang (2002) provide evidence that firms employ different knowledge management practices over time, as both studies corroborate the fact that management involvement is more important in the early phase of a joint venture and less important as the alliance matures. Janowicz-Panjaitan and Noorderhaven (2008) reveal that informal knowledge transfer practices have a constant positive effect, while more formal knowledge management practices show a positive but diminishing effect on knowledge transfer.

Another promising research area appears to be how the importance of management practices changes over time. Similarly, it seems to be of great interest to examine how the effectiveness of practices will differ over time owing to learning curve effects. In alliances with high degrees of management involvement, valuable knowledge assets are particularly exposed at the outset of the relationship. However, the pace of the knowledge transfer is likely to decrease when the easiest to absorb knowledge has been transferred, and when less obvious knowledge is sought for extraction.

Discussion, future directions and conclusion

This paper reviewed empirical evidence on knowledge management in alliances and proposed a systematic framework which identified common areas and provided an in-depth analysis of empirical evidence in this field of research. The landmarks identified are knowledge characteristics, partner characteristics, partner interaction and active knowledge management. Building on the framework and review, open questions were derived in order to provide impetus for future research. Table 1 summarizes the central issues and research gaps identified in this review.

Regarding the knowledge management outcomes examined, the focus has been largely on knowledge transfer so far (cf. Jiang and Li 2009). Research has neglected the outcomes of knowledge creation and application. There are several possible explanations for this shortcoming.

First, the transfer of knowledge might be more ‘visible’ and thus easier to observe by comparison with the creation and especially with the application of knowledge. While the manifestation of knowledge creation in newly developed products, technologies and production routines might require more time than the transfer of existing knowledge, the process of joint knowledge application is even more time-consuming and, thus, not immediately measurable. For instance, in R&D alliances between biotechnology and pharmaceutical firms, partners almost immediately start creating and transferring existing basic knowledge. However, the joint application of knowledge to commercial ends, i.e. the development and clinical testing of a prototype product, normally follows at a much later point in time (cf. Rothaermel and Deeds 2004). The sole interest in knowledge transfer may also originate from its importance as a major driver of alliance formation (e.g. Chen 2004).

Furthermore, as the field lacks precise definitions and delineation of key concepts, the theoretical concepts of different knowledge assets, processes and outcomes remain fuzzy and overlapping. However, these concepts have to be clearly distinguished theoretically and empirically. For instance, there is a subtle, but nevertheless important difference between measuring the degree to which an organization engages in knowledge creation activities and the extent to which knowledge assets such as new products or technologies are accumulated as a result of such activities. While the first captures a knowledge management process, the latter assesses a knowledge management outcome.

The literature has distinguished different knowledge outcomes, but these distinctions are only rarely reflected in the operationalization of variables (e.g. Jiang and Li 2009; Lane et al. 2001) and distinct outcomes tend instead to be merged, e.g. as one measure of organizational learning (e.g. Janowicz-Panjaitan and Noorderhaven 2008). However, the study of Jiang and Li (2009) gives reason to believe that creation and transfer are distinguishable knowledge outcomes. Furthermore, the partially found positive relationship between knowledge transfer and performance (e.g. Hamel 1991; Tsang et al. 2004), on the one hand, and the existence of the ‘NIH’ (not invented here) syndrome in alliance relationships, on the other hand (cf. Inkpen 2005), indicate that firms are able to apply new external knowledge to commercial ends, but that such application is not an inevitable consequence. The real world of business provides many informative examples of alliances emphasizing distinct knowledge management outcomes. For instance, creating...
new knowledge in the form of new mobile computing devices and technologies is the major aim of the alliance between Intel and Nokia; the transfer of existing knowledge on epigenetics is the major driving force behind the alliance of Cellzome and GlaxoSmithKline; and the joint commercialization and application of existing market knowledge is the motive of the alliance between Vodafone and China Mobile. Joint product and technology development in R&D alliances (e.g. Norman 2004), exchange of market knowledge in international alliances (e.g. Hau and Evangelista 2007) and joint knowledge application and commercialization (e.g. Rindfleisch and Moorman 2001) are certainly indicative of the existence of distinct knowledge management processes. However, future research is needed to develop meaningful measurements of knowledge creation and application besides well-established

<table>
<thead>
<tr>
<th>Research unit of analysis</th>
<th>Findings</th>
<th>Research gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landscape of the field</strong></td>
<td>Broad range of different industry and national settings</td>
<td>Lack of research with a longitudinal design capable of capturing dynamic processes</td>
</tr>
<tr>
<td></td>
<td>More than three-quarters of studies are quantitative in nature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Focus on single informants from one partner of the alliance relationship</td>
<td></td>
</tr>
<tr>
<td>Knowledge management outcomes</td>
<td>Quantitative and qualitative research focuses almost exclusively on knowledge transfer</td>
<td>Lack of research on other knowledge management outcomes, such as joint knowledge creation and application</td>
</tr>
<tr>
<td>Knowledge characteristics</td>
<td>Knowledge tacitness impedes knowledge transfer</td>
<td>Lack of testing the influence of knowledge dimensions other than tacitism on knowledge management outcomes</td>
</tr>
<tr>
<td></td>
<td>Alliance experience and the devotion of resources can reduce the impeding effect of knowledge complexity</td>
<td>A general lack of empirical research on how knowledge characteristics influence knowledge management processes</td>
</tr>
<tr>
<td>Partner characteristics</td>
<td>Knowledge-related alliance motives differ significantly among each other</td>
<td>Lack of research on how different knowledge-related motives affect how and to what degree alliance partners collaborate</td>
</tr>
<tr>
<td></td>
<td>Learning intent positively influences knowledge transfer</td>
<td>Lack of research on the factors that mediate the relationship between learning intent and knowledge transfer</td>
</tr>
<tr>
<td></td>
<td>Absorptive capacity facilitates the transfer of knowledge</td>
<td>Lack of research on the determinants that constitute the degree of absorptive capacity</td>
</tr>
<tr>
<td></td>
<td>Cultural differences must not necessarily impede knowledge transfer</td>
<td>Lack of research on how and why different cultural dimensions influence knowledge management outcomes</td>
</tr>
<tr>
<td></td>
<td>Competitive overlap between partners can both support and constrain knowledge transfer</td>
<td>Lack of research on the interrelation between competitive overlap and trust</td>
</tr>
<tr>
<td>Partner interaction</td>
<td>Trust between alliance partners facilitates knowledge transfer and is of particular importance for the transfer of tacit knowledge</td>
<td>Lack of research that considers trust and conflict as dynamic processes undergoing constant change</td>
</tr>
<tr>
<td></td>
<td>Conflict between partners is a detrimental force to trustworthy relationships and knowledge transfer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conflict management and mutual adjustment can mitigate the negative effect of conflict on knowledge transfer</td>
<td></td>
</tr>
<tr>
<td>Active knowledge management</td>
<td>Governance form choices are complex; they provide an institutional frame and cannot simply be reduced to a decision problem for or against a certain knowledge outcome</td>
<td>Lack of research that incorporates relational capital between partners, governance form, and alliance scope in an integrated analysis</td>
</tr>
<tr>
<td></td>
<td>Structured, proactive, and goal-oriented knowledge management practices can facilitate the transfer of knowledge</td>
<td>Lack of research on which knowledge management practices are most useful in order to transfer different types of knowledge</td>
</tr>
<tr>
<td></td>
<td>The effectiveness of different knowledge management practices varies over time</td>
<td>Lack of research on which different knowledge management practices are used during the alliance life cycle</td>
</tr>
</tbody>
</table>
scales for knowledge transfer. Such measurements will help to further our understanding of how firms generate, store, retrieve and apply knowledge in alliances.

It is noticeable that the lack of precise definitions and limitation of key constructs has blurred the discussion. Since scholars have often avoided the clear definition and delineation of theoretical concepts, this review reaffirms prior critique (e.g. Grant and Baden-Fuller 2004; Mowery et al. 1996) and calls for a more precise and distinct formulation and development of theoretical concepts and their empirical operationalization.

Conceptual work on the impact of knowledge characteristics on knowledge management outcomes has clearly outpaced its empirical verification. Although scholars have proposed multiple knowledge taxonomies, there is only limited empirical work (Simonin 1999b). The distinction between tacit and explicit knowledge prevails, and empirical evidence is mostly supportive of the suggested relationships. In sum, it appears that knowledge tacitness contributes to transfer complications for two reasons: tacit knowledge is (1) non-verbalizable, context specific and personally bounded, and (2) alliance partners are reluctant to transfer such knowledge freely to the alliance partner, as it is perceived as particularly valuable.

The literature emphasizes the influence of absorptive capacity on knowledge management outcomes among the partner characteristics. There is broad consensus and empirical evidence that absorptive capacity facilitates knowledge transfer. Furthermore, firms committed to knowledge management goals and willing to deploy resources to the achievement of such goals turn out to be more successful at transferring knowledge. However, other partner characteristics such as cultural distance have been less explored, and the results remain vague and inconsistent. Future research is needed to analyse in greater detail which cultural dimensions influence the relationship and interaction between alliance partners and how firms overcome cultural distance with cultural sensitivity and management programmes (Simonin 1999b).

By comparison with the above conclusions, summarizing the influence of partner interaction on knowledge management outcomes is a more complex task. Alliance partner interaction covers a diverse set of dimensions. While the influence of competitive overlap and prior ties on knowledge management outcomes remains fairly inconclusive, the empirical evidence concerning trust and conflict is relatively unambiguous. It turns out that trustworthy and amicable partner relationships characterized by a high quality of communication are supportive of knowledge transfer. Joint conflict management and mutual adjustment prove to facilitate knowledge transfer in two ways: by reducing the impeding effect of partner conflict, and by functioning as a transfer mechanism in and of themselves. However, future research is needed to elaborate on how alliance relationships develop over time, and how a potential shift in power relations (Inkpen and Beamish 1997) might influence the relationship between partners.

Although the governance choice decision has received a lot of theoretical attention, empirical findings concerning the influence of this choice on knowledge management outcomes are highly diverse. The findings suggest that, instead of a simple and direct relationship, more intricate mechanisms might be at work. The governance form is thus better understood as a context variable for the knowledge management interaction between the partners. Future research should incorporate the underlying motives of the alliance partners, the alliance scope and the interaction between partners.

Although quantitative empirical work on knowledge management practices exists, our understanding is still limited. Articulated goals, the delegation of expatriates, and other practices of active involvement generally enhance the transfer of knowledge. However, more research is needed to examine which knowledge management practices firms employ to manage different types of knowledge. Similarly, researchers should ask how firms adapt their knowledge management practices to the specific alliance partner and specific interaction. The conjecture that knowledge management practices that create intensive face-to-face interaction among partners are positively related to the transfer of tacit knowledge has been supported by various case studies (e.g. Inkpen and Dinur 1998). However, more quantitative empirical testing is needed to disclose further which knowledge management practices are effective in different contexts. For example, how do firms align knowledge management practices to the quality of partner interaction? If partner interaction is characterized by a

---

13The original scale of Lyles and Salk (1996) has been repeatedly used in other studies (see e.g. Jiang and Li 2008, 2009; Lane et al. 2001; Thuc Anh et al. 2006; Tsang et al. 2004).
high level of trust, communication quality and perceived fairness in the resolution of conflicts, firms might be more capable of incorporating practices such as the exchange of key personnel, and be willing to do so. In addition, further research should be conducted on the joint influence of various factors captured by the framework (see Figure 1) on knowledge management outcomes. Research that examines which knowledge management practices firms choose, based on those explanatory factors (characteristics of knowledge, partners and their interaction), will be helpful to practitioners and scholars alike.

Empirical research on knowledge management outcomes has been conducted in various country, sector and industry settings. Studies providing comprehensive cross-national and cross-industry testing are still lacking, however. But alliances are embedded in a particular context and environment whose characteristics affect knowledge management processes. For example, production or manufacturing-based alliances will show a considerably smaller need to transfer knowledge (Beamish and Berdrow 2003) by comparison with R&D alliances (e.g. Rothaermel and Deeds 2004; Sampson 2004). Furthermore, alliances between partners from knowledge-intensive industries such as chemicals, computers, biotechnology, electronics, pharmaceuticals, semiconductors or telecommunications will follow a different learning imperative by comparison with alliances in less knowledge intensive industries. Also, alliances involving a Western partner and a partner from an emerging country follow a different logic from alliances among Western firms. Such alliances are often based on the mutual agreement that the Western firm functions as teacher to firms catching up within the transition process after social developments (cf. Lyles and Salk 1996; Si and Bruton 2005; Yan and Child 2002). Meyer (2007, p. 35) suggests that future research should ‘incorporate contextual variables explicitly in the study design, and thus [to] pursue more cross-context comparative research, and replication of empirical studies in different contexts’.

Another area which has received only limited theoretical and empirical attention is the question of how environmental factors affect knowledge management in alliances. As a turbulent market environment provides the impetus for allying (Grant and Baden-Fuller 2004; Osland and Yaprak 1995), it is surprising that market and technology uncertainty have not been included in the empirical research agenda yet. In general, firms with a superior ability to manage knowledge in alliances are assumed to be better able to adapt to rapidly increasing innovation pressures and changing market conditions (Richter and Vettel 1995). Wu and Cavusgil (2006) found that firms were more committed to an alliance relationship under the conditions of high market uncertainty. Analysing how environmental factors such as technology and market uncertainty affect the relationship between partners, which governance form they choose, and which knowledge management practices they apply is a promising stream of future research.

In conclusion, we need a closer fit between theory and methodology to advance the convergence and consensus within the field (e.g. Lane et al. 2001; Mowery et al. 1996; Tsang 2002). The field suffers from measurement insufficiency and methodological restrictions. Some of the future research questions identified within this review have not been addressed in prior studies because of a lack of longitudinal approaches. How ‘learning races’ destabilize a relationship (Inkpen and Beamish 1997), how different types of trust develop in alliances, and how firms reduce knowledge ambiguity: these are dynamic processes that cannot be captured by cross-sectional models.

The established framework (Figure 1) and the summary of the empirical evidence presented in this review provide a comprehensive overview of the research field. As such, this paper hopefully offers impetus for future research and identifies some major avenues of convergence and divergence in the field.

References


### Appendix 1. Exclusion criteria

<table>
<thead>
<tr>
<th>No.</th>
<th>Criteria</th>
<th>Reason for exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pre-1996</td>
<td>The awardwining paper of Lyles and Salk (1996) is chosen as the point of reference for this review</td>
</tr>
<tr>
<td>2.</td>
<td>Publication type</td>
<td>Exclude books, book chapters, conference proceedings, dissertation abstracts, editorials, and working papers</td>
</tr>
<tr>
<td>3.</td>
<td>Perspective</td>
<td>Exclude articles with industry, regional or sector analysis</td>
</tr>
<tr>
<td>4.</td>
<td>Organizational form</td>
<td>Exclude articles with an intra-organizational focus, a focus on inter-organizational relationships other than alliances, a focus on individuals, and a focus on networks. Exclude articles which compare different organizational forms with each other</td>
</tr>
<tr>
<td>5.</td>
<td>Non-commercial alliances</td>
<td>Exclude articles on alliances of governmental organizations, of NGOs, or with the participation of universities</td>
</tr>
<tr>
<td>6.</td>
<td>Alliance life cycle</td>
<td>Exclude articles on alliance formation, on the choice between alternative organizational forms, and on alliance termination. Articles on alliance formation will be included where interrelations to subsequent knowledge management processes are investigated</td>
</tr>
</tbody>
</table>

### Appendix 2. Inclusion criteria

<table>
<thead>
<tr>
<th>No.</th>
<th>Criteria</th>
<th>Reason for inclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Theoretical papers</td>
<td>These articles provide the basis for summarizing and integrating empirical evidence</td>
</tr>
<tr>
<td>2.</td>
<td>Quantitative and qualitative empirical studies</td>
<td>Extant empirical evidence represents the particular interest of this review</td>
</tr>
<tr>
<td>3.</td>
<td>All industries</td>
<td>Provide a cross-industry overview</td>
</tr>
<tr>
<td>4.</td>
<td>All countries</td>
<td>Provide a cross-country overview</td>
</tr>
<tr>
<td>5.</td>
<td>Knowledge management outcomes</td>
<td>Examine how knowledge management processes are managed in strategic alliances and how these influence performance</td>
</tr>
</tbody>
</table>

*Note that conceptual and theoretical papers are gathered in the first round of search and are excluded in the search with the citations identified in Stage (5).*