

# Alliance Portfolios: A Review and Research Agenda

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*The engagement of firms in multiple simultaneous strategic alliances with different partners has become a ubiquitous phenomenon in today's business landscape. This article offers a review of the extant alliance portfolio literature and organizes it around three key research areas: (a) the emergence of alliance portfolios, (b) the configuration of alliance portfolios, and (c) the management of alliance portfolios. The article also highlights existing gaps in the present understanding of alliance portfolios and outlines a research agenda by identifying key research questions and issues in the areas where further research is needed.*

**Keywords:** *strategic alliances; alliance portfolios; literature review*

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The engagement of firms in a wide array of strategic alliances has become a ubiquitous phenomenon in today's business landscape (Contractor & Lorange, 2002; Gulati, 1998). In many key industries such as computer hard- and software, telecommunications, electronics, pharmaceuticals, and air transportation, strategic alliances have become an important strategic device and an essential part of firm strategy. As a consequence, most firms are engaged in multiple simultaneous strategic alliances with different partners and are facing the challenge to manage an entire alliance portfolio (Anand & Khanna, 2000; Bamford & Ernst, 2002; Doz & Hamel, 1998; George, Zahra, Wheatley, & Khan, 2001; Gulati, 1998; Hoffmann, 2005, 2007; Lavie, 2006, 2007; Lavie & Miller, 2008; Ozcan & Eisenhardt,

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2009; Parise & Casher, 2003). Although traditional alliance research has predominantly focused on single alliances, various alliance researchers have pointed out that the alliance portfolio as the unit of analysis raises indeed a number of new and important issues that merit further scholarly research (Gulati, 1998; Khanna, 1998; Lavie, 2006).

Whereas the bulk of traditional alliance research has mainly focused on the formation, governance, evolution, and performance of single alliances as well as the performance consequences for firms entering into alliances (Gulati, 1998), research on the alliance portfolio level of analysis attempts to uncover the issues that emerge from the management of multiple simultaneous alliances with different partners. Authors from a broad range of backgrounds such as strategic management (Hoffmann, 2007; Lavie, 2007), organizational theory (Baum, Calabrese, & Silverman, 2000; Rowley, Behrens, & Krackhardt, 2000), entrepreneurship (Marino, Strandholm, Steensma, & Weaver, 2002), and management consulting (Bamford & Ernst, 2002) have tackled the alliance portfolio phenomenon, each using the theories and frameworks provided by their respective domains. Such a broad range of perspectives of different theories and alliance portfolio-related research issues makes it difficult to synthesize the existing insights and knowledge on the subject.

Therefore, the purpose of this article is to (a) identify, review, and organize key conceptual and empirical research on alliance portfolios and (b) establish a research agenda by identifying key research issues and questions in areas where further research is required. The research effort in this article focuses primarily on articles published in major scholarly peer-reviewed journals. In the first part of this article, I address the question of what an alliance portfolio is. Next, I briefly describe the method that was used to conduct the extensive survey, review, and categorization of the literature. I then provide a brief overview of the theoretical lenses that have been used to study alliance portfolios. In the third section of the article, I review recent scholarly developments in three research streams central to alliance portfolios: (a) the emergence of alliance portfolios, (b) the configuration of alliance portfolios, and (c) the management of alliance portfolios. Last, I conclude the article by highlighting the shortcomings in the existing literature and identifying and discussing the issues and questions that need to be addressed by future research.

## **What Is an Alliance Portfolio?**

Alliance researchers seem to agree in general on what a strategic alliance is, leading to small variation between the existing alliance definitions. When it comes to alliance portfolios, however, there seems to be less agreement, more variation, and more confusion on what exactly constitutes an alliance portfolio. The fact that the alliance portfolio phenomenon has been approached by researchers from diverse organizational fields has resulted in multiple and at times confusing alliance portfolio conceptualizations.

The most common approach to define an alliance portfolio is to take an additive perspective (i.e., viewing an alliance portfolio as the aggregate of all strategic alliances of a focal firm; Bae & Gargiulo, 2004; George et al., 2001; Hoffmann, 2005, 2007; Marino et al., 2002; Lavie, 2007; Lavie & Miller, 2008). Studies grounded in the network literature define an alliance portfolio as a focal firm's egocentric alliance network (i.e., all direct ties with partner firms; Baum et al., 2000; Ozcan & Eisenhardt, 2009; Rowley et al., 2000). Alliance

**Table 1**  
**Existing Conceptualizations of Alliance Portfolios**

Study	Alliance Portfolio Conceptualization
Bae & Gargiulo (2004)	The set of alliances in which a firm is involved
Baum et al. (2000) and Rowley et al. (2000)	A focal firm's egocentric alliance network (i.e., all direct ties with partner firms) (social network perspective)
Doz & Hamel (1998)	The set of bilateral alliances maintained by a focal firm
George et al. (2001)	A firm's portfolio of strategic agreements or relationships
Hoffmann (2005, 2007)	All alliances of a focal firm
Lavie (2007)	A firm's collection of direct alliances with partners
Lavie & Miller (2008)	A firm's collection of immediate alliance partners
Parise & Casher (2003)	A firm's network of business-partner relationships
Reuer et al. (2002)	A firm's accumulated international joint venture experience (learning perspective)
Reuer & Ragozzino (2006)	All international joint ventures of a focal firm

researchers that approach the alliance portfolio phenomenon from a learning angle define an alliance portfolio as a focal firm's accumulated alliance experience (i.e., a firm's ongoing as well as past alliances; Anand & Khanna, 2000; Hoang & Rothaermel, 2005; Kale, Dyer, & Singh, 2002; Reuer, Park, & Zollo, 2002; Simonin, 1997).

An ongoing issue with the existing definitions is that the level of analysis from a strategic management perspective—that is, whether the alliance portfolio is situated on the business or corporate level—is often unclear. Although from a business strategy perspective an alliance portfolio includes only alliances of a particular business, from a corporate strategy perspective it includes all alliances of a multibusiness firm. Thus, multibusiness firms can theoretically have as many alliance portfolios as they have businesses. Therefore, from a corporate-level strategy perspective, an alliance portfolio can be viewed as the collection of the alliance portfolios of the different businesses. Few authors are explicit on where they situate the alliance portfolio (e.g., Hoffmann, 2007), and the majority of the authors do not clearly specify the level of analysis for this issue.

A second issue with the existing alliance portfolio definitions is that the temporal perspective is often unclear. The point here is whether a focal firm's alliance portfolio includes only the active alliances or also past alliances that have become inactive at the point of study. The latter perspective is frequently chosen in research that focuses on the issues of learning across an alliance portfolio and the creation of alliance capability (Anand & Khanna, 2000; Hoang & Rothaermel, 2005; Kale et al., 2002; Reuer et al., 2002; Simonin, 1997).

Furthermore, some authors chose to include only certain types of alliances in their alliance portfolio definitions. For instance, Doz and Hamel (1998) define an alliance portfolio as the set of bilateral alliances maintained by one firm, whereas Reuer and Ragozzino (2006) view an alliance portfolio as all international joint ventures of a focal firm. However, the exclusion of certain alliance types from the definition may create an incomplete or biased alliance portfolio view. For example, Doz and Hamel's focus on bilateral alliances assumes away that many firms are indeed engaged in both bilateral as well as multipartner alliances. Moreover, Reuer and Ragozzino's (2006) definition excludes alliances with a domestic

scope as well as alliances with governance structures other than joint ventures such as licensing agreements. To help clarify these various definitions, Table 1 provides a summary of the most prominent alliance portfolio conceptualizations used in the extant literature.

Moreover, confusion on what constitutes an alliance portfolio is also created because some of the existing terminology is inconsistently used to describe different alliance-related phenomena. For example, although social network theorists (Baum et al., 2000; Rowley et al., 2000) use the term *alliance network* to refer to a focal firm's direct ties with different partners (i.e., its alliance portfolio), some authors use the identical term to refer to multiparty alliances (i.e., a strategic alliances with more than two partners; Doz & Hamel, 1998; Goerzen, 2005; Koza & Lewin, 1999). Some authors, however, refer to such multiparty alliances as alliance constellations (Das & Teng, 2002; Gomes-Casseres, 1994; Lazzarini, 2007) or alliance blocks (Vanhaverbeke & Noorderhaven, 2001). Moreover, a number of studies examine the phenomenon of alliance networks not from a focal firm (i.e., egocentric) perspective but from the industry level of analysis (e.g., Gulati & Gargiulo, 1999; Schilling & Phelps, 2007). Furthermore, Doz and Hamel (1998) coined the term *alliance web*, which they clearly distinguish from an alliance portfolio, by defining it as "a set of alliances that are more interdependent than a portfolio but less uniform than a network" (p. 223). Lorenzoni and Baden-Fuller (1995) use a similar term, namely, *web of alliances*, to refer to an alliance network with strategic guidance by a center organization.

Thus, to overcome the shortcomings and limitations in the extant literature, future alliance portfolio research must pay attention to the use of terms with more than one meaning. Moreover, depending on the theoretical lens used, future research must also be explicit about (a) the types of the focal firm's alliances that are included and excluded, (b) whether the alliance portfolio is situated on the business or corporate level, and (c) the temporal perspective chosen (i.e., whether past alliances that have become inactive are included).

As the objective of this article is to identify, review, and organize the existing knowledge and insights related to the issues arising from a focal firm's engagement in more than one alliance, I deliberately adopt a broad alliance portfolio definition to also include research adjoining to the alliance portfolio phenomenon. Such adjoining research includes the alliance capability literature. Thus, for the purpose of this study, I define an alliance portfolio as a focal firm's past as well as ongoing strategic alliances of all types. Because the objective of this study is to produce a complete as possible review of the existing literature, I include alliance portfolio research that is situated on the business as well as corporate level. Moreover, I exclude the phenomenon of multipartner alliances as well as alliance networks on the industry level of analysis from this review because they are at a different level of analysis than the alliance portfolio phenomenon.

## Method

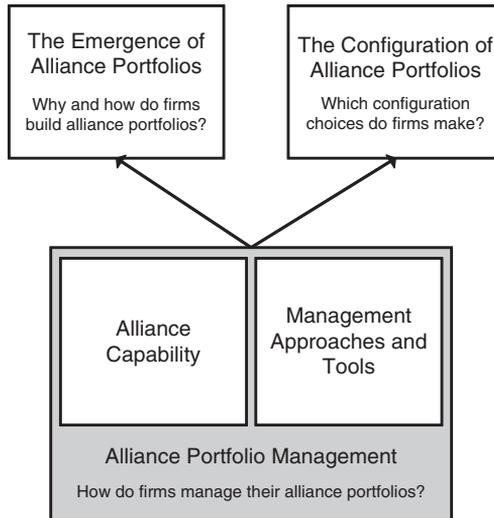
In this study, I applied a method similar to that described in Provan, Fish, and Sydow (2007). The first step in the adapted process of surveying and reviewing the relevant existing scholarly work on alliance portfolios was an extensive search for scholarly peer-reviewed journal articles in the subject areas of business and management (including entrepreneurship), economics, finance, and sociology using various search engines such as EBSCO

Academic Search Premier, the JSTOR Arts and Science Collection, and ABI/INFORM on ProQuest. The search covered a 20-year time period, a time span that is often used in literature reviews, spanning from 1988 to today and used both specific terms such as *alliance portfolio*, *alliance network*, *alliance web*, *strategic alliance*, *joint venture*, *inter-firm/organizational relationship*, *inter-firm/organizational collaboration*, as well as more generic terms such as *alliance*. Because the bulk of alliance portfolio research has accumulated in more recent years, an additional search on journal Web sites for in press articles was conducted to ensure a more complete list of articles (e.g., Articles in Advance of *Organization Science* or OnlineFirst of the *Journal of Management*). The second step was to analyze the titles and abstracts of the articles that came out of the search and decide on whether they are relevant to the alliance portfolio phenomenon. For cases in which a title or abstract was not conclusive about the relevance of the article, the article was scanned in more detail to determine whether it should be included in the review. Irrelevant articles were discarded. The third step included an in-depth analysis of the reference section of the relevant articles to identify relevant books on the subject and references that may have been omitted in the keyword search. The next step was then to read all the relevant articles that met the requirements and produce a summary including key characteristics such as the study type (i.e., theoretical, empirical, or practitioner oriented), the research issue and question, theoretical underpinnings, research design, independent and dependent variables, empirical setting, findings, and implications. In addition, each study was coded with keywords to identify emerging themes in alliance portfolio research.

The alliance portfolio research themes that emerged from the reviewed literature clustered around three major questions, each representing an important phase and challenge in the life cycle of an alliance portfolio: (a) why and how firms build alliance portfolios, (b) which configuration choices firms make, and (c) how firms manage their alliance portfolios on an ongoing basis. Moreover, the empirical large sample size—quantitative research predicting a performance-related outcome variable and thus addressing the issue of “how alliance portfolios impact performance”—falls almost exclusively into the second domain because the bulk of the existing studies explains performance differentials through variation in firms’ alliance portfolio configurations. Although most empirical studies focus on the impact of certain alliance portfolio attributes on a performance variable, the conceptual and more managerially oriented articles mainly address the issue of how to manage an alliance portfolio. Although the bulk of the adjoining research on alliance capability focuses on building single alliance management capability through the engagement in multiple alliances (Anand & Khanna, 2000; Hoang & Rothaermel, 2005; Kale et al., 2002), more recent extensions of that line of research have focused on the concept of alliance portfolio management capability (Heimeriks, Duysters, & Vanhaverbeke, 2007; Sarkar, Aulakh, & Madhok, in press). Figure 1 depicts the conceptual map of the alliance portfolio research areas and the linkages between them.

To summarize, the alliance portfolio research issues that were identified in the extant literature can be categorized into the following three general research streams: (a) the emergence of alliance portfolios, (b) the configuration of alliance portfolios, and (c) the management of alliance portfolios. Before I review the existing research in each of these three streams, I briefly review in the next section the theoretical lenses that have been used to study alliance portfolios.

**Figure 1**  
**Conceptual Map of Alliance Portfolio Research Areas**



## Theoretical Lenses in Alliance Portfolio Research

Researchers studying alliance portfolios have drawn on a wide range of theoretical lenses commonly used in strategic management research (Rumelt, Schendel, & Teece, 1994). Table 2 summarizes the most common theories used in alliance portfolio research.

In many studies, researchers chose to integrate two or more theoretical lenses to examine the issue under study. Two theories that have been integrated in a significant number of studies are social network theory and the resource-based view of the firm (Ahuja, 2000a, 2000b; Baum et al., 2000; Chung, Singh, & Lee, 2000; Zaheer & Bell, 2005). Other theoretical lenses that were integrated are transaction cost economics with social network theory (Goerzen, 2007; Goerzen & Beamish, 2005), organizational learning and network theory (Gulati, 1999; Powell, Koput, & Smith-Doerr, 1996; Rowley et al., 2000; Stuart, 2000), real options theory and the resource-based view of the firm (Vassolo, Anand, & Folta, 2004), network theory and resource dependency theory (Bae & Gargiulo, 2004; Ozcan & Eisenhardt, 2009), the relational view and organizational learning (George et al., 2001), and the knowledge-based view of the firm with evolutionary economics and dynamic capabilities (Kale et al., 2002; Lorenzoni & Lipparini, 1999).

Some theories are particularly suited to address specific alliance portfolio research issues. For instance, the bulk of the studies examining alliance portfolio configuration use theories grounded in the social network literature, the resource-based view, or organizational learning (including the exploration/exploitation framework) or a combination of the three (Ahuja,

**Table 2**  
**Theoretical Lenses Used in Alliance Portfolio Research**

Theoretical Lens	Study
Social network theory	Ahuja, 2000a, 2000b; Bae & Gargiulo, 2004; Baum et al., 2000; Capaldo, 2007; Chung et al., 2000; Goerzen, 2007; Goerzen & Beamish, 2005; Gulati, 1999; Powell et al., 1996; Rowley et al., 2000; Stuart, 2000; Walker et al., 1997; Zaheer & Bell, 2005
Organizational learning in general	Anand & Khanna, 2000, Deeds & Hill, 1996; Draulans et al., 2003; George et al., 2001; Gulati, 1999; Hoang & Rothaermel, 2005; Kale et al., 2002; Lavie & Miller, 2008; Powell et al., 1996; Reuer et al., 2002; Stuart, 2000
Exploration/exploitation framework	Dittrich et al., 2007; Lavie & Rosenkopf, 2006; Rothaermel, 2001
Resource-based view of the firm	Ahuja, 2000a, 2000b; Chung et al., 2000; Lavie, 2006; Lorenzoni & Lipparini, 1999; Vassolo et al., 2004; Zaheer & Bell, 2005
Dynamic capabilities	Kale et al., 2002; Lorenzoni & Lipparini, 1999
Knowledge-based view	Draulans et al., 2003; Kale et al., 2002; Lorenzoni & Lipparini, 1999
Relational view	George et al., 2001
Evolutionary economics	Kale et al., 2002
Transaction cost economics	Goerzen, 2007; Goerzen & Beamish, 2005
Other economics	Deeds & Hill, 1996
Agency theory	Reuer & Ragozzino, 2006
Contingency theory	Hoffmann, 2007
Coevolutionary perspective	Hoffmann, 2007
Contract theory	Anand & Khanna, 2000
Real options	Vassolo et al., 2004
Resource dependency theory	Bae & Gargiulo, 2004; Ozcan & Eisenhardt, 2009

2000a, 2000b; Baum et al., 2000; George et al., 2001; Lavie & Rosenkopf, 2006; Stuart, 2000). Researchers studying the emergence of alliance portfolios have frequently borrowed from social network theory, the resource-based view of the firm, and organizational learning (Ahuja, 2000b; Gulati, 1999; Ozcan & Eisenhardt, 2009; Powell et al., 1996). The majority of the studies addressing the issue of alliance capability are grounded in organizational learning, the knowledge-based view of the firm, the dynamic capabilities literature, and evolutionary economics (Anand & Khanna, 2000; Draulans, de Man, & Volberda, 2003; Heimeriks & Duysters, 2007; Heimeriks et al., 2007; Hoang & Rothaermel, 2005; Kale et al., 2002; Lorenzoni & Lipparini, 1999).

Overall, researchers have examined the alliance portfolio phenomenon through a broad range of different theoretical lenses. Scholars have taken two routes to tackle alliance portfolios. Although some researchers identified interesting and relevant alliance portfolio-related issues and questions from the real world and then drew on the respective theories best suited to answer the question (e.g., Hoffmann, 2007), other scholars started with a theoretical gap or tension and picked alliance portfolios as the phenomenon to test the developed theory (e.g., Vassolo et al., 2004).

## Existing Alliance Portfolio Research

### *The Emergence of Alliance Portfolios*

A logical starting point for a literature review on alliance portfolios are the following questions: (a) Why do firms build alliance portfolios? (b) How do they go about it? The first question, however, is somewhat different from the issues of “why firms enter into alliances” (Ahuja, 2000b; Chung et al., 2000; Gulati, 1995b, 1998) and “how alliance networks emerge on the industry level of analysis” (Gulati & Gargiulo, 1999) that have been addressed in the alliance literature. Indeed, a large and important part of the traditional alliance literature focuses on the formation of individual alliances and explains why firms enter into strategic alliances and who they choose as partners (Ahuja, 2000b; Chung et al., 2000; Gulati, 1995b, 1998). The motivations of why firms form strategic alliances are manifold: to access new valuable resources from partners (Chung et al., 2000; Das & Teng, 2000; Eisenhardt & Schoonhoven, 1996; Lavie, 2006), to reduce transaction costs (Kogut, 1988), to learn from a partner (Inkpen, 2000; Kogut, 1988), to deal with uncertainty through future options for expansion (Kogut, 1991), or to improve the competitive positioning vis-à-vis rivals (Gimeno, 2004; Kogut, 1988; Silverman & Baum, 2002). Because alliance portfolios are essentially the result of various formations of individual alliances, each having their own motivation and singular purpose, an important link between the objectives of individual alliances and the alliance portfolio strategy is the business-level strategy deployed (Hoffmann, 2007). However, alliance portfolios often represent a mixed bag of individual alliances that as a whole fail to cohere into a consistent portfolio (Bamford & Ernst, 2002; Doz & Hamel, 1998; George et al., 2001).

Alliance researchers report a broad number of rationales for why firms build and maintain alliance portfolios that go beyond the previously discussed motivations of why firms enter into individual strategic alliances. Indeed, firms can receive benefits from the engagement in multiple simultaneous alliances that may not be available to them if they had only one alliance at a given point in time. One of the main motivations for firms to build alliance portfolios is the management of risk and uncertainty. By pursuing multiple goals through a number of simultaneous alliances, firms can spread the risk and potentially overcome uncertainty and obtain greater alliance benefits overall (George et al., 2001; Hoffmann, 2007). Also from a learning perspective, building an alliance portfolio can provide benefits beyond the single alliance level. Multiple simultaneous alliances with different partners can help firms to create a more substantial experience base to accelerate their learning on how to design and manage strategic alliances (Anand & Khanna, 2000). Although alliances are generally viewed as strategically critical mechanisms to access valuable partner resources to overcome internal resource constraints, an alliance portfolio and thus the simultaneous access to a broad range of valuable network resources from different partners can be an effective means to enhance a firm’s resource stock and capacity to earn relational rents (Ahuja, 2000b; Gulati, 2007; Hoffmann, 2007; Lavie, 2006).

Furthermore, from a social network perspective, firms may also be induced to build alliance portfolios for a number of reasons. First, firms may face opportunities to either exploit structural holes between themselves, an already existing partner, and a new potential

partner or increase the social capital among their already existing alliance partners through the formation of additional alliances (Walker, Kogut, & Shan, 1997). Moreover, from a relational embeddedness perspective, firms may expand certain parts of their alliance portfolios by engaging in new alliances with already existing (i.e., repeated) alliance partners (Goerzen, 2007; Gulati, 1995a; Gulati & Gargiulo, 1999). A history of joint collaboration and the level of trust established between alliance partners influence not only the probability of future alliance formation between the partners but also decisions regarding the governance structure of a future alliance (Gulati, 1995a; Gulati & Gargiulo, 1999). A third factor that influences firms' decisions to add alliances to their alliance portfolios is structural embeddedness. From such a perspective, a focal firm and a potential new alliance partner are more likely to engage in a new alliance if they already had prior indirect alliance ties (Gulati & Gargiulo, 1999).

Last, the external environment has also been identified as an important factor in explaining why firms build alliance portfolios. On one side, firms often build and use their alliance portfolios as mechanisms to coevolve with the competitive environment to shape the nature of competition (Lorenzoni & Lipparini, 1999). On the other side, firms' alliance portfolios can also be shaped by competition and thus represent the result of a complex process of industry-level competitive dynamics in which strategically behaving firms build alliance portfolios over time by entering into both offensive and defensive alliances (Gimeno, 2004).

A second set of studies that is focusing on startup and entrepreneurial firms shows that firms with a high degree of entrepreneurial orientation use strategic alliances more extensively and are thus more likely to build alliance portfolios than firms with a weak entrepreneurial orientation (Marino et al., 2002). An important motive for start-up firms to build an alliance portfolio is the creation of relationships and resources typical of a more established firm (Baum et al., 2000). Building an alliance portfolio with prominent partners that can provide access to valuable resources is often part of startups' initial public offering (IPO) strategy because the affiliation to a set of well-established partners can provide important signals to the stock market and may affect IPO success (Gulati & Higgins, 2003; Stuart, Hoang, & Hybels, 1999). Recent research has also started to address the issue of how firms build their alliance portfolios. Ozcan and Eisenhardt (2009) provide process-oriented insights on how entrepreneurial firms originate their alliance portfolios. The authors show that alliance portfolios are the result of firms' strategic choices in three areas: (a) the approach on how to visualize the alliance portfolio in the context of an entire industry and how to shape the architecture of the industry, (b) the decision to engage disconnected firms to exploit opportunities, and (c) the approach on how to tackle uncertainties that occur in the industry.

Although the previously mentioned studies implicitly assume that firms are boundedly rational and build alliance portfolios for strategic reasons to fulfill shareholder interests, recent research has questioned that logic and examined the process of building alliance portfolios from a corporate governance perspective. By applying an agency theory perspective, Reuer and Ragozzino (2006) found that firms' decisions regarding investments in alliance portfolios are influenced by agency hazards arising from the separation of ownership and control. Managers' own interests and efforts to obtain private benefits from creating or expanding an alliance portfolio can therefore harm the interest of the focal firm and its shareholders. This study is an important contribution to the research on how alliance portfolios

emerge and a counterweight to the first set of studies because it applies a corporate governance perspective. However, the generalizability of the findings may be somewhat limited because of the study's focus on U.S. manufacturing firms.

To sum up, the findings of the existing studies in this area of research indicate that the emergence of alliance portfolios can be explained from two different perspectives. First, on the firm level of analysis, it can be concluded that firms build alliance portfolios mainly for strategic reasons to enhance their strategic competitiveness. Alliance portfolios can therefore be seen as the outcome of a rational strategy process. From the level of the individual manager, however, the perspective is very different because here alliance portfolios may simply be the result of managers' efforts to maximize their own utility functions. Although the outcome for both processes is essentially the alliance portfolio that was built over time, although driven by different motivations, variation may occur in the alliance portfolios' configurations. Alliance portfolios that are the outcome of a rational strategy process and aimed at enhancing firms' strategic competitiveness may be more coherent than alliance portfolios that emerge as a result of agency hazards potentially leading to a more random mix of alliances. The research area of alliance portfolio configuration represents another important research stream that is reviewed in more detail in the next section.

### *The Configuration of Alliance Portfolios*

Research on alliance portfolio configuration is about the content of alliance portfolios and its arrangement. Alliance portfolio configuration is a complex concept comprising multiple dimensions including (a) a size dimension determined by characteristics such as the number of alliances and partners (Ahuja, 2000a; Deeds & Hill, 1996; Hoffmann, 2007); (b) a structural dimension constituted by characteristics such as breadth, density, and the level of redundancy within the portfolio (Ahuja, 2000a; Gulati, 1999; Hoffmann, 2007; Koka & Prescott, 2008); (c) a relational dimension made up of characteristics such as the tie strength of individual alliances in the portfolio (Hoffmann, 2007; Rowley et al., 2000); and (d) a partner dimension focusing on certain partner-related characteristics (Lavie, 2007; Stuart, 2000; Stuart et al., 1999). Additional complexity is added to the conceptualization of alliance portfolio configuration by the fact that these four configuration dimensions span across multiple levels of analysis. Although the size related and structural characteristics of alliance portfolios are on the alliance portfolio level of analysis, the relational dimension is on the individual alliance level of analysis, and the partner dimension is on the partner firm level of analysis.

The configuration of a focal firm's alliance portfolio essentially determines

- (1) the quality, quantity, and diversity of information and resources to which the focal company has access, (2) the efficiency of the access to these network resources, and (3) the flexibility or stability of the focal company's position in the interorganizational field. (Hoffmann, 2007: 834)

By maintaining strategic alliances, firms, however, incur not only benefits but also costs (Madhok & Tallman, 1998, Park & Zhou, 2005, White & Lui, 2005). Although in some cases the cost-benefit evaluation can be carried out at the single alliance level, in many situations the costs and benefits need to be assessed in a broader context (Park & Zhou, 2005). From

an alliance portfolio perspective, such a broader context can be the configuration of the portfolio. The costs and benefits related to alliance portfolios essentially depend on how efficiently an alliance portfolio is configured. According to Baum et al. (2000), an alliance portfolio is configured efficiently when it provides “access to more diverse information and capabilities per alliance, and thus produce[s] desired benefits with minimum costs of redundancy, conflict, and complexity” (p. 270). Although from a cost-benefit perspective the ultimate goal is to maximize alliance portfolio efficiency to receive the maximum amount of benefits at the least possible costs, actual practice is often different. Even though recent research has shown that alliance portfolio configuration is driven by business strategy and in many firms is not the outcome of a random process (Hoffmann, 2007), the alliance portfolios of many firms are configured inefficiently and often represent nothing more than a random mix of strategic alliances with sometimes even conflicting demands (Bamford & Ernst, 2002). As noted earlier, this may be explained by corporate governance issues such as agency hazards (Reuer & Ragozzino, 2006).

Researchers have tackled alliance portfolio configuration from multiple perspectives and addressed a broad range of research issues. Although some of the existing studies are mainly conceptual advancing frameworks aimed at better understanding certain configuration-related issues, empirical research on the subject can be classified into two different types: (a) studies that draw a link between certain dimensions of alliance portfolio configuration and a performance-related outcome variable (i.e., studies addressing the question, “Do alliance portfolios affect performance?”) and (b) studies that examine a configuration issue but predict other, non-performance-related, outcomes. Moreover, the bulk of the literature in this research area has taken a cross-sectional and static perspective, and only more recently, a few studies have applied a longitudinal and dynamic perspective to examine the changes firms make in their alliance portfolio configuration over time (Dittrich, Duysters, & de Man, 2007; Dyer & Nobeoka, 2000; Hoffmann, 2007).

In this section, I review six prominent research issues that have been discussed in the existing literature on alliance portfolio configuration: (a) the role of alliance portfolio size, (b) the role of the alliance partners, (c) the role of structural and relational alliance portfolio characteristics, (d) the role of interdependencies between alliances and alliance partners, (e) changes that firms make in the configuration of their alliance portfolios over time, and (f) the role of experience accumulation, learning, and knowledge transfer within alliance portfolios.

*Quantity versus quality: Does alliance portfolio size matter?* Perhaps the most prominent debate in the literature concerning alliance portfolio configuration is centered around the issue of how alliance portfolio size affects the benefits that firms derive from their alliance portfolios. Authors in this line of research have drawn on a broad range of theoretical lenses, such as the resource-based view of the firm (Ahuja, 2000a; Baum et al., 2000), social network theory (Ahuja, 2000a; Baum et al., 2000; Gulati, 1999; Stuart, 2000), and basic economic theory (Deeds & Hill, 1996). Independent from the theoretical lens chosen, the majority of these studies operationalize alliance portfolio size as a count variable measured as the number of alliances a focal firm is engaged in at a given point in time.

A first set of studies concludes that size matters and shows that alliance portfolio size is indeed significant in explaining performance differentials among firms. Most of these studies focus on entrepreneurial biotechnology firms and technological performance, such as innovation output rates (Shan, Walker, & Kogut, 1994) or new product development (Deeds & Hill, 1996). Researchers in this domain have found different types of relationships between alliance portfolio size and performance. Some authors suggest that more is better; others posit that bigger is not necessarily better. Although Shan et al. (1994) find that a start-up's number of cooperative relationships with larger firms has a positive linear effect on its innovative output, Deeds and Hill (1996) report a curvilinear relationship between an entrepreneurial biotechnology firm's number of alliances and the firm's rate of new product development. Although a linear relationship suggests that firms earn the same returns from each new alliance added to their alliance portfolio, the findings from the second study suggest that this is not the case and firms will earn diminishing returns from each additional alliance added to an alliance portfolio once their alliance portfolio has passed a certain size. However, as these two studies focus mainly on entrepreneurial biotechnology firms, the generalizability of the results may be somewhat limited.

The relationship between alliance portfolio size and the benefits that firms derive from their alliance portfolios, however, appears to be even more complex because a second set of studies concludes that size alone does not matter because it can be outweighed by other factors. Contrary to the findings of the research that focused on size only, these studies conclude that size alone is not a sufficient predictor for performance. To understand the full impact of alliance portfolio size on performance, other configuration factors such as alliance portfolio breadth (Ahuja, 2000a; Gulati, 1999), efficiency (Baum et al., 2000), and alliance partner quality (Stuart, 2000; Stuart et al., 1999) need to be considered and may actually be more important than size in explaining the benefits firms derive from their alliance portfolios. Alliance portfolios that are small in size but have a high breadth, efficient configuration, or high-quality partners may in fact be more beneficial and cost effective than alliance portfolios that contain a large number of alliances providing access to similar partners and therefore redundant resources, information, and capabilities. The breadth of an alliance portfolio is, however, not so much a matter of the portfolio's size but of the extent of the connections of the focal firm's alliance partners (Gulati, 1999). Concerning the link between alliance portfolio breadth and alliance portfolio efficiency, it seems that an alliance portfolio with few direct ties but with access to a large number of indirect ties can be a very effective means to enjoy the advantages of size without having to bear the costs of an alliance portfolio with a large number of direct ties (Ahuja, 2000a). Overall, firms with broader alliance portfolios are likely to have better access to additional resources, knowledge, and information about existing and potential partners but are also more visible themselves for firms that seek partnering opportunities (Ahuja, 2000b; Gulati, 1999).

As previously noted, to fully understand the size–performance link, one must also consider the efficiency of an alliance portfolio's configuration (i.e., nonredundancy among alliance partners in the portfolio). An efficient alliance portfolio can outweigh the benefits of sheer size. In a study of Canadian biotechnology firms, Baum et al. (2000) find that a start-up's initial performance increases not only with the size but also with the efficiency of its alliance portfolio at founding because an efficient portfolio provides access to more diverse

information and capabilities. A third important factor that plays a critical role in understanding the size–performance link is the quality of the focal firm’s alliance partners in its alliance portfolio. Also here, research has shown that the advantage of an alliance portfolio is in fact not so much determined by its size but by certain characteristics and the quality of the partner firms to which a focal firm is connected (Stuart, 2000; Stuart et al., 1999). The role of a focal firm’s alliance partners is discussed in greater detail in the next section.

To summarize, although research addressing the alliance portfolio size issue has started to accumulate, the generalizability of the existing findings may be limited, as the existing studies have focused on a small number of industries and often on a particular type of firm such as startups and entrepreneurial firms (Baum et al., 2000; Deeds & Hill, 1996; Shan et al., 1994). Although most existing studies draw a link between alliance portfolio size and performance-related outcome variables (Ahuja, 2000a; Baum et al., 2000; Deeds & Hill, 1996; Shan et al., 1994; Stuart, 2000), the findings of how alliance portfolio size affects performance remain inconclusive. Although some studies report a direct linear effect (Shan et al., 1994), others show a curvilinear effect (Deeds & Hill, 1996) or even suggest a moderated relationship between the number of direct and indirect ties (Ahuja, 2000a). Regarding the size–performance link, Ahuja (2000a) also found that the number of a focal firm’s direct ties is positively related to the firm’s performance but also that the number of direct ties moderates the relationship between indirect ties and innovation output. Moreover, it seems that other configurational factors are as or even more important in predicting performance than just alliance portfolio size alone. In addition, most studies examining alliance portfolio size have taken a one-dimensional view in the sense that they focus mainly on one aspect of size, namely the number of alliances, but neglect a second important dimension, namely the number of partners a focal firm has in its alliance portfolio.

*The role of the alliance partners.* Having the right partners is crucial for alliance success (Brouthers, Brouthers, & Wilkinson, 1995). A second important aspect of alliance portfolio configuration is the set of alliance partners to which a focal firm is connected. Indeed, various studies have examined the role that alliance partners play in determining the benefits that firms derive from their alliance portfolios. Partner-level attributes that have been examined include the reputation and quality, resource contributions, and internationality of the partners.

From the perspective of young and entrepreneurial firms, the affiliation to larger already established alliance partners can provide a range of benefits, such as preferential access to valuable resources or spillover effects from the partner’s reputation. Even though various studies addressed the question of whether alliance partners play a critical role in the success of IPOs of entrepreneurial firms, findings still remain somewhat inconclusive. Stuart et al. (1999) found that young firms with prominent alliance partners and organizational equity investors completed their IPO faster and earned greater valuations from the IPO. On the contrary, Gulati and Higgins (2003) concluded that alliance portfolios did not matter for entrepreneurial firms in the biotechnology sector at the time of firms’ IPOs and that a young biotech firm’s strategic alliances with well-established pharmaceutical firms did not matter to IPO success, especially under cold market conditions for new equity offerings.

Because no single firm can possess all the strategically critical resources required for long-term success, growth, and survival, alliance portfolios can be an effective means to

access, exchange, or internalize valuable resources from partner firms. Thus, looking at the role of alliance partners from a resource and capabilities perspectives can reveal new insights on how variation in firms' alliance partners affects the benefits they derive from their alliance portfolios. The extant literature taking a resource-based and capabilities approach has examined the role of alliance partners from two distinct perspectives. First, it has examined the importance of the resource and capability endowments of the partners. A second and distinct perspective examined individual alliances and focused on the resources and capabilities that partner firms endow to the alliances with a focal firm. By taking a partner firm perspective, Stuart (2000) shows in a study of entrepreneurial firms that the benefits derived from alliance portfolios are mostly determined by the technological and innovation capabilities as well as the revenues of a focal firm's partners. Being connected to high-quality alliance partners can therefore enhance the reputation of a focal firm especially if the firm is young and entrepreneurial. Taking a different perspective and focusing on the resources that alliance partners endow to the alliances with the focal firm, Lavie (2007) recently addressed the issue of alliance partners' resource contributions to value creation on the focal firm level. He shows that the resource contribution of a focal firm's partners to value creation is contingent on the complementarity of those resources and that the relative bargaining power of alliance partners constrains the focal firm's appropriation capacity. Furthermore, Baum et al. (2000) also stress the importance of the diversity among a focal firm's alliance partners and show that a small set of alliances with diverse partners may yield more diverse resources, information, and capabilities for less cost than a large set of alliances with similar partners.

Last, a set of studies has recently examined the role of alliances and partners from an international business perspective. Alliance portfolios are important means in firms' internationalization efforts. The internationalization through alliance strategies that firms follow fall into four basic categories: (a) internationalization through local alliances, (b) internationalization through one key global alliance, (c) internationalization through multiple regional-scope alliances, and (d) internationalization through competence-building alliances (García-Canal, López Duarte, Rialp Criado, & Valdés Llana, 2002). Having international partners in the alliance portfolio can on one side provide many benefits such as access to new resources, information, and capabilities that may not be available from local partners. On the other side, an alliance portfolio with high diversity of international partners can also add additional complexity to the management of the alliance portfolio. Two recent studies found different relationships between the international dimension of firms' alliance portfolios and firm performance. By examining how the mix of unique home country partners, unique local partners, and unique partner industries in alliance portfolios affects economic performance of multinational firms, Goerzen and Beamish (2005) found a negative relationship between the international diversity of a firm's alliance portfolio and economic performance. More recently, Lavie and Miller (2008) examined how alliance portfolio internationalization (API)—that is, the cross-national differences between a focal firm's home country and its partners' countries of origin—affects the performance of U.S. software firms and how firms learn to bridge such national differences in their alliance portfolios. The authors find a sigmoid relationship between API and firm performance (i.e., as a firm's API increases, financial performance initially declines, then improves, and finally declines). They also find that both a focal firm's foreign partnering experience and subsidiary country overlap positively

moderate the relationship between API and financial performance. The findings of these studies suggest that one of the key challenges for internationally operating firms is to find the right balance between international and local alliance partners.

*Structural and relational alliance portfolio characteristics.* A third important aspect of alliance portfolio configuration is the structural and relational characteristics of alliance portfolios. The studies in this area of research are mainly grounded in the network literature and view an alliance portfolio as a focal firm's egocentric network of partnerships. The main structural and relational configuration factors that have been examined in the extant literature are the tie strength of individual alliances and the structure of the network.

Although tie strength is a concept at the individual relationship level of analysis, it has been used in a number of studies to examine alliance portfolio configuration. From an alliance portfolio perspective, the relationship between tie strength of individual alliances and the benefits that firms derive from their alliance portfolios, however, can only be fully understood when other factors are taken into account. Rowley et al. (2000) find that the relationship between tie strength in firms' alliance portfolios and firm performance is indeed contingent on the density of ties in the alliance portfolio as well as the investments in exploration and exploitation required by the external environment. However, strong ties in the context of alliance portfolios can also be a double-edged sword. On one side, an alliance portfolio of strong dyadic ties can affect a focal firm's innovative capabilities positively if they are trust based, knowledge intensive, and reinforced through the development of social content between alliance partners, relationship-specific investments, and the deepening of mutual knowledge (Capaldo, 2007). On the other side, they can also affect a focal firm's innovative capabilities negatively by stimulating a vicious circle in which a reduced number of contacts, decreased flexibility for collaboration with new partners, and diminishing responsiveness to new market trends reinforce each other, leading to a small, homogeneous, and closed network (Capaldo, 2007). Moreover, on the alliance portfolio level of analysis, firms often use a mix of structural hole bridging ties as well as strong ties to enhance their alliance ambidexterity and alliance performance (Tiwana, 2008).

Various studies have examined the role of network structure together with other factors such as focal firm as well as partner resources and capabilities to explain the costs and benefits associated with alliance portfolios. By leveraging the structure of their resource-accessing networks, especially if they provide opportunities to bridge structural holes, firms can derive more benefits from their own innovative capabilities than from the innovativeness of their partners (Dyer, Singh, & Kale, 2008; Zaheer & Bell, 2005). However, firms do leverage the structure of their alliance portfolios not only to enhance performance but also to mitigate the costs that might result from associating with resource-rich and powerful alliance partners (Bae & Gargiulo, 2004). In fact, the returns that firms obtain from their alliance portfolios are negatively related to the density of alliances between the focal firm's partners, and the relationship between the shares of resources controlled by a firm's alliance partners and the returns obtained from the alliance portfolio is positively moderated by the density of alliances between those partners (Bae & Gargiulo, 2004). The performance impact of certain structural characteristics of alliance portfolios, however, is contingent on moderating factors. Koka and Prescott (2008) show that the performance benefits of two very distinct structural

configurations of alliance portfolio (i.e., a configuration leading to a prominent network position and a configuration leading to an entrepreneurial network position that allows the bridging of structural holes) are contingent on environmental change and firm strategy. The authors also find that the effect of particular network positions on firm performance changes over time, suggesting that changes in the alliance portfolio configuration is driven by environmental and strategic contingencies.

*Interdependencies in alliance portfolios and the portfolio effect.* Two research issues that have so far received very little attention among alliance scholars are the types of interdependencies that can occur in alliance portfolios and the outcomes of such interdependencies. Technically, interdependencies in alliance portfolios can create two different types of outcomes: (a) synergies or (b) conflict. Synergies in alliance portfolios include knowledge transfer across alliances (Powell et al., 1996), economies of scale and scope (Doz & Hamel, 1998), and the development and institutionalization of firm-level alliance capability (Kale et al., 2002). Conflict in alliance portfolios refers to redundancy or competitive overlap between alliances and partners in the portfolio (Baum et al., 2000; Gimeno, 2004; Gomes-Casseres, 1996; Silverman & Baum, 2002). Moreover, the synergies and conflict in an alliance portfolio create what can be referred to as the alliance portfolio effect, which makes the overall value created by an alliance portfolio greater or smaller than the sum of the values created by each individual alliance in the portfolio (Vassolo et al., 2004). The few existing studies that have tackled this topic refer to synergy-creating interdependencies as facilitating or superadditive interdependencies and to conflict-creating interdependencies as constraining or subadditive interdependencies (Parise & Casher, 2003; Vassolo et al., 2004).

Synergy- or conflict-creating interdependencies in alliance portfolios can occur on two different levels. First, they can occur between individual alliances (Vassolo et al., 2004) and more specifically between alliances of one business unit or between various alliances of different business units (Hoffmann, 2007). Second, synergy- or conflict-creating interdependencies can also occur between a focal firm's partners within an alliance portfolio (Parise & Casher, 2003). According to Parise and Casher's (2003) framework, synergies between partners in an alliance portfolio occur when partners affect one another positively because they (a) are both part of the same network, (b) provide complementary offerings, (c) promote similar standards or infrastructure, (d) learn from each other, or (e) view the presence of other members in the portfolio as a way to mitigate their own risk.

On the other side, conflict between partners occurs when they affect one another negatively because they (a) are members of competing networks, (b) are strong rivals in an industry, or (c) promote competing technologies. Although this framework is an important pillar for understanding the types and causes of interdependencies between partners in an alliance portfolio, it is descriptive in nature and does not allow deriving any conclusions about the performance impact and portfolio effect of the interdependencies. Moreover, because the framework is geared toward understanding synergies and conflict between partners, it provides an incomplete view of alliance portfolio interdependencies because it ignores the interdependencies that can occur between individual strategic alliances.

Another study took a different perspective and examined the interdependencies that can occur between alliances. By examining portfolios of biotechnology alliances, Vassolo et al.

(2004) model super- and subadditive interdependencies between individual alliances and find that when firms invest in multiple and competing alliances, correlations between the outcomes of the alliances lead to a subadditive value of the portfolio, and when firms invest in multiple projects, fungibility of shared resources with the projects leads to a superadditive value of the portfolio. Superadditive interdependencies, therefore, create a positive alliance portfolio effect because they create value above and beyond the aggregated value that is created by all individual alliances in the portfolio. Consequently, subadditive interdependencies create a negative portfolio effect because they destroy value relative to the aggregated value that is created by all individual alliances in the portfolio.

To sum up, this area of research is central to alliance portfolios because interdependencies in alliance portfolios are critical determinants whether the overall value that firms derive from their alliance portfolios is greater or smaller than the sum of the values of each individual alliance in the portfolio. Surprisingly, this area of research is underresearched and lacks empirical studies on the subject. Moreover, to fully understand synergies and conflict in alliance portfolios, both interdependencies between individual alliances as well as partners in an alliance portfolio need to be considered simultaneously to create a more complete alliance portfolio view. Recent empirical scholarly work that has addressed the issue of interdependencies in alliance portfolios provides support for the portfolio effect idea (Vassolo et al., 2004), but research tackling the measurement of the portfolio effect is still scant. Moreover, because there are only a few studies that examine this issue empirically, the generalizability of the findings is uncertain.

*Changing the alliance portfolio configuration over time.* The configuration of an alliance portfolio is generally not of static nature, and it may in fact change over time through both the formation of new alliances (Ahuja, 2000b; Chung et al., 2000) as well as the termination of existing ones (Makino et al., 2007; Reuer & Zollo, 2005). Although both alliance formations and terminations have been studied as independent phenomena, studies that take an alliance portfolio perspective and consider both simultaneously are scant. So far, only a few case-based studies have addressed the issue of how alliance portfolios evolve and how their configuration changes over time (Dittrich et al., 2007; Dyer & Nobeoka, 2000; Hoffmann, 2007). Oftentimes, firms are forced to change the configuration of their alliance portfolios to improve their competitive position vis-à-vis their rivals in an industry or simply to secure their competitive advantage. Firms change the configurations of their alliance portfolios by altering one or more of the configuration parameters, such as the number of alliances or partners (i.e., portfolio size) or the tie strength with certain partners.

The studies that address changes in alliance portfolio configuration have looked at this phenomenon from two different perspectives: Some studies focus on the antecedents that drive the changes in the configuration (Hoffmann, 2007), whereas others treat the changes in alliance portfolio configurations as an antecedent to an outcome variable such as a firm's competitiveness (Dittrich et al., 2007; Dyer & Nobeoka, 2000). Antecedents that drive changes in the configuration of alliance portfolios include strategic uncertainty, the potential to shape the environment, and the firm's alliance strategy (Hoffmann, 2007). Studies in the second line of thought have shown that firms generate, transfer, and recombine knowledge

to strengthen the relationship dimension in their alliance portfolios over time (Dyer & Nobeoka, 2000) or simply add and delete alliance partners from their portfolio to drive radical strategic change to enhance their competitiveness (Dittrich et al., 2007).

*Experience-, learning-, and knowledge-related dimensions.* Last, a prominent stream of alliance portfolio configuration research has taken a different approach and examined the experience-, learning-, and knowledge-related dimensions of alliance portfolio configuration. Research issues in this domain that have been examined include the accumulation and structure of experience, the balance of different learning styles, and knowledge flows within alliance portfolios.

From a learning perspective, an alliance portfolio can be viewed as a repository of experience as well as a vehicle for learning. Because an alliance portfolio essentially represents a firm's accumulated alliance experience, an important issue is how firms benefit from that experience. Research has indeed shown that past experience matters for the value that firms derive from their alliances (Anand & Khanna, 2000). Moreover, when a new alliance is added to an alliance portfolio, three factors need to be considered simultaneously to fully understand the value that is created by this new alliance: the amount of prior alliance experience, the heterogeneity of that prior alliance experience, and the degree of novelty of the new alliance that is added to the alliance portfolio (Reuer et al., 2002). Firms with very homogeneous alliance experience may find it in fact difficult to benefit from their experience when they have to deal with new alliances that are novel in scope.

Firms create their experience base through different styles of learning, and firms that view alliance portfolios as learning face the challenge to balance these different learning styles within their portfolios. Two particular learning styles (i.e., exploration and exploitation) have been examined extensively in the dyadic alliance literature (Rothaermel, 2001). However, very little is known on how firms configure their alliance portfolios to balance their exploration and exploitation activities. A recent study shows that firms indeed balance exploration and exploitation over time and across three alliance portfolio domains: (a) a function domain (i.e., whether an alliance generates new or leverages existing knowledge), (b) a structural domain referring to the network positions of alliance partners, and (c) a partner attribute domain (Lavie & Rosenkopf, 2006).

Moreover, researchers have also started to examine the link between alliance portfolios and firms' absorptive capacity (Cohen & Levinthal, 1990). Research has shown that a firm's absorptive capacity is in fact influenced by two alliance portfolio configuration characteristics, which explain firm performance differentials over and above what is explained by the firm's absorptive capacity: (a) alliance structure (i.e., horizontal and vertical relationships) and (b) knowledge flows between partners in alliance portfolios (George et al., 2001).

To summarize, the way firms configure their alliance portfolios determines not only which experience they accumulate and how and what they learn but also the benefits they derive from their alliance portfolios. Moreover, the configuration of an alliance portfolio also affects a firm's absorptive capacity and therefore its ability to use knowledge accessed from its alliance partners.

## *The Management of Alliance Portfolios*

Research concerned with alliance portfolio management mainly focuses on two distinct but interrelated topics: (a) the creation of alliance capability through the engagement in multiple alliances and (b) the approaches and tools used to manage multiple simultaneous alliances.

*Alliance capability.* An important stream of firm-level alliance research focuses on how firms learn to manage individual alliances and build alliance capability (Anand & Khanna, 2000; Kale et al., 2002). Khanna (1998) defines alliance capability as “a firm’s ability to identify partners, initiate alliances, and engage in the ongoing management and possible restructuring and termination of these alliances” (p. 351). Scholars have argued that only by possessing alliance capability can firms master the difficult task of alliance management (Kogut, 1989), achieve tangible and intangible collaborative benefits (Simonin, 1997), maximize the probability of alliance success (Kale et al., 2002), and create a competitive advantage through their alliances (Draulans et al., 2003).

Alliance experience constitutes an important antecedent for building alliance capability and collaborative know-how (Anand & Khanna, 2000; Heimeriks & Duysters, 2007; Hoang & Rothaermel, 2005; Kale et al., 2002; Simonin, 1997). Researchers have shown that the performance of firms engaging in multiple alliances over time varies with the amount of alliance experience (Simonin, 1997), the learning effects across different alliance scopes (Anand & Khanna, 2000), and the novelty of additional alliance experience related to the characteristics of the existing alliance experience (Reuer et al., 2002). In a study of alliances between pharmaceutical and biotechnology firms, Hoang and Rothaermel (2005) examine how general alliance experience, diverse partner experience, and partner-specific experience affect alliance performance. They find that general alliance experience affects alliance performance of biotech firms but not of pharmaceutical firms and that partner-specific experience has a negative effect on alliance performance.

Moreover, various alliance researchers demonstrated that firm-level alliance capability is not created by simply accumulating more alliance experience through engaging in more alliances but rather through explicit efforts to leverage previous alliance experience and facilitate the transfer of lessons learned and specific know-how across alliances (Kale et al., 2002; Powell et al., 1996). More specifically, important factors for successfully creating alliance capability include a learning process (Kale & Singh, 2007; Khanna, 1998; Lorenzoni & Lipparini, 1999; Simonin, 1997); a firm’s mechanisms and routines to capture, codify, store, integrate, and diffuse prior and ongoing alliance know-how (Anand & Khanna, 2000; Heimeriks et al., 2007; Kale et al., 2002; Powell et al., 1996; Simonin, 1999); and training for managers and executives on alliance skills (Bamford, Gomes Casseres, & Robinson, 2003; Draulans et al., 2003; Kale, Dyer, & Singh, 2001). Research has shown that firms that institutionalize these mechanisms and routines in a so-called dedicated alliance function (i.e., a function that coordinates all alliance-related activity across a firm’s alliance portfolio) achieve better performance on the single alliance as well as on the firm level (Kale et al., 2002). Recent research has also shown that the relationship between the existence of a dedicated alliance function and a firm’s overall alliance

success is mediated by the firm's alliance learning process (Kale & Singh, 2007). Scholars also posit that such a dedicated alliance function can indeed be an effective system for the strategic and operational monitoring and coordination of all alliances across the portfolio (Bamford & Ernst, 2002; Harbison & Pekar, 1997; Kale et al., 2001).

The alliance learning and capability literature often conceptualizes a firm's alliance portfolio as the firm's alliance experience (i.e., the firm's ongoing as well as past alliances; Anand & Khanna, 2000; Hoang & Rothaermel, 2005; Kale et al., 2002; Reuer et al., 2002; Simonin, 1997). Through their alliance portfolios, firms essentially gain two distinct types of alliance experience: (a) experience in how to manage single alliances and (b) experience in how to manage multiple simultaneous alliances with different partners. Consequently, these two types of experience can lead to two distinct types of alliance capability: (a) single alliance management capability (Anand & Khanna, 2000; Hoang & Rothaermel, 2005; Kale et al., 2002) and (b) alliance portfolio management capability (Heimeriks et al., 2007; Sarkar et al., in press). Alliance capability on the portfolio level constitutes the ability to develop the alliance portfolio strategy, establish an alliance management system, and coordinate and monitor the portfolio (Hoffmann, 2005). The way alliance portfolio management capability affects the performance of alliance portfolios depends on the way alliance experience is integrated and institutionalized in the focal firm (Heimeriks et al., 2007). Moreover, alliance portfolio management capability affects also the alliance portfolio's capital (i.e., the value residing in alliance portfolios), but this relationship is contingent on the existence of a dedicated alliance function and the diversity of the alliance portfolio (Sarkar et al., in press). Although the extant literature has mainly focused on understanding single alliance management capability, research addressing the issue of alliance portfolio management capability has only recently started to accumulate, and further research is needed to develop a more complete alliance portfolio view on the important concept of alliance capability.

*Approaches and tools for alliance portfolio management.* The second alliance portfolio management literature stream focuses on the approaches and tools that help managers to take alliance portfolio decisions. Various authors stress that managing a portfolio of alliances requires a holistic approach that takes the entire portfolio into account and moves away from treating each alliance in the portfolio as a standalone transaction (Bamford & Ernst, 2002; Duysters, de Man, & Wildeman, 1999; Hoffmann, 2005; Parise & Casher, 2003). Such a holistic approach includes the following activities: partner selection based on portfolio fit, leveraging knowledge across partners, and managing alliances as a set of competences (Duysters et al., 1999); performance measurement on the individual alliance, alliance portfolio, and alliance strategy level (Bamford & Ernst, 2002; Hoffmann, 2005; Parise & Casher, 2003); exploiting synergies and avoiding conflict across the entire portfolio (Hoffmann, 2005; Parise & Casher, 2003); as well as developing and implementing the portfolio strategy, monitoring and coordinating the portfolio, and establishing an alliance management system (Hoffmann, 2007). Dyer and Hatch (2004, 2006) also point out that by making an alliance portfolio a knowledge-sharing network in which explicit and tacit knowledge is transferred between the focal firm and its alliance partners, the alliance portfolio can become a source of competitive advantage. Furthermore, Parise and Casher (2003) stress that such a

holistic approach should also include assessing trust and knowledge exchange between partners, monitoring the impact that alliances in the portfolio have on each other and on performance overall, changing the alliance portfolio configuration over time, and aligning alliance and corporate strategy objectives. To implement such a holistic approach, firms use a number of formalized processes and tools such as knowledge management (i.e., the sharing of alliance best practices and related knowledge; Dyer & Hatch, 2004; Parise & Casher, 2003), portfolio analysis, partner programs, alliance databases (Duysters et al., 1999), and alliance scorecards (Bamford & Ernst, 2002).

Another important concern in this line of research is the assessment of alliance portfolio performance. Various authors have suggested a number of different ways on how to assess the performance of alliance portfolios. Some authors have argued that the performance assessment should be systematic, continuous, and conducted on three different levels (Bamford & Ernst, 2002; Hoffmann, 2005): (a) the individual alliance level where the performance of the alliance is assessed, (b) the business unit level where the performance of the alliance portfolio is assessed, and (c) the corporate level where the effectiveness of the firm's alliance policy is assessed. Evaluation criteria on the business unit level are the alliance portfolio's financial and strategic contribution to business performance. Criteria on the corporate level include the degree of alliance capability, the reputational capital and the degree of interorganizational trust to strategically important partners, and the positioning in cross-industry networks (Hoffmann, 2001). Other authors suggest a slightly different approach: unstructured evaluation on the individual alliance level and cross-alliance comparison on the organizational level (Draulans et al., 2003). Alliance portfolio performance assessment also includes the evaluation of performance patterns across an alliance portfolio in three areas: (a) the types of alliances that perform well for the company, (b) the stage in the alliance life cycle on which the company consistently stumbles, and (c) alliances with specific partners or types of partners that are more successful than others (Bamford & Ernst, 2002).

Firms' ability to assess the performance of their alliance portfolios is dependent on their alliance experience and alliance capability. Research has shown that evaluating individual alliances is more beneficial to inexperienced firms than to experienced firms but experienced firms on the other hand seem to benefit more from cross-alliance evaluation (Draulans et al., 2003). In contrast, there are also some claims that most firms are indeed unable to assess and control the performance of their alliance portfolios because they lack rigorous performance measurement on the individual alliance level, recognition of performance patterns across the whole portfolio, and information on the senior management level to assess whether the alliance portfolio supports the firm's strategy (Bamford & Ernst, 2002).

Overall, recent articles provide a broad range of insights and guidelines relevant for alliance managers in how to manage an alliance portfolio and assess its performance and success. An ongoing issue in this literature is that most studies are conceptual and lack large-scale empirical research and testing of the propositions or recommendations put forward. Another shortcoming in this literature stream is the lack of consistent and adequate operationalization of performance and success, and thus, large-scale empirical studies aimed at understanding the performance and success of alliance portfolios are rare. These limitations affect the generalizability of the proposed frameworks and tools.

**Table 3**  
**Future Research Opportunities**

Key Research Area	Future Research Opportunity
The emergence of alliance portfolios	<p>Conduct more empirical studies on two levels of analysis to better understand antecedents of the rationales and motivations why alliance portfolios emerge: (a) the firm level of analysis and (b) the individual manager level of analysis.</p> <p>Conduct more empirical studies to disentangle the relationship between business, corporate, and alliance strategy and alliance portfolio formation.</p> <p>Conduct more process research on how alliance portfolios emerge.</p>
The configuration of alliance portfolios	<p>Develop compound measures for configuration variables such as size and mix.</p> <p>Conduct comparative research on alliance portfolio configurations.</p> <p>Understand the costs and benefits associated with different types of alliance portfolio configurations.</p> <p>Develop measures to operationalize synergies and conflict and the alliance portfolio effect.</p> <p>Conduct longitudinal studies to understand how and why firms change the configuration of their alliance portfolios over time and how that affects firm performance.</p>
The management of alliance portfolios	<p>Conduct definitional studies to clarify the conceptual dimensions of alliance portfolio management capability.</p> <p>Clarify how alliance capability on the single alliance level is different from alliance portfolio management capability.</p> <p>Examine the role of the dedicated alliance function in alliance portfolio management.</p> <p>Measurement of the effect of existing frameworks and tools on performance-related variables.</p> <p>Establish generalizability of the existing conceptual frameworks through large-scale empirical studies.</p> <p>Clarify the conceptual dimensions of alliance portfolio performance and success.</p> <p>Develop measures for alliance portfolio performance and success.</p>

### Directions for Future Research

The survey of the extant literature and organization of major findings along three prominent alliance portfolio research areas revealed that many areas require extensions and further research questions need to be asked. One of the general conclusions that can be drawn is that empirical research in all three alliance portfolio research areas has only started to accumulate in the more recent years and that there is still not very much of it compared to other research areas in the field of strategic alliances. In this section, I identify key issues and research questions in the areas where additional research is needed. These future research opportunities are summarized in Table 3.

#### *The Emergence of Alliance Portfolios*

The review of the existing research addressing the emergence of alliance portfolios reveals that there are only a few empirical studies that identify the antecedents and explain why firms build and maintain alliance portfolios. An important direction for future research

is therefore to include more empirical studies that capture the underlying motivations and antecedents for the creation of alliance portfolios. These antecedents and motivations can be at two different levels of analysis: (a) at the firm level of analysis and (b) at the individual manager or executive team level of analysis.

As noted earlier, the bulk of the studies assume that alliance portfolios are the result of a rational strategy process. Reuer and Ragozzino's (2006) study provides a counterperspective by suggesting that alliance portfolios may be the results of agency hazards. These findings create a tension between the various explanations of why alliance portfolios emerge. Thus, more research is needed that explores the role of individual managers in creating alliance portfolios. Methods such as case studies or survey research are likely to be the most promising to explore this further.

At the firm level of analysis, a firm's business as well as alliance strategy has been identified as a key link between the singular objectives of individual alliances and the overall strategic objective of an alliance portfolio (Hoffmann, 2007). Thus, a promising avenue for future work could also further investigate the relationship between business, corporate, and alliance strategy and the emergence of alliance portfolios. From such a perspective, it would also be useful to apply a process perspective to shed further light on how alliance portfolios emerge in multibusiness firms. Ozcan and Eisenhardt's (2009) process study of entrepreneurial firms in the wireless gaming industry provides a first building block for process-oriented alliances portfolio research, but more research is needed to create a more generalizable theory on why and how alliance portfolios emerge. In attempting to disentangle this relationship, case studies seem to be a promising method to pursue this future research avenue.

### *The Configuration of Alliance Portfolios*

An ongoing issue with existing research on alliance portfolio configuration is that the operationalization of key constructs such as size is mainly one dimensional (i.e., takes into account either a focal firm's alliances or its partners but never both at the same time). For example, alliance portfolio size is often operationalized as a count variable measuring a focal firm's alliances assuming away the partner dimension (Ahuja, 2000b; Deeds & Hill, 1996). Size as a one-dimensional variable is of limited use because an alliance portfolio configuration containing five alliances with five different partners is different than a portfolio containing five alliances with only two partners. Thus, a promising research opportunity would be to combine the two dimensions and conduct some comparative research on different alliance portfolio configurations (e.g., alliance portfolios with many alliances and many partners versus alliance portfolio with many alliances but few partners, i.e., many repeated partners; Goerzen, 2007; Gulati, 1995a). In other words, size as a two-dimensional compound measure can help to shed new light on the complexity of alliance portfolio configuration.

Furthermore, the development of such compound measures, taking both alliances and partners into account, could also shed new light on the issue of alliance portfolio mix. Technically, the mix of an alliance portfolio can be thought of as the blend of certain alliance as well as partner types in a focal firm's alliance portfolio. Alliance portfolio mix can be described through attributes such as uniformity/diversity and homo-/heterogeneity of the alliance portfolio content. Extant research that has tackled the issue of alliance portfolio mix

is still scant, and the few studies that touch on the subject examine mix only along one dimension (e.g., home or local partners; Goerzen & Beamish, 2005) or exploration and exploitation alliances in an alliance portfolio (Lavie & Rosenkopf, 2006). A fruitful approach would therefore be to operationalize mix as a two-dimensional construct incorporating both alliance and partner attributes proposed in the extant literature.

Attributes at the alliance level of analysis that could be used to describe the alliance dimension of mix include the governance structure (i.e., equity versus nonequity involvement; Gulati, 1995a), age (Deeds & Rothaermel, 2003), whether an alliance is dyadic or a multipartner alliance (Gomes-Casseres, 1994), and scope of the alliance. Alliance scholars have described the scope of an alliance from a broad range of perspectives, including (a) the functional scope (i.e., whether the alliance has a marketing, research and development, and/or production scope; Anand & Khanna, 2000), (b) the value chain scope (i.e., whether the alliance has a horizontal or vertical scope; George et al., 2001; Hagedoorn & Schakenraad, 1994), (c) the scope of learning (i.e., whether the alliance has an exploration or exploitation scope; Rothaermel, 2001), (d) the scope of capability contribution (i.e., whether the alliance contributes similar or different capabilities; Dussauge, Garrette, & Mitchell, 2000), and (e) the knowledge management scope (i.e., whether the alliance is knowledge accessing or knowledge acquiring; Grant & Baden-Fuller, 2002). Attributes on the partner firm level of analysis that could be used to describe the partner dimension of mix include for instance the partner's industry affiliation (Kotabe & Swan, 1995; Nohria & Garcia-Pont, 1991), whether the partner is a competitor or not (Dussauge et al., 2000), whether the partner is a large or small firm (Kotabe & Swan, 1995), country of origin (Hagedoorn & Schakenraad, 1994; Kotabe & Swan, 1995), reputation (Saxton, 1997), and whether the partner is a repeated or a new partner (Goerzen, 2007; Gulati, 1995a).

Thus, future research on alliance portfolio mix may take two routes. First, it should continue to understand the issues of alliance mix and partner mix separately by drawing on some of the alliance and partner-level attributes described earlier that have not been examined in existing research. Second and in parallel, it should further explore the mix concept by considering alliance and partner-level attributes simultaneously. A logical step from here would be to develop a typology clarifying the understanding of homo- and heterogeneity in alliance portfolios. Such a typology could map out different types of alliance portfolio configurations, such as alliance portfolios with a high similarity of alliances and partner types versus alliance portfolios with low similarity of alliances and partner types.

Next, future alliance portfolio configuration research should shed more light on the costs and benefits associated with different types of alliance portfolio configurations. An alliance portfolio with many alliances with many partners may be more costly to coordinate than a portfolio with the same amount of alliances but with fewer partners. Moreover, the benefits that firms derive from certain alliance portfolio configuration may be limited by the focal firm's absorptive capacity (Cohen & Levinthal, 1990). Thus, future work must shed new light on these issues and work toward establishing generalizability by conducting more large-scale empirical research.

Furthermore, future research must first find better ways to operationalize both synergies and conflict that occur in alliance portfolios. Better ways to measure synergies and conflicts also allow further examination of the alliance portfolio effect, which has so far been

addressed in only one empirical study (Vassolo et al., 2004). Once such measures are in place, future research should conduct more empirical studies designed to explain how synergies and conflicts relate to performance-related outcome variables. Although existing research has explained performance differentials through variation in firms' alliance portfolio configurations, little is known about performance and success on the alliance portfolio level. One explanation may be that constructing adequate performance measures on the portfolio level requires overcoming some empirical obstacles such as how to account for the portfolio effect and disentangle alliance portfolio performance from firm or business unit performance. However, linking alliance portfolio configuration to the performance of alliance portfolios is a topic that should be addressed by future studies.

Last, little is still known on how alliance portfolio configurations change over time and what drives this evolution. Most studies that have contributed to this line of research have taken a qualitative and case-based approach. Thus, to shed more light on alliance portfolio evolution, future research must implement large-scale empirical studies to test the theories developed in these case-based studies. Additionally, it would also be useful to implement longitudinal research designs that consider both the inflow (i.e., formations) of new alliances as well as the outflow (i.e., terminations) of existing alliances from an alliance portfolio.

### *The Management of Alliance Portfolio*

The review of the extant literature on issues related to the management of alliance portfolios shows that alliance capability is an important firm-level capability that has received a great amount of attention in the context of single-alliance management and alliance and firm-level success. However, previous research has left many questions regarding alliance capability in the alliance portfolio context unanswered. Only recently, researchers have started to examine how alliance capability is created on the alliance portfolio level (Heimeriks et al., 2007; Sarkar et al., in press). Therefore, future research needs to address (a) how alliance capability on the single alliance level is different from alliance capability on the portfolio level, (b) what the conceptual dimensions of alliance portfolio capability are, (c) what role a dedicated alliance function plays in managing an alliance portfolio, and (d) how firms build alliance portfolio capability from their alliance portfolios.

More specifically, future research needs to disentangle alliance capability on the single alliance level from alliance capability on the alliance portfolio level. Because alliances are often viewed as standalone transactions, it would be interesting to examine the correlation between a firm's alliance capability on the single alliance level and on the alliance portfolio level. In other words, it would be interesting to research whether firms with a high level of single alliance capability also possess a high level of alliance portfolio management capability. In addition, further research is needed to better understand the antecedents and constituents of alliance portfolio capability beyond the antecedents that have been identified in recent research (Heimeriks et al., 2007; Sarkar et al., in press). Future research opportunities also include the examination of the evolution from single alliance management capability to alliance portfolio capability and understanding the role of a dedicated alliance function in enabling this evolution. Once these antecedents and constituents are understood, ways on

how to operationalize alliance portfolio management capability need to be developed, and further empirical studies can be designed. It would be useful to examine the relationship between alliance portfolio capability and alliance portfolio success, alliance performance, and firm performance.

The recent development in the extant literature to provide conceptual frameworks and tools on how to manage alliance portfolio aimed at practitioners should be continued. However, the ultimate goal of such research should be to generate new insights on the effectiveness of these frameworks and tools. Thus, future research should be concerned with measuring the effects of such frameworks and tools on performance-related outcome variables such as alliance portfolio success or alliance performance. Moreover, future research should be concerned with establishing generalizability by conducting large sample size empirical studies. Future research opportunities also include identifying the determinants and constituents of successful alliance portfolio management and performance assessment.

The key areas of interest for studying alliance portfolios from a performance angle are the underlying factors that determine alliance portfolio success and the measurement of that success by adequate performance measures. Thus, future research should first clearly define the construct and conceptual dimensions of alliance portfolio success and performance taking into account important alliance portfolio concepts such as the portfolio effect created through synergies and conflict in alliance portfolios. A logical second step is to develop appropriate measures for alliance portfolio success and performance. One promising avenue is to draw on managerial assessments through alliance managers or corporate or business unit-level alliance executives (Geringer & Hebert, 1991).

## Conclusion

I started this article by noting the importance of alliance portfolios in today's business landscape. The alliance portfolio phenomenon is a relatively new research area in the widely researched field of strategic alliances, and researchers from different domains have started to address a broad set of research questions through a wide range of theoretical lenses, leading to a certain level of fragmentation of the extant alliance portfolio literature. The objectives of this article were to review the existing alliance portfolio research, organize major findings by key research areas, and develop a research agenda by identifying existing gaps in the present understanding and highlighting future research opportunities. The review of the extant alliance portfolio literature suggested that the existing body of research can be organized around a conceptual map comprising three major areas each representing an important phase and challenge in the life cycle of an alliance portfolio. These three areas are the emergence, configuration, and management of alliance portfolios. Although the interest among alliance scholars in the alliance portfolio phenomenon has grown significantly in the past few years, many of the theoretically and empirically relevant and interesting issues in these three research areas have not yet been investigated or have only been addressed peripherally.

Although the intention of this research effort was to present a complete as possible review, there are some limitations to this study. Most important, the literature search process was somewhat driven by a specific focus on portfolios of strategic alliances and not

interorganizational relationships in general. Thus, the focus on issues that arise from being engaged in multiple simultaneous alliances with different partners may have led to the exclusion of some more network-oriented studies that focus on interorganizational relationships with other actors than alliance partners such as customers and suppliers (McEvily & Marcus, 2005) or external advisors (McEvily & Zaheer, 1999). Nevertheless, I am confident that this review covers the majority of the studies that are at the core of the research issues related to alliance portfolios.

I submit that the contribution of this article rests in three areas: (a) the development of a conceptual map of the alliance portfolio literature comprising three key research areas, (b) a review of the existing alliance portfolio research and discussion of major findings in each key research area, and (c) the development of an agenda for future research. Overall, in the relatively mature field of strategic alliances, alliance portfolios represent an exciting and promising area of research that is rich of further research opportunities. I hope that this article is able to highlight some of them.

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