

Mishari A. Alnahedh
Kuwait University

Friends or Strangers? Antecedents and Consequences of Strategic Alliance Partner Selection

Abstract

Purpose: The objective of this study is to investigate behavioral antecedents and performance implications of broadening and reinforcing alliances. By integrating the behavioral theory of the firm, threat rigidity theory, transaction cost economics, and social exchange theory, the study explores how firms make choices on alliance portfolio reconfiguration and how these choices affect firm profitability and growth. **Study design/methodology/approach:** The study applies random-effects negative binomial regressions and system Generalized Method of Moments (GMM). **Sample and data:** A longitudinal dataset of Fortune 500 companies between 1995 and 2015 is used as the study sample. **Results:** The results of the study show that CEO career horizon has a positive effect on broadening and reinforcing alliances. The closer a firm is to bankruptcy, the less likely it is to form alliances with repeated or new partners. Firm slack has a positive effect on reinforcing alliances but no effect on broadening alliances. The research findings also indicate a negative effect of broadening alliances on firm profitability. There is a positive relationship between the count of reinforcing alliances and firm profitability and growth. **Originality/value:** The study develops and examines an alliance portfolio reconfiguration model that encompasses behavioral antecedents and economic consequences of the alliance partner selection decision. This study highlights the importance of balancing exploration and exploitation in strategic alliances. **Research limitations/implications:** The findings of the study provide insights to managers for designing a firm's alliance partners portfolio while pointing out the need for the awareness and consideration of the behavioral heuristics exhibited by CEOs.

Keywords: Alliances, Repeated Partnership, Alliance Formation, Firm Performance, Networks.

JEL classification: L24, L25, M19

Submitted: 19/2/2023, revised : 18/4/2023, accepted: 15/5/2023.

To cite: Alnahedh, M. A. 2022. Friends or Strangers? Antecedents and Consequences of Strategic Alliance Partner Selection. *Arab Journal of Administrative Sciences*, 29(3): 565- 602. Doi: 10.34120/0430-029-003-005

Introduction

Interorganizational alliances continue to receive prominent interest in the strategy literature (Ren *et al.*, 2022). A strategic alliance is any voluntarily formed strategic interorganizational cooperative relationship that entails the exchange or sharing of resources and knowledge for the common purpose of developing, selling, or servicing a product or service (Gulati, 1998, 1999). Firms establish strategic alliances for a variety of strategic objectives that range from accessing technological resources or capabilities (Hitt *et al.*, 2004; Teece, 1992), reaching new growth opportunities (Golonka and Latusek, 2016), acquiring valuable external knowledge (Martínez-Noya and García-Canal, 2021), improving market position (Lavie *et al.*, 2007), to exploring and entering new domains and markets (Tyler and Caner, 2016; Rosenkopf and Almeida, 2003). In emerging markets, the motivation behind strategic alliance formation extends to navigating different institutional environments (Hitt *et al.*, 2004) and handling political influence, bribery pressure, and protection from extortion (Young *et al.*, 2011). Considering these value-creating purposes, strategic alliances have long been recognized as a source of competitive advantage to firms.

Who to partner with is one of the most consequential strategic decisions an organization makes when forming strategic alliances. In a recent study using the Shapley Value variance-decomposition method, Kumar *et al.* (2022) demonstrate that 11% of firm profitability is explained by the firm's alliance network. Among the primary criteria the focal firm uses in the partner selection decision is whether the new alliance partner should be a repeated or new partner. The research on how and why firms reconfigure their alliance portfolios is limited, and a comprehensive understanding of the alliance portfolio reconfiguration decision can only be achieved by complementing the drivers of the decision with whether it achieves its intended outcomes (Kavusan and Frankort, 2019; Gulati, 1998). Furthermore, the extant research on the performance implications of alliance partner selection shows mixed findings (Holloway and Parmigiani, 2016; Poppo *et al.*, 2008).

The alliance partner selection decision involves managing the tradeoffs between broadening alliances as an explorative activity and reinforcing alliances as an exploitative behavior (Zimmermann *et al.*, 2015). Whereas allying with a new partner is associated with the firm's alliance network expansion, organizational learning, and the discovery of new opportunities, forming an alliance with a known partner reduces uncertainty, promotes stability, minimizes transactional costs and chances for opportunism, leverages existing resources, and facilitates

organizational efficiency (Pomegbe *et al.*, 2021; Lin *et al.*, 2007; Beckman *et al.*, 2004; Rosenkopf and Almeida, 2003). The complex decision problem accentuates the influence of the bounded rationality and behavioral heuristics exhibited by the CEO, stressing the significance of the behavioral drivers of the firm's alliance portfolio reconfiguration choices. Nevertheless, our knowledge of how the behavioral drivers affect the firm's alliance portfolio reconfiguration is limited (Zhang *et al.*, 2023; Kavusan and Frankort, 2019).

In this study, we investigate behavioral antecedents of partner selection and the firm performance implications of forming broadening and reinforcing alliances. Specifically, we propose a model that explores how CEO career horizon, proximity to bankruptcy, and firm slack affect the alliance partner decision. We choose to focus on CEO characteristics and related behavioral factors that are alluded in past studies but do not focused on (McClelland and Barker, 2012; Hitt *et al.*, 2004). Behavioral CEO attributes such as CEO hubris, overconfidence, and Machiavellianism have been linked to risk taking, acquisitions, and strategic alliance behaviors (Chandler *et al.*, 2021; Dhir and Mital, 2012; Li *et al.*, 2010). Recent work calls attention to further understanding of the behavioral motivations for strategic alliance formation and portfolio reconfiguration over long periods (Zhang *et al.*, 2023; Howard *et al.*, 2016). We assess the validity of the proposed model by applying a random-effects negative binomial regression on longitudinal data of Fortune 500 companies between 1995 and 2015, extracted from the Thomson Reuters SDC Joint Ventures and Alliances database and the COMPU-STAT database. While the main focus of this study is upon the firm as the unit of analysis, random-effects negative binomial regressions and system generalized method of moments (GMM) are applied on a total of 4,081 firm-year observations. The results show that the CEO career horizon has a positive effect on broadening and reinforcing alliances. The closer the firm is to bankruptcy, the less likely it is to form alliances with repeated or new partners. Firm slack has a positive effect on reinforcing alliances with no effect on broadening alliances. The results also indicate a negative effect of broadening alliances on firm profitability. We subsequently develop and empirically test arguments about the performance outcomes of broadening and reinforcing alliances, namely firm profitability and firm growth. Our paper provides evidence of positive relationships between the count of reinforcing alliances and firm profitability and growth on one hand, and a negative effect of broadening alliances on firm profitability on the other hand.

The study represents theoretical and empirical contributions in at least three different ways. The primary theoretical contribution is the development and

examination of an alliance portfolio reconfiguration model that encompasses behavioral antecedents and economic consequences of the alliance partner selection decision. By developing and testing the research model, the study contributes to the network research by confirming the role of behavior drivers of network change and network partnering decisions (Beckman *et al.*, 2004). As well as, the study integrates the behavioral theory of the firm, transaction cost economics, threat rigidity theory, and social exchange theory in the context of strategic alliances to understand the drivers and effects of broadening and reinforcing alliances. Thus, the results of this study propose extensions to the current research on the four theories. For example, by combining the behavioral theory of the firm and the threat rigidity theory, the study enriches the scholarly conversation on CEO decision making by explaining a mechanism of how a CEO's career horizon affects firm performance (Cho and Kim, 2017). Finally, through empirically discerning the value creation between repeated and novel alliance partners, the study contributes to the empirical evidence on the performance implications of alliance networks, responding to calls for a more thorough understanding of strategic alliance outcomes (Ryan-Charleton *et al.*, 2022).

Literature Review

Strategic alliances are voluntarily established interorganizational cooperative partnerships that involve the sharing or trading of resources and information. Strategic alliances provide various advantages to firms, including opportunity creation, knowledge transfer, access to unique resources, and improved efficiency (Martõnez-Noya and Garcõa-Canal, 2021; Golonka and Latusek, 2016; Tyler and Caner, 2016; Teece, 1992). In Hitt *et al.* (2000) it is shown that firms frequently choose partners that complement their resources, capabilities, and accumulated knowledge stocks. More pronounced in emerging and transition economies with distinct institutional environments, the choice of alliance partner is partially influenced by the stability of the institutional environment and accordingly the nature of strategic and complementary assets access desired from the alliance partner (Hitt *et al.*, 2004). The selection of a specific partner is manifested as an alliance portfolio reconfiguration as the firm continuously determines the alliance partner whenever a strategic alliance is formed. From the perspective of the alliance portfolio, the choices of partners are interdependent, forming a system of partnerships that generate complementarities or conflicts (Holloway and Parmigiani, 2016). Following the same idea, Alrashdan and Alnahedh (2019) emphasize the benefits of effective strategic alliance portfolio management by illustrating the

synergistic benefits the firm achieves by simultaneously combining and managing a balance of different alliance modes. When the firm forms a new strategic alliance, the alliance partner selection decision is an essential parameter of the alliance portfolio configuration and an important alliance governance mechanism (Meuleman *et al.*, 2010; Li *et al.*, 2008). Once the firm decides to establish an alliance, it can choose to ally with a novel partner firm, forming a broadening alliance, or with an existing partner firm, forming a reinforcing alliance.

To illustrate with a recent case of reinforcing alliance, in December 2022, Thai Airways (THAI) and Singapore Airlines (SIA) announced the signing of a Memorandum of Understanding (MoU) to form a new strategic partnership. In this partnership, both airlines will gradually code share more of each other's flight and airport ground services and consider broader collaboration. Both airlines are current members of the Star Alliance, the world's largest global airline alliance with 26 members, where Singapore Airlines joined in 2000 and Thai Airways joined in 1997. In a joint press release, the CEO of Singapore Airlines, Goh Phong, said, "*SIA and THAI have had a close relationship for many years, which we aim to strengthen through this comprehensive agreement.*", which was followed by Thai Airways' statement by its acting CEO, Suvadhana Sibunruang, that "*THAI and Singapore Airlines have shared a long-term relationship, and I am glad that this cooperation between the two airlines will certainly cater for the demand of travellers between Thailand, Singapore, and beyond.*" (Airport Technology, 2022). Statements from both partnered firms clearly emphasize the value of previous relationships, mutual trust, and shared experience in the formation and structure of the new strategic alliance.

Among the studies that explore the factors which affect the choice of alliance partners is the prominent paper which written is by Beckman *et al.* (2004) who sought to reconcile the tension between alliance network expansion to explore new opportunities and social structure stability to exploit existing knowledge with existing partners. The empirical findings demonstrate that firms facing firm-specific uncertainty tend to engage in exploration activities by forming new ties with new alliance partners, expanding the focal firm's knowledge base, and acquiring new resources. Firms that face market uncertainty tend to strengthen existing ties with previous alliance partners, focusing on exploitative behavior. A firm competing in an uncertain market tends to reduce uncertainty by allying with existing partners and seeking stability and trust in interorganizational relationships (Beckman *et al.*, 2004). More recently, Howard *et al.* (2016) replicate Beckman *et al.* (2004) study by extending the sample firms from Fortune 300 to

Fortune 500 companies and the study period from 1988-1993 to 1988-2010. In contrast to the previous findings, Howard *et al.* (2016) documented the greater use of repeated alliances by companies faced with firm-specific uncertainty, whereas market uncertainty causes firms to broaden their alliance network partners.

A firm may also choose reinforcing alliances with a familiar partner to prevent private knowledge leakage, more pronounced in RandD alliances with radical innovation objectives, as an alternative mechanism to the alliance governance structure and narrowing alliance scope (Li *et al.*, 2008). The stronger the intellectual property rights protection and the more focused the alliance scope are, the more likely the firm is to ally with a repeated partner (Li *et al.*, 2008). Empirical attempts to investigate the behavioral drivers of alliance portfolio reconfigurations are scarce. For example, a study on US biotechnology firms that form 1,340 alliances by Kavusan and Frankfort (2019) found that the firm's negative performance attainment discrepancy relative to aspiration motivates alliance formation with novel partners. The study also reveals a positive relationship between organizational slack and alliance formation with novel partners.

Employing agency theory and relational network theory, Meuleman *et al.* (2010) demonstrate that relational embeddedness, captured by the count of previous collaborations between partners, is a significant predictor of repeated partnership. Using the context of private equity buyout investment syndicates, the authors highlight three boundary conditions that moderate the effect of relational embeddedness on repeated partnerships: knowledge complementarity between the focal firm and potential partners (positive), vertical agency problem severity (positive), and the reputation of the potential partner (negative).

Utilizing diverse empirical contexts and research designs, the previous research attempts to determine the economic performance implication of broadening and reinforcing alliances. The results, however, reveal conflicting outcomes. Pangarkar and Wu (2013) investigate the performance implications of the alliance portfolio diversity on technology startups in Singapore. The survey responses analysis reveals that startups whose alliance portfolio constitutes a diverse category set of alliance partners (e.g., VCs, incubators, universities) enjoy better sales growth, market share, and profitability. Similarly, Holloway and Parmigiani (2016) document the fact that a higher revenue with lower profitability is linked to the greater use of repeated alliances. In contrast, for example, Goerzen (2007) empirically reveals that the number of repeated partnerships has a negative effect on firm performance. This effect is especially accentuated in industries with high

technological uncertainty. Table 1 summarizes the existing body of research on strategic alliance partner selection, starting with the drivers of repeated versus novel partner choices.

Table 1
Summary of Research on Alliance Partnership Selection

Article	Sample and study period	Outcome variable	Empirical findings
Oh and Lee (2017)	555 alliances by publicly traded firms in high-tech industries from 2001 to 2009.	Repeated partnership in a new alliance (dichotomous variable).	Equity sharing and broad functional alliance scope decreases the probability of repeated alliances, whereas an alliance with a partner from a foreign country is more likely to be a repeated alliance.
Beckman et al. (2004)	Fortune 300 firms from 1988 to 1993.	Count of broadening alliances and count of reinforcing alliances.	Firm-specific uncertainty has a negative effect on alliance broadening only, while market uncertainty has a positive effect on alliance reinforcing.
Howard et al. (2016)	Fortune 500 firms between 1988 and 2010.	Count of broadening alliances and count of reinforcing alliances.	Market uncertainty causes firms to broaden their alliance network partners, whereas firm-specific uncertainty is positively related to reinforcing alliance.
Li et al. (2008)	1,159 R&D alliances by firms in high-tech industries during the period 1994-2003.	A categorical variable that defines the partner relationship: strangers, acquaintance (one prior alliance, and friend (more than one prior alliance).	Alliance goal's innovation radicality is positively associated with repeated alliances. The stronger the intellectual property rights protection and the more focused the alliance scope are, the more likely the firm is to ally with a repeated partner.
Kavusan and Frankfort (2019)	Public U.S. dedicated biotechnology firms that formed 1,340 alliances between 1985 and 2000.	Count of alliances with novel partners (with existing and with new resources) and count of alliances with existing partners with new resources	Negative performance attainment discrepancy positively affects alliances with novel partners (i.e. broadening alliances). Firms with abundant organizational slack are more likely to form alliances with novel partners focusing on new resources.
Meuleman et al. (2010)	212 Syndicated buy out transactions in the UK that occurred between 1993 and 2003.	The probability of syndicate co-participation by two private equity firms.	Structural embeddedness, proxied by the count of previous shared partnership, is a significant driver of collaboration partner selection decision. The relationship is amplified when knowledge complementarity is high (positive interaction) and vertical agency costs are high (positive interaction) but weakened when the potential partner is reputable (negative interaction).

Cont. Table 1
Summary of Research on Alliance Partnership Selection

Article	Sample and study period	Outcome variable	Empirical findings
Holloway and Parmigiani (2016)	580 partnerships that completed 144 bridge construction projects.	Revenue and profitability	The count of repeated partnerships by the prime contractor is positively related to revenue but negatively related to profitability.
Goerzen (2007)	13,529 surveys in year 1999 from 580 large Japanese multinational corporations.	Economic firm performance measured by return on assets, operating return on sales, and operating return on invested capital.	The number of repeated partnerships has a negative effect on firm performance, with a stronger effect in technologically uncertain environments.
Xia (2011)	587 cross-border alliances formed by 525 multinational corporations from 41 countries from 1990 and 2007.	Alliances survival versus termination	Repeated partnerships increase the probability of alliance survival
Pangarkar and Wu (2013)	76 survey responses from internet startups in Singapore.	Perceived performance measured by sales growth, profit growth, and market share.	Alliance portfolio partners category diversity is associated with higher market share, growth, and profitability.

Hypotheses Development

Proximity to Bankruptcy

The threat rigidity theory asserts that when faced with threatening situations, organizations tend to behave more rigidly and less flexibly in response to the restriction of information processing and the narrowing of control within the organization (Staw *et al.*, 1981). As noted by Sirmon *et al.* (2008) threat rigidity responses in the form of efficiency-enhancing actions “lead to more conservative investments, reductions in accepted risk, and the diminishing of long-term strategic commitments to fulfill short-term efficiencies” (p. 985). The threat rigidity thesis further suggests that, in the face of adverse economic threats, firms are unable to explore creative solutions or do something new (Staw *et al.*, 1981). When approaching bankruptcy, firms are more focused on survival,

tightening controls, and stressing resource conservation. Firms will subsequently avoid taking risky actions and limit new strategic initiatives (Fernndez-Menéndez *et al.*, 2020; Kreiser *et al.*, 2020). Thus, a firm that is under threat of financial distress and is on the verge of bankruptcy will be risk-averse, employ existing schemas, and refrain from contracting with a new alliance partner.

Our prediction is consistent with Chen and Miller's (2007) argument that when a firm's survival is threatened, it is less likely to search for new technologies and spend on research and development. One motivation for broadening alliances is to access new knowledge and technologies from new strategic alliance partners and jointly pursue an innovation project, which also entails risks of opportunism behavior and the exploration of an unknown partner. In the context of corporate acquisitions, a firm's proximity to bankruptcy is found to negatively affect the probability of an acquisition event (Iyer and Miller, 2008). As the firm approaches bankruptcy, facing credit default risks, it moves to a survival mode and strives to insure survival and protection from failure instead of seeking aspirations achievement (Bammens *et al.*, 2022). The closer the firm is to bankruptcy, the less likely it is to pursue risky growth options and take a risk by forming alliances with new partners. The aforementioned assertion is in congruence with the threat-rigidity explanation for the documented positive relationship between market uncertainty and reinforcing alliances (Beckman *et al.*, 2004).

Similarly, the threat rigidity perspective suggests that at times of threat, efficiency concerns dominate organizational thinking and attention, reducing the adoption of novel strategies and solutions (Staw *et al.*, 1981). Moreover, threats from adverse environmental and financial conditions result in the reliance on prior knowledge, restricting the information-processing capacity of the organization. Because the firm reserves accumulated knowledge about its existing alliance partners, it is then natural when approaching financial adversities to resort to existing partners. As proximity to bankruptcy increases, the firm shifts its focus and is more likely to reinforce its alliance network.

H1a. *The closer the firm is to bankruptcy, the less likely it is to broaden its alliance network, forming fewer alliance relationships with new partners.*

H1b. *The closer the firm is to bankruptcy, the more likely it is to reinforce its alliance network, forming additional alliance relationships with existing partners.*

Firm Slack

Firm slack represents a firm's available resources to initiate organizational change or engage in risky actions. Slack resources include excess resources beyond

the necessary operational and managerial costs (Cyert and March, 1963) and act as facilitators of organizational adaptation and innovation. When a firm possesses excess slack resources, it can afford experimentation with new initiatives and solutions (Carnes *et al.*, 2019).

Based on the behavioral theory of the firm, slack resources allow for experimentation with new alternatives, one of which is exploiting new opportunities (Alrashdan and Alnahedh, 2023; Cyert and March, 1963). Within the context of strategic alliances, partnering with a novel partner represents a new strategic opportunity, where the focal firm can experiment with an unfamiliar project jointly with a new partner that contributes a unique value and allows for new structures, innovations, products, and methodologies. Such endeavors can be facilitated by a “cushion” or excess resources that accentuate the appetite for failure. Hence, a firm’s slack resources encourage broadening alliances.

On the contrary, repeated partnerships entail risk reduction since the focal firm is establishing an alliance with a partner that it is especially familiar with. The primary driver behind the reinforcing alliance decision here is the value of previous experience with the partner, yielding less information asymmetry between the two partners and less improved expectations from each other (Gulati and Nickerson, 2008; Gulati, 1999). While having more slack will increase a firm’s appetite to go for new alternatives, it will be more likely to elect for risky broadening alliances than safer reinforcing alliances. Accordingly, we expect a negative relationship between firm slack and reinforcing alliances.

H2a. *The higher the level of firm slack, the more likely the firm is to broaden its alliance network, forming additional alliance relationships with new partners.*

H2b. *The higher the level of firm slack, the less likely the firm is to reinforce its alliance network, forming fewer alliance relationships with existing partners.*

CEO Career Horizon

CEO career horizon refers to the time remaining as the CEO of a firm approaches retirement or dismissal (Matta and Beamish, 2008). A shorter career horizon means the CEO is close to the end of the CEO’s career and has less time to execute and reap the benefits of long-term investments and strategic actions. Therefore, a shorter career horizon leads to short-term behavior as well as prioritizing and maximizing the CEO’s short-term benefit over the firm’s best interests (Lee *et al.*, 2018). The literature shows that CEOs with shorter career horizons are risk-averse, which subsequently negatively affects long-term firm performance (McClelland and Barker, 2012). The risk-aversion is translated into

favoring exploitative activities over risky explorative activities. Hence, CEOs with longer career horizons are more likely to spend on RandD and produce breakthrough innovations (Cho and Kim, 2017).

CEO career horizon is concerned with how far the CEO is from retirement and how far the firm's decision-maker thinks about the external alliance partnership, long-term or short-term. A shorter career horizon will lead the decision-maker to engage in partnerships that are short-term in nature. From an alliance portfolio reconfiguration perspective, reinforcing alliances can be exploitative and result in short-term benefits that can be reaped rather quickly. CEO often resist making long-term investments because they believe those investments will only benefit their successors in the long run and the CEO's anticipated career conclusion with the firm restricts the investment time horizon (Antia *et al.*, 2010; Matta and Beamish, 2008; James, 1999). Broadening alliances, on the contrary, might be long-term oriented because the focal firm would aspire to develop new relationships with new partners to create and capture opportunities that are long-term in nature.

In essence, a long career horizon demands participating in long-term investments through alliances with new partners, and hence a CEO with a longer career prospect is more likely to take risks. Our arguments reflect Fan *et al.*'s. (2023) findings about the relationship between CEO career horizon and corporate bribery. They find out that CEOs are more inclined to invest in bribes if they have a longer career horizon. Furthermore, a CEO with a short-term career horizon, by definition, be in business for a long term. In this case, the CEO would have already had several alliance partners that he/she has an experience with and enjoys a wider set of known partners to ally with. Hence, CEO Career horizon is expected to negatively affect alliance formations with existing partners.

H3a. *The longer the horizon of the CEO of a firm, the more likely the firm is to broaden its alliance network, forming alliance relationships with new partners.*

H3b. *The longer the horizon of the CEO of a firm, the less likely the firm is to reinforce its alliance network, forming fewer alliance relationships with existing partners.*

Consequences of Alliance Partners Selection

Broadening alliances involve experimentation with new alliance partners and that experimentation involves exploring partner selection, alliance governance mode, and partnership contract terms. Thus, broadening alliances entail taking risks and uncertain exposures to unknowns. According to the transaction costs

logic, decreasing the transaction uncertainty reduces transaction costs, and recurring transactions decrease the set-up costs associated with specialized transaction governance structures (Williamson, 1979). Transaction cost economics underscores the alliance partner selection decision as a transactional element of strategic alliances (Li *et al.*, 2008; Reuer *et al.*, 2002). In alliance contracts with a recurring partner, alliance partners utilize the learning from previous partnership experiences and redeploy the alliance governance structure in future strategic alliances, lowering costs associated with new alliance formations. In contrast, allying with a novel partner would be associated with transaction costs from transaction uncertainty and alliance governance structuring efforts. By increasing the number of alliances with novel partners, alliance portfolio management becomes more complex, further increasing the costs of managing simultaneous interorganizational relationships (Das and Teng, 2001).

In the face of dynamic and complex environments and for the facilitation of organizational adaptation, organizations are pressured to pursue an ambidextrous orientation, balancing exploration and exploitation activities. In the alliance partner selection decision, firms face a trade-off between dedicating resources to improve current alliance ties and the creation of new network relationships to expand their knowledge resources (Lin *et al.*, 2007). We argue that the discovery of new opportunities, an explorative activity through broadening alliances, supports firm growth. As well as, the governance mechanisms of broadening alliances encompass flexibility performance monitoring, decentralized behavior monitoring, and contractual information flow control, which hinder exploitative knowledge processes (Zimmermann *et al.*, 2015; Lavie and Rosenkopf, 2006).

Social exchange theory predicts the development of trust in repeated and frequent exchange relationships (Young-Ybarra and Wiersema, 1999). In joint ventures, for example, prior alliance experience with a partner and extensive inter-partner communication facilitates mutual trust emergence between the alliance partners, whereby the historical exchange raises the knowledge of each partner's organizational processes, alliance practices and routines, and mutual expectations from each other (Khalid and Ali, 2017). Lioukas and Reuer (2015) advance social exchange theory in strategic alliances to demonstrate that prior ties between partnering firms not only increase trust between partners, but also facilitate learning about the partner's future behavior and alliance tasks coordination. In addition, preexisting interorganizational trust attenuates the fear of opportunistic behavior from the country alliance party. Interorganizational trust proves by

experiment that it reduces the frequency of disputes between alliance partners, expands the scope of the alliance relationship, and lowers the alliance governance costs, particularly with an exchange hazard present in the alliance (Gulati and Nickerson, 2008).

Expanding an alliance network is documented to increase learning between alliances and through participation in networks of learning and accessing new knowledge, knowledge-intensive alliances support firm growth (Rosenkopf and Almeida, 2003; Powell *et al.*, 1996). Alliance portfolio diversity undoubtedly exposes the firm to a diverse set of skills and opportunities for learning, which in turn enhances the knowledge absorption and accumulated alliance formation experience by the firm (Pangarkar and Wu, 2013). Moreover, broadening the alliance portfolio and searching for a new partner is an opportunity to locate and partner with a firm that occupies a central position in an alliance network and offers rare resource-recombination opportunities and valuable capabilities (Kumar *et al.*, 2022; Gulati, 1999). Based on the preceding arguments, we expect a positive effect of broadening alliances on a firm's growth rate and a negative effect on profitability. Thus, for broadening alliances, we hypothesize the following:

H4a. Broadening alliances are negatively related to firm profitability.

H4b. Broadening alliances are positively related to firm growth.

Transaction costs associated with reinforcing alliances are substantially lower than transaction costs incurred by firms who engage in broadening alliances. When a focal firm partners with a partner with whom it has historically contracted with, the firm takes advantage of the knowledge and information it has accumulated about the partner. Experience and partner-specific information minimize potential transaction costs that stem from synergy and compatibility uncertainties, information asymmetry, and the threat of opportunistic behavior by the partner. A wide array of self-interest-seeking behavior can be exhibited by an alliance partner. Not only are search and information costs lower when partnering with a historical partner, but also bargaining and negotiation are more efficient through repeated interaction, reducing transaction costs associated with new alliance formation (Dahlman, 1979). Moreover, repeated partnerships provide the benefits of shared experiences, improved coordination, and mutual adaptation (Holloway and Parmigiani, 2016).

Furthermore, through repeated and frequent contractual agreements in the form of strategic alliances, a focal firm develops and deploys alliance governance

mechanisms that fit both alliance partners and reduces the threat of opportunism in future alliances with the same partner. According to relational exchange theory, partners that work closely together and take actions jointly in an exchange relationship achieve favorable partnership performance (Pomegbe *et al.*, 2021; Kapoor and Lee, 2012). Repeated strategic partnerships allow for the sharing of private and intimate technological and operating information, which in turn evolves trust and coordinated behavior between the partnering parties. Partnering with a known partner takes advantage of the value of past exchanges, which will help to improve profitability. As illustrated by Pomegbe *et al.* (2021), closeness and relational governance facilitate information, decision, and process coordination between trusted partners. Thus, we expect a positive effect of repeated partnerships on firm profitability because of reduced transaction costs, improved efficiency, and enhanced resources and information shared among the alliance parties. We further postulate that reinforcing alliances is a double-edged sword that incorporates downsides from overlooking better alternatives and opportunities. Exploitative alliances are useful to leverage existing resources but at the cost of exploring new growth opportunities (Lin *et al.*, 2007).

H5a. Reinforcing alliances are positively related to firm profitability.

H5b. Reinforcing alliances are negatively related to firm growth.

Figure 1 represents the conceptual research framework of the study, highlighting three determinants of broadening and reinforcing alliances and integrating two alliance performance outcomes, namely firm profitability and growth.

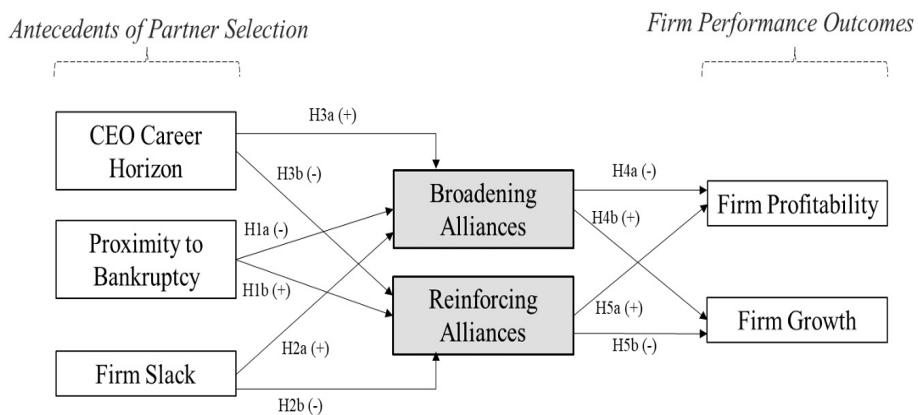


Figure 1: Hypothesized Research Model

Research Methodology

Sample and Data

To test the study hypotheses, we use panel data on a sample of *Fortune 500* firms between 1995 and 2015. We collect firm financial variables from COMPUSTAT and alliance information from Thompson Reuters SDC Joint Ventures and Alliances database. After removing observations with missing information on any of the study variables, firms that do not engage in alliances, and firms that are acquired or merged with another firm, the final sample amounts to a total of 4,081 firm-year observations and 202 firms. Figure 2 shows the average number of broadening and reinforcing alliances over years. On average, a firm in the sample has three alliances with a new partner in 1995, but that number decreases significantly to less than one alliance for those firms in 2015. Reinforcing alliances show a similar pattern with a less steep decrease. Firms engage in fewer alliances overall in 2015 when compared to those in 1995. A closer look at the trends in the composition of alliances over the years is shown in figure 3. The main observation is that the alliance portfolio of the sampled firms consists mostly of broadening alliances.

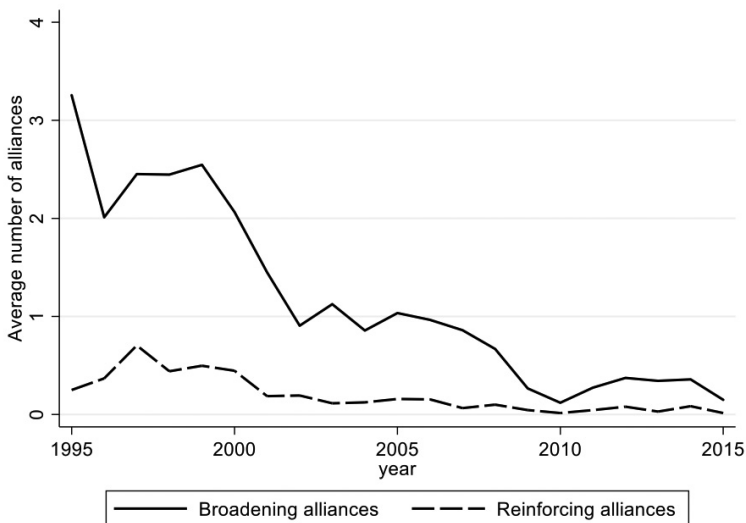


Figure 2: Average Number of Broadening and Reinforcing Alliances Over the Years

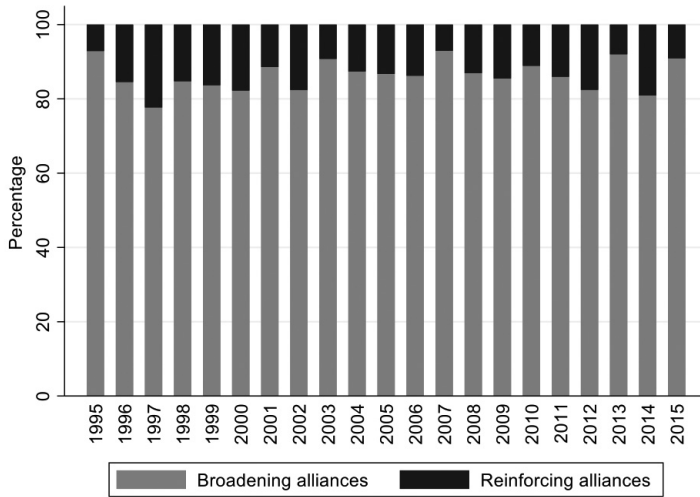


Figure 3: Trends in the Composition of Alliances from 1995 to 2015

Measures

Dependent Variables

Broadening alliances and *reinforcing alliances* are the count of annual broadening or reinforcing alliances formed by the focal firm in the study sample. In line with previous studies (Howard *et al.*, 2016; Beckman *et al.*, 2004), alliance broadening takes place when a focal firm forms an alliance with a new partner firm that has never allied with, whereas alliance reinforcing occurs when the focal firm forms an alliance with a previous partner firm with whom the firm has previously established an alliance. The period of reference starts with the first year in the sample, 1995, up to the observation year. This study employs two firm performance variables: profitability and growth. Firm profitability is measured using Return-on-Assets (ROA), an accounting-based proxy for firm profitability that is commonly used in strategic management research. Firm growth is measured by the annual revenue growth rate.

Independent Variables

Proximity to bankruptcy. To measure a firm's proximity to bankruptcy, we use Altman's Z score which measures the financial health of a firm (Altman, 1983).

Here, Altman's Z score is the inverse of the firm's proximity to bankruptcy, where the Z score is calculated as a weighted average of five financial ratios as follows:

$$Z = \left(1.2 \times \frac{\text{Working Capital}}{\text{Total Assets}} \right) + \left(1.4 \times \frac{\text{Retained Earnings}}{\text{Total Assets}} \right) + \left(3.3 \times \frac{\text{Income before Interest Expenses and Taxes}}{\text{Total Assets}} \right) + \left(0.6 \times \frac{\text{Market Value of Equity}}{\text{Total Liability}} \right) + \left(1.0 \times \frac{\text{Sales}}{\text{Total Assets}} \right)$$

To facilitate the interpretation, we multiply the Altman's Z score by -1 to obtain the firm's proximity to bankruptcy because a lower Altman Z means the firm is closer to bankruptcy. The higher the value of proximity to bankruptcy is, the less financially healthy the firm is and the closer the firm to bankruptcy.

Firm slack. To capture firm slack, we create a composite measure of slack resources that incorporates three types of slack: available slack, recoverable slack, and potential slack (Chen, 2008; Bromiley, 1991). Available slack is represented by the firm's current ratio, calculated by dividing current assets by current liabilities, whereas recoverable slack is measured by the working-capital to sales ratio, which is the difference between current assets and current liabilities over sales. Potential slack is the firm's promising slack, for which we proxy with the firm's ability to borrow and take additional debt in the future, measured by the firm's equity-to-debt ratio. Finally, the three measures are standardized and summed up to generate a general measure for a firm's slack resources.

CEO career horizon. This measure represents the number of years that the CEO is expected to remain in his or her position in the firm (Matta and Beamish, 2008). To measure the CEO career horizon, we used an industry-adjusted measure of CEO age to reflect how old or young the CEO is compared to other CEOs in the same industry (Antia *et al.*, 2010). The adjusted measure indicates the typical retirement age in the CEO's industry and can show how long the CEO is expected to remain in the firm (Lee *et al.*, 2018). Thus, the CEO's career horizon is calculated as follows:

$$\text{CEO career horizon}_{i,t} = \text{CEO age}_{\text{industry},t} - \text{CEO age}_{i,t}$$

where $\text{CEO age}_{\text{industry},t}$ represents the average CEO age in the firm's industry in year t , defined by the firm's 4-digits SIC code, and $\text{CEO age}_{i,t}$ reflects firm i 's CEO age at year t .

Control Variables

We include several firm characteristics as controls in this study. Our first set of control variables is composed of firm characteristics. *Firm size* is measured by the log of the firm's total revenue. We also control for the firm's capital expenditure. In a firm's capital structure, debt may serve as a governance mechanism that influences corporate strategy decisions. Therefore, we control for the firm's *debt ratio*, measured by the firm's total debt as a percentage of its total assets. We also control for the firm's capital expenditures. Our second set of controls consists of market attributes that are expected to affect the dependent variables in our tested models. In dynamic markets, uncertainties that arise would influence the riskiness of strategic alliance formations, whereas a growing market provides space for experimentation to support firm growth through alliances. Additionally, in dynamic markets, opportunities arise rather rapidly and consequently the extent of market dynamism may shape the choice between explorative broadening alliances versus exploitative reinforcing alliances (Larraneta *et al.*, 2014). Therefore, we control for market dynamism and growth. We first regressed market sales against time over the prior-year period. Following previous studies, the ratio of the regression slope coefficient to the mean value of sales is used as a proxy for *market growth*. By dividing the regression slope coefficient by the mean value of sales over the same period, we obtain *market dynamism* (Lin and Dang, 2017). We also include *market concentration*, measured by the Herfindahl concentration index, as a control variable because higher market concentration indicates a less competitive market and high agency costs (Antia *et al.*, 2010), which is likely to influence how the CEO approaches the alliance decision.

Analytical Techniques

For the first stage (hypotheses 1-3), we test models with two dependent variables, the count of broadening alliances and the count of reinforcing alliances. Because both are count variables, we employ negative binomial regression models. To decide between a fixed or random effects model for our panel data, we run a Hausman test (Hausman, 1978). The test fails to reject the null hypothesis and hence the random effects model is much preferred. Thus, we adopt maximum-likelihood random-effects negative binomial models (Beckman *et al.*, 2004). For the second stage of the model (i.e., the effect of broadening and reinforcing alliances on firm performance), we implement the Arellano and Bond (1991) system-GMM estimators. By instrumenting for the first-differenced equation with lags of the firm performance and first differences of the exogenous variables, we account for the autocorrelation in our data

and address the endogeneity concern. First, we check the GMM model validity using the Hansen test of overidentification restrictions, which yields a non-significant result and suggests that the model is fit to use with system GMM. To further ensure that the GMM estimator is valid, we perform first-and-second-order autocorrelation tests. As shown in table 5, the first-order autocorrelation test AR(1) is significant, while the second-order autocorrelation test AR(2) is non-significant, a proof for the presence of serial autocorrelation of the first-order and for the validity of using the system GMM estimation.

Results

Table 2 displays the sample descriptive statistics. Broadening alliances range from zero to 60 alliances whereas reinforcing alliances range from zero to 33 alliances. The CEO career horizon ranges from -28 to 21, with a mean of -0.73. Firm profitability ranges from -1.23 to 0.49, with a mean of 0.05. Table 3 lists the pairwise correlation coefficients for the study variables. The correlation coefficient between broadening and reinforcing alliances is 0.77, close to the correlation coefficients of 0.72 by Beckman *et al.* (2004) and 0.84 by Howard *et al.* (2016). Table 2 also lists the calculated variance inflation factor (VIF). The maximum VIF is 2.76, which is below the critical VIF value of 10. Thus, multicollinearity does not seem to cause a problem.

Table 2
Summary Statistics

	N	Mean	Std. Dev.	Min	Max	VIF
Broadening alliances	4,081	1.14	3.43	0.00	60.00	2.76
Reinforcing alliances	4,081	0.19	1.13	0.00	33.00	2.54
Firm profitability	4,081	0.05	0.07	-1.23	0.49	1.29
Firm growth	4,079	0.07	0.21	-2.62	2.49	1.10
Proximity to bankruptcy	4,081	-3.38	3.62	-75.38	3.93	1.87
Firm slack	4,081	0.08	2.21	-12.52	22.17	1.49
CEO career horizon	4,081	-0.73	5.97	-28.00	21.00	1.01
Firm size	4,081	9.46	1.12	4.47	13.09	1.77
Debt ratio	4,081	0.22	0.14	0.00	1.32	1.24
Capital expenditures	4,081	1,480.20	2,976.62	0.00	3,7985.00	1.40
Market dynamism	4,081	4.52	2.39	1.17	8.44	1.40
Market growth	4,081	12.31	23.73	-21.69	60.44	1.06
Market concentration	4,081	0.07	0.08	0.01	0.58	1.06

Table 3
Pairwise Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Broadening alliances	1.00												
(2) Reinforcing alliances	0.77*	1.00											
(3) Firm profit ability	0.08*	0.09*	1.00										
(4) Firm growth	0.10*	0.05*	0.11*	1.00									
(5) Proximity to bankruptcy	-0.26*	-0.23*	-0.44*	-0.14*	1.00								
(6) Firm slack	0.13*	0.10*	0.23*	0.03*	-0.54*	1.00							
(7) CEO career horizon	-0.01	-0.01	-0.04*	0.00	-0.01	-0.03	1.00						
(8) Firm size	0.12*	0.11*	0.08*	-0.05*	0.03*	-0.11*	-0.04*	1.00					
(9) Debt ratio	-0.13*	-0.09*	-0.25*	-0.04*	0.31*	-0.23*	0.05*	-0.20*	1.00				
(10) Capital expenditures	0.10*	0.07*	0.01	-0.03	0.08*	-0.03*	-0.06*	0.51*	-0.01	1.00			
(11) Market dynamism	-0.24*	-0.13*	-0.03*	-0.24*	0.15*	-0.03	0.03	0.34*	0.07*	0.15*	1.00		
(12) Market growth	-0.02	-0.01	0.10*	0.10*	0.00	0.00	0.02	0.08*	-0.07*	0.03	0.16*	1.00	
(13) Market concentration	-0.07*	-0.05*	0.05*	0.00	-0.07*	0.04*	0.04*	0.17*	0.00	0.05*	0.09*	0.01	1.00

Note: * $p < 0.05$

Table 4 shows the results of the random-effects negative binomial regression models for the prediction of broadening and reinforcing alliance formation. Models 1 and 2 correspond to broadening alliances whereas models 3 and 4 correspond to reinforcing alliances as dependent variables. Model 1 includes control variables only, where many controls are significant. As expected, larger firms are more likely to form new alliances, both broadening and reinforcing. All market-level control variables are significant. Hypotheses 1a, 2a, and 3a are tested in model 2. Hypothesis 1a predicts a negative relationship between proximity to bankruptcy and the number of broadening alliances formed. The coefficient for proximity to bankruptcy is negative and significant ($\beta = -0.012$, $p < 0.05$), supporting hypothesis 1a. According to hypothesis 2a, firm slack is positively related to the number of broadening alliances. The coefficient for firm slack is not significant and thus hypothesis 2a is not supported.

In hypothesis 3a, we hypothesize a positive effect of CEO career horizon on broadening alliances. The coefficient for CEO career horizon is positive and significant ($\beta = 0.009$, $p < 0.05$), such that CEOs with loner career horizons are more likely to form broadening alliances, confirming the prediction in hypothesis 3a. To test hypothesis 3b on the effect of CEO career horizon on reinforcing alliances, we find that CEO career horizon is positive and significant in model 4 ($\beta = 0.02$, $p < 0.05$). This suggests that CEOs with longer career horizons have a higher, propensity to form alliances with existing alliance partners, in contrast to hypothesis 3b.

Table 4
Random-Effects Negative Binomial Regressions for the Prediction of Broadening and Reinforcing Alliance Formation

	Model 1	Model 2	Model 3	Model 4
Dependent variable	Broadening Alliances	Broadening Alliances	Reinforcing Alliances	Reinforcing Alliances
Proximity to bankruptcy		-0.012* (0.005)		-0.015* (0.007)
Firm Slack		0.022 (0.015)		0.058 + (0.032)
CEO Career horizon		0.009* (0.004)		0.020* (0.010)
<i>Controls:</i>				
Firm size	0.360*** (0.045)	0.407*** (0.046)	0.676*** (0.111)	0.803*** (0.112)
Debt Ratio	-0.451 (0.264)	-0.164 (0.274)	0.134 (0.661)	0.841 (0.676)
Capital expenditures	0.000 (0.000)	0.000 (0.000)	-0.000* (0.000)	-0.000** (0.000)
Performance	-0.109 (0.355)	-0.295 (0.347)	0.788 (0.756)	0.534 (0.742)
Market dynamism	-0.598* (0.240)	-0.594* (0.239)	-1.649** (0.567)	-1.646** (0.567)
Market growth	0.045*** (0.013)	0.045*** (0.013)	0.079* (0.033)	0.080* (0.033)
Market concentration	-1.649* (0.662)	-1.824** (0.662)	-4.489 (2.613)	-5.561* (2.590)
Constant	0.016 (1.730)	-0.563 (1.734)	3.902 (4.031)	2.415 (4.042)
Year fixed effects	Yes	Yes	Yes	Yes
Observations	4,092	4,081	4,092	4,081
Log likelihood	-4,410.00	-4,388	-1,172	-1,160
Wald Chi-squared	887.6***	920.6***	272.1***	304.4***

Note: Robust standard errors are in parenthesis.
significant levels: *** p < 0.001, ** p < 0.01, * p < 0.05, + p < 0.10

The results of the second stage analysis and the system GMM models predicting firm profitability and growth are shown in table 5. In the control variables of models 5 and 7 only, all controls are significant predictors of firm growth and profitability. Model 6 highlights the relationship between broadening and reinforcing alliances and firm profitability, whereas model 8 shows the results of the GMM model with firm growth as the dependent variable. Consistent with hypothesis 4a, we find that broadening alliances has a negative effect on firm profitability ($\beta = -0.003, p < 0.001$). We, however, find no support for hypothesis 4b that predicts a positive effect of broadening alliances on firm growth ($p > 0.1$).

According to hypothesis 5a, the more reinforcing alliances the firm forms, the higher its level of profitability will be. The coefficient for reinforcing alliances in model 6 is positive and significant ($\beta = 0.011, p < 0.001$), confirming hypothesis 5a. Hypothesis 5b predicts a negative relationship between reinforcing alliances and firm growth. In model 8, we find that reinforcing alliances have a significant and positive effect on firm growth ($\beta = 0.119, p < 0.001$), contrary to the prediction of hypothesis 5b. A possible explanation for the reverse direction of the reinforcing alliances effect on firm growth is that the ambidextrous formation of exploratory and exploitative alliances, combining knowledge from the firm's existing partners network with knowledge from new partners, results in more innovations and firm growth performance (Lin *et al.*, 2007). Table 6 summarizes the results of our hypotheses testing.

Table 5
System GMM Models Predicting Firm Profitability and Growth

	Model 5	Model 6	Model 7	Model 8
Dependent variable	Profitability	Profitability	Growth	Growth
Broadening alliances		-0.003*** (0.000)		0.000 (0.001)
Reinforcing alliances		0.011*** (0.000)		0.119*** (0.005)
<i>Controls:</i>				
Firm size	0.018*** (0.000)	0.018*** (0.000)	0.008*** (0.002)	0.012*** (0.002)
Debt ratio	-0.187*** (0.001)	-0.186*** (0.002)	-0.107*** (0.010)	-0.061*** (0.011)
Capital expenditures	-0.000*** (0.000)	-0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Firm slack	-0.000* (0.000)	-0.000 (0.000)	0.004*** (0.001)	0.002* (0.001)
Market dynamism	-0.001*** (0.000)	-0.000 (0.000)	-0.032*** (0.001)	-0.025*** (0.001)
Market concentration	0.180*** (0.007)	0.184*** (0.007)	0.460*** (0.024)	0.464*** (0.024)
Lagged dependent variable	0.331*** (0.001)	0.328*** (0.001)	0.057*** (0.002)	0.066*** (0.002)
Constant	-0.091*** (0.003)	-0.097*** (0.003)	0.155*** (0.017)	0.052** (0.019)
Year fixed effects	Yes	Yes	Yes	Yes
Observations	4,092	4,092	4,087	4,087
Arellano-Bond test for AR (1)	[0.000]	[0.000]	[0.000]	[0.000]
Arellano-Bond test for AR (2)	[0.582]	[0.686]	[0.585]	[0.707]
Hansen test of overidentification	[0.823]	[0.727]	[0.761]	[0.832]
Wald Chi-squared	[0.000]	[0.000]	[0.000]	[0.000]

Note: Robust standard errors are in parenthesis, p-values are between brackets, significant levels: *** p < 0.001, ** p < 0.01, * p < 0.05, + p < 0.10

Table 6
Robustness Checks Using Alternative Methods and Specifications

	Model 9	Model 10	Model 11
Dependent variables	Broadening Alliances	Reinforcing Alliances	Tobin's Q
Proximity to bankruptcy	-0.009** (0.003)	-0.011 + (0.006)	
Firm Slack	0.011 (0.011)	0.049 + (0.028)	0.069*** (0.001)
CEO career horizon	0.013*** (0.003)	0.021* (0.008)	
Broadening alliances			-0.039*** (0.001)
Reinforcing alliances			0.270*** (0.001)
Controls:			
Firm size	0.320*** (0.037)	0.794*** (0.107)	0.165*** (0.006)
Debt ratio	-0.145 (0.208)	0.555 (0.635)	0.375*** (0.013)
Capital expenditures	0.000 (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Performance	-0.558** (0.215)	1.066 (0.624)	
Market dynamism	-0.643** (0.206)	-1.772** (0.555)	
Market growth	0.045*** (0.011)	0.084** (0.032)	0.007*** (0.000)
Market concentration	-1.224 (0.694)	-3.352 (2.813)	1.758*** (0.055)
Lagged dependent variable			0.675*** (0.001)
Constant	-0.165 (1.479)	0.877 (3.911)	-1.562*** (0.062)
Year fixed effects	Yes	Yes	Yes
Observations	4,081	4,081	4,052
Log likelihood	-4,587	-1,176	
Wald Chi-squared	[0.000]	[0.000]	[0.000]

Note: Robust standard errors are in parenthesis, p-values are between brackets, significant levels: *** p < 0.001, ** p < 0.01, * p < 0.05, + p < 0.1

Robustness Tests

We conduct a series of robustness tests. First, we assess the robustness of our findings for hypotheses 1-3 to an alternative estimation technique. We estimate random-effects Poisson regression models with robust standard errors. The results of the Poisson regression are shown in table 7, as indicated in models 9 and 10 for broadening and reinforcing alliances, respectively. For predictors of broadening alliances, the coefficients reveal similar results to the negative binomial regression model with smaller p-values. Second, the GMM models are estimated using an alternate measure of profitability, the firm's Tobin's Q, which is the ratio between the market value of the firm to the replacement cost of its assets. As with the original measure of profitability, the coefficients for broadening and reinforcing alliances in model 11 are positive and significant, validating the support for hypotheses 4a and 5a.

Table 7
Summary of Hypotheses Testing Results

Hypothesis	Covariate	Outcome variable	Hypothesized relationship	Empirical finding
H1a	Proximity to bankruptcy	Broadening alliances	Negative	Negative
H1b	Proximity to bankruptcy	Reinforcing alliances	Positive	Negative
H2a	Firm slack	Broadening alliances	Positive	Not significant
H2b	Firm slack	Reinforcing alliances	Negative	Positive
H3a	CEO career horizon	Broadening alliances	Positive	Positive
H3b	CEO career horizon	Reinforcing alliances	Negative	Positive
H4a	Broadening alliances	Firm profitability	Negative	Negative
H4b	Broadening alliances	Firm growth	Positive	Not significant
H5a	Reinforcing alliances	Firm profitability	Positive	Positive
H5b	Reinforcing alliances	Firm growth	Negative	Positive

Discussion

When a firm decides to form a strategic alliance, how do the CEO career horizon, firm slack resources, and the firm's proximity to bankruptcy affect the choice between broadening and reinforcing alliances? How does this choice influence the firm's profitability and growth? To answer these questions, this study develops and tests hypotheses that link the three behavioral drivers of the alliance partner selection decision, and subsequently the firm's economic perfor-

mance, using panel data on Fortune 500 firms that engage in alliances between 1995 and 2015.

The results reveal that the longer the CEO's career horizon, the more likely is the CEO to form broadening and reinforcing alliances. Consistent with a threat rigidity perspective, the findings suggest that proximity to bankruptcy is negatively related to the formation of both broadening and reinforcing alliances. When confronted with threatening environments, firms are more likely to become rigid and constrain their strategic actions (Kreiser *et al.*, 2020; Staw *et al.*, 1981). Contrary to our hypothesis and previous research (Kavusan and Frankort, 2019), we find no relationship between firm slack and broadening alliances and a marginally significant positive relationship with reinforcing alliances. One possible explanation is that slack resources allow the firm to partner with existing partners perhaps to enter innovative alternatives that are more feasible with a familiar alliance partner. This finding suggests that more slack is associated with more appetite for risk in an alliance but only with a familiar partner. As well as the results confirm the limited cognitive capability of the boundedly rational decision-maker when facing a strategic alliance portfolio reconfiguration decision (Zhang *et al.*, 2023).

Next, we posit that broadening alliances lead to lower firm profitability but drive firm growth. The empirical analyses show sole support for the profitability hypothesis. The lack of support for the growth hypothesis can be attributed to the compounding effect of risks associated with partnering with novel partners on firm growth. For reinforcing alliances, the results show a positive relationship between reinforcing alliances, firm profitability and growth. The positive effect of repeated partnership is consistent with the findings by Xia (2011) but the opposite of the negative effect found by Holloway and Parmigiani (2016). We attribute the conflicting results to the context and the decision making process for decisions made by CEOs of listed firms, as in this study, compared to managers in a public institution, as in Holloway and Parmigiani's (2016) study. For example, the probability of opportunistic behavior by a partnering subcontractor could be higher than the probability of opportunistic behavior by a strategic partner who allies with a reputable Fortune 500 company.

Contributions

The study makes several empirical and theoretical contributions. In terms of empirical contributions, the study addresses an important decision in strategic alliances (i.e., alliance partner selection) and teases out how firm attributes predict

a firm's network change, extending the conversation on interorganizational relationships formation to a longer and more recent time period (Howard *et al.*, 2016; Beckman *et al.*, 2004). The study is among the earliest to investigate the alliance partner selection performance repercussion on publicly listed firms in the US. Furthermore, by empirically examining the predictors and performance outcomes of the alliance partner decision, the study teases out the consequences of the behavioral motivations of the strategic alliance reconfiguration decision, providing more complete evidence at the firm level.

In terms of contribution to theory, the study integrates transaction cost economics, the behavioral theory of the firm, the threat rigidity perspective, and the relational exchange theory framework to explain the heterogeneity in alliance partner selections between firms. The exerted effort to marry these theories and frameworks is novel and complements theoretical attempts to explain the antecedents and consequences of the alliance partner decision. Configuring exploration versus exploitation in the alliance partnership portfolio is a complex problem faced by a boundedly rational decision-maker (Zhang *et al.*, 2023). The study bestows a channel between the bounded rationality perspective and the rational economic and relational social sequelae.

The study also contributes to the transaction cost economics theory and the behavioral theory of the firm. We add to the transaction cost economics theory by emphasizing the role of the partner selection decision in driving firm performance and growth outcomes from alliances. In addition, the findings contribute to research on the behavioral theory of alliance portfolio configuration (Kavusan and Frankort, 2019) by integrating insights from the behavioral theory of the firm logic and alliance research and providing an analysis of the relationship between three behavioral drivers of alliances and the choice of an alliance partner. By focusing on how CEO career horizon, organizational slack, and proximity to bankruptcy affect the choice of alliance partner, the findings go beyond previous work showing how CEO-specific attributes such as overconfidence influence strategic alliances (Chandler *et al.*, 2021).

Limitations and Directions for Future Research

The study includes several limitations that may be addressed by future research. First, the sample is restricted to *Fortune 500* companies, large firms that continue to engage in a substantial number of alliances every year, which facilitates capturing a variance in the count of partner selection decisions. While

the sample is popular in empirical strategy and alliance research, the findings of the study may not generalize to specific industries. Future studies can test the hypotheses, for example, in the biopharmaceutical industry characterized by intensive R and D alliances and new product developments (Diestre and Rajagopalan, 2012) or in a cross-country design to verify the generalizability of the findings. Second, while the study attempts to address the endogeneity bias due to autocorrelation and measurement error, the findings may still be prone to an omitted variable bias. While the research model investigates three distinct behavioral determinants of alliance portfolio reconfigurations, other behavioral antecedents may influence the choices between reinforcing and broadening alliances.

Another caveat is that the study exclusively focuses on economic performance outcomes of alliance portfolio reconfiguration decisions. Researchers can replicate and extend the study by examining alliance outcomes related to innovation performance and the propensity to form alliances with international partners. Focusing on firm-level analysis, the study only captures a part of the effect of reinforcing versus broadening alliances. An alliance-level investigation enables a closer understanding of how the choice of alliance partner directly determines the alliance governance mode (e.g., equity versus non-equity, horizontal versus vertical), contract complexity, and alliance performance (e.g., termination).

Future research can explore contingencies that moderate the relationships between the behavioral factors and alliance portfolio choices, and between alliance partner selection and firm performance. Another extension to the proposed research model in this study is to investigate in depth the mediation mechanism through which broadening and reinforcing alliances affect firm performance. Taking the knowledge-based view of the firm and using an organizational learning perspective lens, it would be interesting to compare the process of adaptability and learning in repeated versus novel alliance partnerships, leading to variations in organizational and transaction cost reductions.

Practical Implications

The study provides insights to managers for designing a firm's alliance partners portfolio, where the findings of the study are particularly relevant to firms that form strategic alliances frequently. The behavioral motivators behind the alliance partner selection decision can inform corporate boards and stockholders in the role of the board to mitigate the agency problem and advise on the CEO search and

selection. It is highly recommended to utilize the findings of the study to design changes in policies and practices related to strategic decision making. Similarly, our analyses point out the need for the awareness and consideration of the behavioral heuristics exhibited by CEOs which can alter the cognitive responses to strategic alliance opportunities. Managers might be interested in understanding how they are prone to psychological biases and are better equipped to create logical strategies for dealing with short-term thinking and systematic risk evaluation.

The study highlights the importance of balancing exploration and exploitation in alliances and guides managers in the relationship-building decision process (Zimmermann *et al.*, 2015). On the one hand, exploration through broadening alliances is risky and linked to declining profitability but provides the chance to find and capture new opportunities. On the other hand, exploitation through repeated partnerships enhances profitability and facilitates sustainable growth. Managers can benefit from the awareness of the trade-offs between minimizing uncertainty by picking a trusted familiar partner and reaping the exploration and efficiency potential by partnering with a novel partner (Holloway and Parmigiani, 2016).

Conclusion

What behavioral factors determine the firm's choices of alliance partners? How do those choices affect the performance of the firm? To answer these questions, the study seeks to test a model of antecedents and consequences of repeated alliances by adopting a behavioral perspective on alliance portfolio reconfiguration. The study distinguishes among the behavioral influencers and economic influences of repeated and new alliance partner selection, confirming the role of bounded rationality and cognitive processes on firms' strategic decision-making. In a nutshell, if this article could demonstrate one idea, it would be that the boundedly rational decision maker makes an alliance partner selection decision based on behavioral predictions that affect the decision short-termism, the nature of the problemistic search, and the appetite for risk-taking, all of which can have significant economic consequences on the firm.

References

- Airport Technology, A. 2022. *Singapore Airlines and THAI Airways form New Strategic Alliance*.
<https://www.airport-technology.com/news/singapore-airlines-thai-airways/>
- Alrashdan, A. A., and Alnahedh, M. A. 2019. Growth through Simultaneous Alliances: Learning and Synergistic Effects. *Arab Journal of Administrative Sciences*, 26(3): 501-541.
- Alrashdan, A. and Alnahedh, M. 2023. Slack Resources and Firm Performance: Evidence from GCC Countries. *International Journal of Organizational Analysis, Forthcomin*, 1-24.
- Altman, E. 1983. *Corporate Financial Distress. A Complete Guide to Predicting, Avoiding, and Dealing with Bankruptcy*. John Wiley and Sons.
- Antia, M., Pantzalis, C., and Park, J. C. 2010. CEO Decision Horizon and Firm Performance: An Empirical Investigation. *Journal of Corporate Finance*, 16(3): 288-301.
- Arellano, M., and Bond, S. 1991. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equation. *The Review of Economic Studies*, 58(2): 277-297.
- Bammens, Y., Hünermund, P., and Andries, P. 2022. Pursuing Gains or Avoiding Losses: The Contingent Effect of Transgenerational Intentions on Innovation Investments. *Journal of Management Studies*, 59(6): 1493-1530.
- Beckman, C. M., Haunschild, P. R., and Phillips, D. J. 2004. Friends or Strangers? Firm-Specific Uncertainty, Market Uncertainty, and Network Partner Selection. *Organization Science*, 15(3): 259-275.
- Bromiley, P. 1991. Testing a Causal Model of Corporate Risk Taking and Performance. *Academy of Management Journal*, 34(1): 37-59.
- Carnes, C. M., Xu, K., Sirmon, D. G., and Karadag, R. 2019. How Competitive Action Mediates the Resource Slack-Performance Relationship: A Meta-Analytic Approach. *Journal of Management Studies*, 56(1): 57-90.
- Chandler, J. A., Petrenko, O. V., Hill, A. D., and Hayes, N. 2021. CEO Machiavellianism and Strategic Alliances in Family Firms. *Family Business Review*, 34(1): 93-115.
- Chen, W.-R. 2008. Determinants of Firms' Backward-and Forward-Looking R and D Search Behavior. *Organization Science*, 19(4): 609-622.

- Chen, W. R., and Miller, K. D. 2007. Situational and Institutional Determinants of Firms' R and D Search Intensity. *Strategic Management Journal*, 28(4): 369-381.
- Cho, S. Y., and Kim, S. K. 2017. Horizon Problem and Firm Innovation: The Influence of CEO Career Horizon, Exploitation and Exploration on Break-through Innovations. *Research Policy*, 46(10): 1801-1809.
- Cyert, R. M., and March, J. G. 1963. *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ.
- Dahlman, C. J. 1979. The Problem of Externality. *Journal of Law and Economics*, 22(1): 141-162.
- Das, T. K., and Teng, B. S. 2001. Trust, Control, and Risk in Strategic Alliances: An Integrated Framework. *Organization Studies*, 22(2): 251-283.
- Dhir, S., and Mital, A. 2012. Decision-Making for Mergers and Acquisitions: The Role of Agency Issues and Behavioral Biases. *Strategic Change*, 21: 59-69.
- Diestre, J., and Rajagopalan, N. 2012. Are All "Sharks" Dangerous? New Biotechnology Ventures and Partner Selection in R&D Alliances. *Strategic Management Journal*, 33(10): 1115-1134.
- Fan, J., Tao, Z., Oehmichen, J., and Van Ees, H. 2023. CEO Career Horizon and Corporate Bribery: A Strategic Relationship Perspective. *Asia Pacific Journal of Management*, Forthcomin.
- Fernandez-Menéndez, J., Rodriguez-Ruiz, O., Lopez- Sanchez, J. I., and Delgado-Pina, M. I. 2020. Innovation in the Aftermath of Downsizing: Evidence from the Threat-Rigidity Perspective. *Personnel Review*, 49(9): 1859-1877.
- Goerzen, A. 2007. Alliance Networks and Firm Performance: The Impact of Repeated Partnerships. *Strategic Management Journal*, 28(5): 487-509.
- Golonka, M., and Latusek, D. 2016. Alliance Portfolio Formation and Configuration by Small and Medium ICT Firms. *Baltic Journal of Management*, 11(1): 65-88.
- Gulati, R. 1998. Alliances and Networks. *Strategic Management Journal*, 19(4): 293-317.
- Gulati, R. 1999. Network Location and Learning: The Influence of Network Resources and Firm Capabilities on Alliance Formation. *Strategic Management Journal*, 20(5): 397-420.
- Gulati, R., and Nickerson, J. A. 2008. Interorganizational Trust, Governance Choice, and Exchange Performance. *Organization Science*, 19(5): 688-708.

- Hausman, J. A. 1978. Specification Tests in Econometrics. *Econometrica*, 46(6): 1251-1271.
- Hitt, M. A., Ahlstrom, D., Dacin, M. T., Levitas, E., and Svobodina, L. 2004. The Institutional Effects on Strategic Alliance Partner Selection in Transition Economies: China Vs. Russia. *Organization Science*, 15(2): 173-185.
- Hitt, M. A, Dacin, M. T., Levitas, E., Arregle, J. L., and Borza, A. 2000. Partner Selection in Emerging and Developed Market Contexts: Resource-Based and Organizational Learning Perspectives. *Academy of Management Journal*, 43(3): 449-467.
- Holloway, S. S., and Parmigiani, A. 2016. Friends and Profits Don't Mix: The Performance Implications of Repeated Partnerships. *Academy of Management Journal*, 59(2): 460-478.
- Howard, M. D., Withers, M. C., Carnes, C. M., and Hillman, A. J. 2016. Friends or Strangers? It all Depends on Context: A Replication and Extension of Beckman, Haunschild, and Phillips (2004). *Strategic Management Journal*, 37(11): 2222-2234.
- Iyer, D. N., and Miller, K. D. 2008. Performance Feedback, Slack, and the Timing of Acquisitions. *Academy of Management Journal*, 51(4): 808-822.
- James, H. S. 1999. Owner as Manager, Extended Horizons and the Family Firm. *International Journal of Economics and Business*, 6(1): 41-55.
- Kapoor, R., and Lee, J. M. 2012. Coordinating and Competing in Ecosystems: How Organizational Forms Shape New Technology Investments. *Strategic Management Journal*, 34(3): 274-296.
- Kavusan, K., and Frankort, H. T. W. 2019. A Behavioral Theory of Alliance Portfolio Reconfiguration: Evidence from Pharmaceutical Biotechnology. *Strategic Management Journal*, 40(10): 1668-1702.
- Khalid, S., and Ali, T. 2017. An Integrated Perspective of Social Exchange Theory and Transaction Cost Approach on the Antecedents of Trust in International Joint Ventures. *International Business Review*, 26(3): 491-501.
- Kreiser, P. M., Anderson, B. S., Kuratko, D. F., and Marino, L. D. 2020. Entrepreneurial Orientation and Environmental Hostility: A Threat Rigidity Perspective. *Entrepreneurship: Theory and Practice*, 44(6): 1174-1198.
- Kumar, P., Liu, X., and Zaheer, A. 2022. How much does the Firm's Alliance Network Matter? *Strategic Management Journal*, 43(8): 1433-1468.

- Larraneta, B., Zahra, S. A., and Gonzalez, J. L. 2014. Strategic Repertoire Variety and New Venture Growth: The Moderating Effects of Origin and Industry Dynamism. *Strategic Management Journal*, 35(5): 761-772.
- Lavie, D., Lechner, C., and Singh, H. 2007. The Performance Implications of Timing of Entry and Involvement in Multipartner Alliances. *Academy of Management Journal*, 50(3): 578-604.
- Lavie, D., and Rosenkopf, L. 2006. Balancing Exploration and Exploitation in Alliance Formation. *Academy of Management Journal*, 49(4): 797-818.
- Lee, J. M., Park, J. C., and Folta, T. B. 2018. CEO Career Horizon, Corporate Governance, and Real Options: The Role of Economic Short-Termism. *Strategic Management Journal*, 39(10): 2703-2725.
- Li, D., Eden, L., Hitt, M. A., and Ireland, R. D. 2008. Friends, Acquaintances, or Strangers? Partner Selection in R and D Alliances. *Academy of Management Journal*, 51(2): 315-334.
- Li, J., Tang, L., and Tang, Y. 2010. CEO Hubris and Firm Risk Taking in China: The Moderating Role of Managerial Discretion. *Academy of Management Journal*, 53(1): 45-68.
- Lin, C. S., and Dang, V. T. 2017. Untangling the Relationship between Strategic Consistency and Organizational Performance: An Empirical Analysis of Moderator Variables. *Journal of Management and Organization*, 23(4): 483-503.
- Lin, Z., Yang, H., and Demirkan, I. 2007. The Performance Consequences of Ambidexterity in Strategic Alliance Formations: Empirical Investigation and Computational Theorizing. *Management Science*, 53(10): 1645-1658.
- Lioukas, C., and Reuer, J. 2015. Isolating Trust Outcomes from Exchange Relationships: Social Exchange and Learning Benefits of Prior Ties in Alliances. *Academy of Management Journal*, 58(6): 1826-1847.
- Martinez-Noya, A., and Garcia-Canal, E. 2021. Innovation Performance Feedback and Technological Alliance Portfolio Diversity: The Moderating Role of Firms' R and D Intensity. *Research Policy*, 50(9): 104321.
- Matta, E., and Beamish, P. W. 2008. The Accentuated CEO Career Horizon Problem: Evidence from International Acquisitions. *Strategic Management Journal*, 29(7): 683-700.

- Mcclelland, P., and Barker, V. L. 2012. CEO Career Horizon and Tenure: Future Performance Implications Under Different Contingencies. *Journal of Business Research*, 65(9): 1387-1393.
- Meuleman, M., Lockett, A., Manigart, S., and Wright, M. 2010. Partner Selection Decisions in Interfirm Collaborations: The Paradox of Relational Embeddedness. *Journal of Management Studies*, 47(6): 995-1019.
- Oh, Y., and Lee, J. 2017. When do Firms Enter a Repeated Partnership? The Effect of Contract Terms and Relative Partner Characteristics. *Management Decision*, 55(10): 2237-2255.
- Pangarkar, N., and Wu, J. 2013. Alliance Formation, Partner Diversity, and Performance of Singapore Startups. *Asia Pacific Journal of Management*, 30(3): 791-807.
- Pomegbe, W. W. K., Li, W., Dogbe, C. S. K., and Otoo, C. O. A. 2021. Closeness or Opportunistic Behavior? Mediating the Business Ecosystem Governance Mechanisms and Coordination Relationship. *Cross Cultural and Strategic Management*, 28(3): 530-552.
- Poppo, L., Zhou, K. Z., and Ryu, S. 2008. Alternative Origins to Interorganizational Trust: An Interdependence Perspective on the Shadow of the Past and the Shadow of the Future. *Organization Science*, 19(1): 39-55.
- Powell, W. W., Koput, K. W., and Smith-Doerr, L. 1996. Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology. *Administrative Science Quarterly*, 41(1): 116-145.
- Ren, C. R., Mulotte, L., Dussauge, P., and Anand, J. 2022. Alliance Performance and Subsequent Make-or-Ally Choices: Evidence from the Aircraft Manufacturing Industry. *Strategic Management Journal*, 43(11): 2382-2413.
- Reuer, J. J., Zollo, M., and Singh, H. 2002. Post-Formation Dynamics in Strategic Alliances. *Strategic Management Journal*, 23(2): 135-151.
- Rosenkopf, L., and Almeida, P. 2003. Overcoming Local Search through Alliances and Mobility. *Management Science*, 49(6): 751-766.
- Ryan-Charleton, T., Gnyawali, D. R., and Oliveira, N. 2022. Strategic Alliance Outcomes: Consolidation and New Directions. *Academy of Management Annals*, 16(2): 719-758.

- Sirmon, D. G., Arregle, J.-L., Hitt, M. A., and Webb, J. W. 2008. The Role of Family Influence in Firms' Strategic Response to Threat of Imitation. *Entrepreneurship Theory and Practice*, 32(6): 979-998.
- Staw, B. M., Sandelands, L. E., and Dutton, J. E. 1981. Threat Rigidity Effects in Organizational Behavior: A Multilevel Analysis. *Administrative Science Quarterly*, 26(4): 501-524.
- Teece, D. J. 1992. Competition, Cooperation, and Innovation. Organizational Arrangements for Regimes of Rapid Technological Progress. *Journal of Economic Behavior and Organization*, 18(1): 1-25.
- Tyler, B. B., and Caner, T. 2016. New Product Introductions Below Aspirations, Slack and R and D Alliances: A Behavioral Perspective. *Strategic Management Journal*, 37(5): 896-910.
- Williamson, O. E. 1979. Transaction-Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics*, 22(2): 233-261.
- Xia, J. 2011. Mutual Dependence, Partner Substitutability, and Repeated Partnership: The Survival of Cross-Border Alliances. *Strategic Management Journal*, 32(3): 229-253.
- Young-Ybarra, C., and Wiersema, M. 1999. Strategic Flexibility in Information Technology Alliances: The Influence of Transaction Cost Economics and Social Exchange Theory. *Organization Science*, 10(4): 439-459.
- <https://doi.org/10.1287/orsc.10.4.439>
- Young, M. N., Ahlstrom, D., Bruton, G. D., and Rubanik, Y. 2011. What do Firms from Transition Economies Want from Their Strategic Alliance Partners? *Business Horizons*, 54(2): 163-174.
- Zhang, F., Yang, X., Yuan, C., and Fan, W. 2023. Boundedly Rational Decisions on Exploration Versus Exploitation in Alliance Portfolios: Problemistic and Slack Searches Under CEO Overconfidence. *British Journal of Management, Forthcoming*.
- Zimmermann, A., Raisch, S., and Birkinshaw, J. 2015. How is Ambidexterity Initiated? The Emergent Charter Definition Process. *Organization Science*, 26(4): 1119-1139.

الملخص

أصدقاء أم غرباء؟ سوابق ونتائج اختيار شركاء التحالف الإستراتيجي

مشاري عبدالعزيز الناهض

جامعة الكويت، الكويت

هدف الدراسة: تهدف الدراسة إلى التحقيق في السوابق السلوكية والآثار في الأداء المترتبة على تحالفات التوسع وتحالفات التعزيز التي تعقدتها الشركة، من خلال دمج النظرية السلوكية للشركة ونظرية الصلابة، أمام التهديدات واقتصاديات تكاليف الصفقة ونظرية التبادل الاجتماعي، وتستكشف الدراسة كيفية قيام الشركات باختيار إعادة تشكيل محفظة التحالفات، وتأثير هذه الخيارات على ربحية الشركة ونموها. **تصميم/ منهجية/ طريقة الدراسة:** تطبق الدراسة الانحدار ذا الحدين السلبي للتأثيرات العشوائية ونظام اللحظات المعممة (GMM) على بيانات زمنية. **عينة الدراسة وبياناتها:** استخدمت مجموعة بيانات زمنية لشركات Fortune 500 بين عامي 1995 و2015 كعينة الدراسة. **نتائج الدراسة:** تظهر نتائج الدراسة أن الأفق الوظيفي للرئيس التنفيذي له تأثير إيجابي على توسيع التحالفات وتعزيزها، وكلما اقتربت الشركة من الإفلاس قل احتمال تكوينها تحالفات مع شركاء متكررين أو جدد، كما وجدت الدراسة أن الموارد الفائضة في الشركة لها تأثير إيجابي على تعزيز التحالفات، ولكن ليس لها تأثير على توسيع التحالفات، وتشير نتائج الدراسة أيضاً إلى التأثير السلبي لتوسيع التحالفات على ربحية الشركة وأن هناك علاقة إيجابية بين عدد تحالفات التعزيز وربحية الشركة ونموها. **أصالة الدراسة:** تطوّر الدراسة وتختبر نموذج إعادة تشكيل محفظة التحالفات، الذي يشمل السوابق السلوكية والعواقب الاقتصادية لقرار اختيار شركاء التحالف، كما تسلط الدراسة الضوء على أهمية الموازنة بين الاستكشاف والاستغلال في التحالفات الإستراتيجية. **حدود الدراسة وتطبيقاتها:** تقدم نتائج الدراسة رؤى للمديرين لتصميم محفظة شركاء تحالف الشركة، وتؤكد الحاجة إلى الوعي والنظر في الاستدلال السلوكي الذي يظهره الرؤساء التنفيذيون.

المصطلحات العلمية: التحالفات، الشراكة المتكررة، تشكيل التحالف، أداء الشركات، الشبكات.

Mishari A. Alnahedh is associate professor of strategy and entrepreneurship and the acting chair of the management and marketing department at Kuwait University's College of Business Administration. He holds a Ph.D. in business administration from the Warrington College of Business at University of Florida and an MBA in strategy, finance and economics from the Booth School of Business at University of Chicago. His research has been published in *Strategy Science*, *Management Research Review*, *International Journal of Organizational Analysis*, and *Social Enterprise Journal*, among other journals. Focusing on entrepreneurship, innovation, and corporate strategy, his research examines organizational change and growth strategies, entrepreneurial finance, informal entrepreneurship, and corporate innovation.
(alnahedh@ku.edu.kw)