九州大学学術情報リポジトリ
Kyushu University Institutional Repository

Alliance portfolio configuration strategies as catalysts for innovation: Evidence from international alliances between Japanese and Taiwanese manufacturing corporations

Oh, Eun-Teak
Department of Business Administration, Sonoda Women's University

Chen, Hao-Cheng
International Business Administration Program, International College, Tunghai University

Nakamoto, Ryuichi
Graduate School of Economics, Kyushu University

Liu, Ren-Jye
Department of Industrial Engineering and Enterprise Information, Tunghai University

https://hdl.handle.net/2324/7172589

出版情報：Technological Forecasting and Social Change. 200, pp.123061-, 2024-03. Elsevier
バージョン：
権利関係：Creative Commons Attribution-NonCommercial International

KYUSHU UNIVERSITY

Technological Forecasting & Social Change 200 (2024) 123061

Contents lists available at ScienceDirect

Technological Forecasting & Social Change

journal homepage: www.elsevier.com/locate/techfore

Alliance portfolio configuration strategies as catalysts for innovation: Evidence from international alliances between Japanese and Taiwanese manufacturing corporations

Eun-Teak Oh [a], Hao-Cheng Chen [b,*], Ryuichi Nakamoto [c], Ren-Jye Liu [d]

[a] Department of Business Administration, Sonoda Women's University, Amagasaki 661-8520, Japan
[b] International Business Administration Program, International College, Tunghai University, Taichung 40704, Taiwan
[c] Graduate School of Economics, Kyushu University, Fukuoka 819-0395, Japan
[d] Department of Industrial Engineering and Enterprise Information, Tunghai University, Taichung 40704, Taiwan

ARTICLE INFO

Keywords:
Innovation
Alliance portfolio configuration
Alliance shaping strategy
Alliance portfolio scope
Japan–Taiwan corporate alliance

ABSTRACT

Interorganizational relationships are vital for innovation and competitive advantage. However, research has primarily focused on high-tech and biopharmaceutical sectors, leaving a gap in understanding their impact on traditional manufacturing industries, which is crucial for a nation's economic development. The current academic discourse lacks a comprehensive understanding of how traditional manufacturing firms strategically configure alliance portfolios to foster innovation over longer time horizons. To address this gap, this study investigates international alliance partnerships in the Japan-Taiwan context, emphasizing external resources and inter-firm linkages as competitive advantage sources. It examines resource management and alliance portfolio configuration within traditional industries, specifically Japanese-Taiwanese alliances in China's automotive and machine tool manufacturing sectors. Findings shed light on the intricate nature of alliance portfolio configuration in traditional manufacturing, involving careful partner selection and resource adjustment through exploitation and exploration. The research offers valuable insights into dynamic alliance development and factors influencing innovation. It presents three propositions and identifies trust, equity commitment, firm capabilities, proactiveness, alliance resource redundancy, and domain segmentation as driving factors. This study contributes to theoretical and empirical knowledge, examining research implications while acknowledging limitations. Future research directions should address these limitations and examine further avenues, deepening our understanding of the complexities involved in driving innovation through interorganizational relationships in industries that lay the foundations for economic growth.

1. Introduction

Innovation is a complex and time-consuming process that demands substantial dedication. To foster their growth, innovative companies must establish collaborative partnerships, which serve as vital contributors (Radicic et al., 2020; Scaringella and Radziwon, 2018). The presence of external resources and inter-firm linkages has been identified as sources of competitive advantage for firms (Dyer and Singh, 1998). These resources are acquired through various methods, and the configuration of inter-firm linkages is crucial. The diversity of partners allows firms to compensate for constrained resources and keep pace with technological developments (Kavusan and Frankort, 2019; Shukla et al., 2020).

In this regard, two research questions are suggested in existing studies on the alliance portfolio. First, existing empirical research on alliance portfolio has predominantly focused on large R&D-intensive companies in medium- and high-tech sectors (Spithoven et al., 2011). In contrast, innovation in the traditional manufacturing sector often requires a longer timeframe, and an enduring alliance portfolio configuration can serve as a catalyst for such innovation. Traditional industries typically refer to established sectors that have a long history and are often characterized by conventional practices and slow innovation processes. Examples include manufacturing, construction, and agriculture. These inherent differences imply that different manufacturers face

* Corresponding author at: International Business Administration Program, International College, Tunghai University, No.1727, Sec.4, Taiwan Boulevard, Xitun District, Taichung City 40704, Taiwan.
E-mail addresses: etoh@sonoda-u.ac.jp (E.-T. Oh), cks@thu.edu.tw (H.-C. Chen), ryunakamoto@econ.kyushu-u.ac.jp (R. Nakamoto), liurj@thu.edu.tw (R.-J. Liu).

https://doi.org/10.1016/j.techfore.2023.123061
Received 15 December 2022; Received in revised form 14 November 2023; Accepted 28 November 2023
Available online 23 December 2023
0040-1625/© 2023 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC license (http://creativecommons.org/licenses/by-nc/4.0/).

varying levels of difficulty in innovating product architectures and consequently adopt different alliance strategies to acquire resources. The research assumes that alliance proactiveness (explore) plays a more significant role in radical innovation within high-tech industries. In contrast, while alliance coordination (exploit) plays a more crucial role in innovation within traditional industries (Inigo et al., 2020).

Second, previous research on innovation creation has primarily focused on empirical studies examining the factors that contribute to the formation and premature dissolution of strategic alliances while giving relatively less attention to the underlying reasons and strategies behind the long-term configuration of alliance portfolios. This limitation necessitates a deeper understanding of the factors that contribute to innovation in traditional manufacturing industries and how firms can gain a competitive advantage through effective resource management and alliance portfolio configuration. While prior research has established a positive relationship between alliance portfolio configuration and innovation (Inigo et al., 2020), the extent to which these findings apply to traditional industries remains unclear.

Considering the aforementioned factors, this study takes a long-term perspective and examines the development of focal firm's alliance portfolio scope and resource focus. We empirically investigate Japanese-Taiwanese international alliances, focusing on enduring partnerships in two industries: automotive manufacturing and machine tool manufacturing. The findings of our study reveal that the construction of an alliance portfolio is not solely the result of intentional strategies formulated to respond to unforeseen environmental changes. Instead, it is characterized by selective partner interactions, involving the exploration and exchange of resources, coupled with their ongoing coordination and adjustment.

The subsequent sections of this paper are organized as follows. First, we provide a succinct review of previous studies on alliance development, with a primary focus on long-term perspectives. Building upon the existing literature, we identify the key components of an analytical framework and conduct a qualitative study on the consistent development of international alliances. Next, we present our propositions and findings. Lastly, we discuss the implications of our study and acknowledge its limitations.

2. Conceptual background

With interorganizational relationships becoming an increasingly important source of competitive advantage, alliance portfolio configuration is gradually regarded as a critical strategic issue (Bakker, 2016; Hoffmann, 2007). In particular, recent attention has focused on how alliances develop over longitudinal time spans. In other words, how alliances develop through longitudinal time and what consequences they have has been an important topic of recent alliance research (Bakker, 2016; Lavie and Singh, 2012). Existing studies on alliances have a long history and explain alliances through a variety of theories.

As summarized in Table 1, a variety of theories, both traditional and relatively new, have been used to analyze alliances. For example, mutual trade dependency theory (Isobe et al., 2000; Xia, 2011), transaction-cost theory (Madhok et al., 2015; Williamson, 1975), resource dependency theory (Inkpen and Beamish, 1997; Pfeffer and Salancik, 2003), resource-based view (Das and Teng, 2000; Kogut, 1989), organizational learning theory (Kogut, 1989; Zidorn and Wagner, 2013), and social network theory (Adler and Kwon, 2002).

2.1. Exploring long-term alliance portfolios

Despite the accumulation of alliance research, alliance's longitudinal (and long-term) development has not been adequately explored (Bakker, 2016). Rather, while existing studies have accumulated much research on the initial stage: the initial conditions of formation of alliances (Greve et al., 2010; Lavie and Rosenkopf, 2006), they have not focused on the implementation stage of alliances. Recent studies have indicated that the post-formation process has a decisive impact on the stability and survival of the alliance (Bakker, 2016; Inigo et al., 2020). In fact, in sustainable (international) alliances, initial conditions vary over time (Kogut, 1989; Parkhe, 1991). In addition, it is not possible to anticipate and plan for all conditions at the time of alliance formation (Gulati et al., 2012). The critical factor is configuring the two most important factors: the resources exchanged in the alliance and the portfolio of participants. Since the process of configuration of such alliances is dynamic (Bakker, 2016; Marion et al., 2015), research methods and perspectives that have been widely adopted in existing studies, i.e., a static explanation from the elemental decomposition viewpoint, cannot reveal why and how long-term (international) alliances occur. In fact, existing studies of this type have analyzed alliances that terminate after three to five years (Guo et al., 2021).

Based on prior studies (Bakker, 2016; Kavusan and Frankort, 2019; Koza and Lewin, 1998), this study tries to discover the innovative creation process of sustainable alliance (portfolio) configurations along the following two dimensions; resource and partner in alliance portfolio. In other words, one is the alliance (resource) shaping strategy related to the resource acquirement method with exploitation and exploration (Inigo et al., 2020), and the other is the alliance (partner) scope related to the extent of partnership (Shukla et al., 2020). A unique feature of our study is that the use of case studies allows us to more closely observe the variation that occurs in long-term partnership projects (i.e., resources and partners) and to track those variations over time. In the next section, we discuss these two aspects in more detail.

Table 1
Theories related to the sustainable development of (international) alliances.

Theory	Key concepts	Scholars
Mutual trade dependency theory	Comparative advantage, complementary relationship, and institutional and cultural distance with respect to the host country	David et al. (1997); Isobe et al. (2000); Xia (2011); Edgington and Hayter (2012); Boehe (2013)
Transaction-cost theory	Transaction cost and alliance relationship	Williamson (1975, 1979); Madhok et al. (2015)
Resource dependence theory	Resource dependence, bargaining power, and alliance instability	Inkpen and Beamish (1997), Pfeffer and Salancik (2003), Hillman et al. (2009), Xia (2011)
Resource-based view	Resource characteristics, resource alignment, partner substitutability, partner selection, and alliance survival and termination	Kogut (1989); Das and Teng (2000); Stuart (2000); Cui et al. (2011); Lu and Ma (2015)
Organizational learning theory	Resource exploitation, resource exploration, continuous learning effects, experience in alliance relationships, and trust	Kogut (1989); Parkhe (1991); Anand and Khanna (2000); Kale et al. (2000); Inkpen (2000); Hitt et al. (2000); Makino et al. (2002); Tsang and Yip (2007); Sivakumar et al. (2011); Nam (2011); Zidorn and Wagner (2013)
Social network theory	Alliance network redundancy, network position of alliance partners, and the abundance of network resources	Rousseau et al. (1998); Koza and Lewin (1998); Hite and Hesterly (2001); Adler and Kwon (2002); Bae and Gargiulo (2004); Gulati (2007); Goerzen (2007); Vanhaverbeke et al. (2009); Greve et al. (2010); Cui (2013); Castro et al. (2014); Rogbeer et al. (2014); Kharrazi et al. (2017)

Source: Organized by this study.

2.2. Managing the alliance portfolio: dynamics of resources and partner configuration

When a firm (re)-configures its alliance portfolio, the primary considerations revolve around resources and partners (Kavusan and Frankort, 2019; Liang and Shao, 2019; Van Wijk and Nadolska, 2020; Wang and Rajagopalan, 2015). These configuration options can be further categorized based on their respective newness. Specifically, they encompass existing resources with a new partner, new resources with an existing partner, and new resources with a new partner (Bakker, 2016). Alliance portfolios may contain redundancies arising from similarities in resources or overlapping competition between partners (Han et al., 2018). Consequently, configuring the alliance portfolio requires effort.

In general, the configuration of such an alliance portfolio can be understood using the concept of exploration and exploitation (Inigo et al., 2020). Exploration focuses on acquiring new resources, such as technology, knowledge, capabilities, opportunities, and assets, while exploitation emphasizes leveraging existing resources (March, 1991). For instance, an exploration-focused alliance shaping strategy may involve engaging in joint technology development and the creation of new value chain activities to meet evolving customer needs. Conversely, an exploitation-focused alliance shaping strategy may entail continuous product differentiation or cost reduction by optimizing manufacturing line efficiency through long-term contracts with suppliers.

Another crucial aspect of this study is the scope of the alliance portfolio, which pertains to the extent of connections with alliance partners of the focal firm (Gulati, 1999; Meschi & Wassmer, 2013). The scope of alliances plays a vital role in generating synergies. Through engagement in diverse alliances, firms gain access to a wider array of complementary resources, including knowledge, technology, and capital, thereby enhancing their competitive advantage. This also facilitates the achievement of economies of scale and scope. Attracting innovative partners enhances firms' capabilities, while selecting partners with a strong market presence provides flexibility in dynamic environments, enabling firms to sustain or expand their market share (Han et al., 2018). Furthermore, focal firms benefit from increased learning opportunities (Faems et al., 2012).

While many researchers argue that forming a broader range of alliances is advantageous, some scholars have suggested that a larger scope of alliances may not necessarily result in better performance (Wassmer, 2010). Their research reveals an inverted U-shaped relationship between the number of alliances and innovation performance, such as the focal firm's ability to develop new products. This phenomenon primarily stems from the constraints of organizational absorptive capability. Additionally, it is worth noting that the majority of research in this area has predominantly focused on entrepreneurial technology or biotechnology sectors, thereby limiting its generalizability to other contexts (Faems et al., 2012).

In summary, a substantial body of quantitative studies has accumulated regarding alliance portfolio configurations. However, the majority of these studies primarily provide quantitative analyses of the antecedents, configurations, and outcomes of alliance portfolios. Consequently, they fail to offer a comprehensive understanding of the dynamics involved in long-term alliance development (Wassmer, 2010). Moreover, prior research on alliance portfolio configurations has predominantly concentrated on industrial settings where the resources exchanged within alliances and the partnering firms undergo relatively short-term changes (Bakker, 2016; Kavusan and Frankort, 2019; Liang and Shao, 2019). Consequently, their insights into the development of long-term alliance portfolio configurations are limited. This creates a research gap, whereby the phenomenon remains unexplained by theories commonly employed to explain the configuration of relatively short-term alliance portfolios, such as the behavioral theory of the firm (Cyert and March, 1963).

This study focuses on the configuration of alliance portfolios for international alliances. Recognizing the importance of trust relationships among top executives and their commitment to long-term alliance development, our research question revolves around how the selection of alliance resources and partners is orchestrated over an extended time horizon, as well as the patterns that emerge in the configuration of the alliance portfolio. To address this, we employ a multiple case study methodology, aiming to provide insights into how innovation is pursued through alliance portfolio configurations in the traditional manufacturing sector from a longer-term perspective.

3. Research design and methodology

An alliance encompasses various forms, such as franchising, licensing, and outsourcing, among others. It is typically regarded as the integration of forces and resources for a specific or indefinite duration to achieve a shared objective. Due to the limitation of data availability, our study exclusively focuses on equity-based international alliances to elucidate diverse alliance portfolio patterns and examine their development.

3.1. Conceptual framework of alliance portfolio configuration patterns

This research examines the dynamic development of alliance portfolios, shedding light on a focal firm's alliance portfolio configuration. Departing from previous research that primarily examines broader structural or dyadic levels of multiple partnerships, we adopt a focal firm perspective to investigate the alliance portfolio configuration. Alliance portfolio refers to the set of alliances in which a firm is involved (Bae and Gargiulo, 2004). Expanding on this concept, we define the alliance portfolio as the aggregation of concurrent alliances within a firm (Lavie, 2007; Parise and Casher, 2003; Van Wijk and Nadolska, 2020), providing a comprehensive depiction of accumulated alliances at the corporate level, regardless of their operational status. Based on the foregoing discussion, we propose a framework with two dimensions and four alliance portfolio configuration types, as shown in Fig. 1. The vertical dimension of alliance shaping strategy indicates the extent to which resource focus is emphasized, following the variation in resource dependence (the method of resource acquisition involving exploitation and exploration) (Rindova et al., 2012). The original horizontal dimension includes the development mode of alliance with the existing partner, new partners, or both by leveraging their initialization or repetition of alliance partnerships (the scale of partnership numbers). The four types are: Optimization type, Resource Development type, Alliance Portfolio Development type, and Diversification type.

Optimization type refers to the situation where the focal firm maintains its existing alliance portfolio and leverages its available resources to drive continuous innovation in existing products. Resource development type focuses on incorporating new technologies or distinct competencies from existing alliance partners, rather than expanding the number of partnerships. One of the most significant forms of resource exploration in this type is the establishment of a joint new business with existing alliance partners. Alliance Portfolio Development type involves expanding the range of alliance partnerships while keeping the types of resources unchanged. This occurs when the focal firm adds a partner with existing resources already present in the alliance portfolio. Diversification type encompasses modifying both the alliance partner and the resources engaged in the alliance. This is illustrated by cases where the focal firm acquires new resources from a partner not previously included in the alliance portfolio.

Nevertheless, the boundary between resource exploitation and exploration in a firm's alliance portfolio can be blurred. Over time, the structure of a firm's alliance portfolio may shift dynamically, making it difficult to definitively categorize the overall portfolio as aiming for exploitation or exploration. Our research focuses specifically on joint venture formation, which we consider to be a significant form of resource exploration due to the high level of resource commitment required. On the other dimension, we categorize a joint venture as an

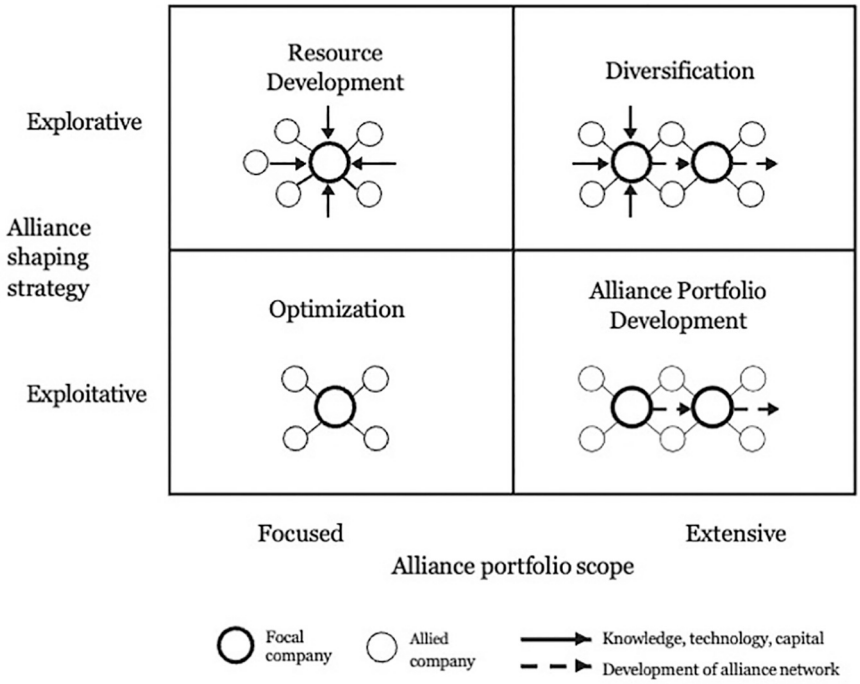

Fig. 1. Conceptual framework of alliance portfolio configuration.

extensive type on the alliance portfolio scope type if it is outside the firm's existing business group. This distinction between equity and non-equity joint ventures, as well as joint ventures within and outside of existing business groups, provides a more definitive way to categorize alliance portfolio configuration types.

The Optimization type is exemplified by China Motor Corporation (CMC) and in the initial stages of the other two cases. The Alliance Portfolio Development type is exemplified by Fair Friend Group (FFG) and is also present in Lioho's development process. The Diversification type is exemplified by Lioho Machine Works (Lioho) and attempted by FFG.

Based on the above reasons, our study categorizes CMC, FFG, and Lioho into the Optimization, Alliance Portfolio Development, and Diversification types, respectively. The Resource Development type was not found in our sample.

3.2. Methods and data collection

The primary objective of this study was to examine and understand the diverse patterns of alliance development. To achieve this, we conducted a comprehensive analysis of longitudinal case data, utilizing specific criteria as a guiding framework.

We adopted a qualitative research method in this study for two main reasons. Firstly, qualitative research is particularly suitable when there is limited knowledge about the phenomenon being investigated and when empirical research in specific areas is limited (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Yin, 1989). Secondly, this method allows for exploring new or alternative meanings and interpretations from different perspectives (Huemer, 2006).

We conducted a longitudinal study to explore variations in Alliance Portfolio Development. The analysis specifically focused on China Motor Corporation (CMC), Fair Friend Group (FFG), and Lioho Machine Works (Lioho), with an emphasis on their joint ventures with international partner companies. These corporations, all founded in the 1970s (CMC in 1969, FFG in 1979, and Lioho in 1971), are considered representative companies in traditional manufacturing sectors. For a list of abbreviations and headquarters locations, please refer to Appendix A.

Table 2 illustrates the comprehensive observation period. To ensure the credibility and consistency of the data, we implemented a robust research methodology involving multiple rounds of interviews with top managers at the headquarters and joint ventures, and supervisors of the international alliances.

These interviews were strategically designed to address the same set of research inquiries, enabling effective comparative analysis. Each interview, with an average duration of approximately two to five hours, was supplemented by on-site visits, which enhanced the depth and richness of data collection. Through these interviews, we gained valuable insights into various facets, including the establishment background of joint ventures, collaborative relationships with partners, variations in business operation outcomes, market dynamics and changes, as well as the dynamic nature of capital, technology, and expertise.

With reference to the four alliance development patterns depicted in Fig. 1, this study conducted a comprehensive series of longitudinal case analyses to explore and examine various alliance development patterns. Specific criteria guided the investigations. First, the study delved into the alliance shaping strategy, emphasizing resource ownership changes, top manager and employee replacements, production model modification, and the integration of new technologies with alliance partners, to identify the driving factors that reinforce resource configurations. Second, the assessment of the alliance portfolio scope focused on the iterative processes and alliance experiences among existing partners and the establishment of new alliance relationships with prospective partners. This analysis aims to reveal the dynamic characteristics of changes in the focal firm's alliance portfolio.

The subsequent section presents detailed insights from these longitudinal case analyses, shedding light on a diverse range of alliance development patterns observed in the cases.

4. Case study analysis: investigating alliance portfolio configuration in international manufacturing corporations

Japanese and Taiwanese corporations have a long history of engaging in collaborative efforts driven by mutual resource

Table 2
Interview records for longitudinal analysis.

Corporation name	Corporation profile	Interview date and time	Interview method	Interviewee	Analysis object
China Motor Corporation (CMC)	Year established: 1969; Number of employees: 1800; Sales amount: $34.7 billion (NTD)	Apr. 2000 (Progressive: time non- applicable)	In-person, Email Q&A, Phone interview	Fujian Southeast Motor: Local Taiwanese (Taiwan) and Japanese president (China)	Fujian Southeast Motor; Two joint ventures in total
		Apr. 22, 2003, 09:00–16:00 (Approx. 5 h)	In-person		
		Apr. 29. 2015, 09:00–16:00 (Approx. 5 h)	In-person		
		Apr. 2, 2021	Email Q&A		
Fair Friend Group (FFG)	Year established: 1979; Number of employees: 5300; Sales amount: $55 billion (NTD)	1990–1996 (Progressive)	In-person	FFG: CEO (Taiwan), chairman (Taiwan), CEO (Taiwan),and president of China business (Taiwan); Waida-Feeler Precision Machinery: President (Japan); Takamatsu Machinery: President of China business (Japan)	Hangzhou Takamatsu-Feeler (2004); F.T. Japan (2007); Hangzhou Feeler- Mectron (2010); Waida- Feeler Precision Machinery (2011); Five joint ventures in total
		May 2004 (Progressive, approx. 5 h)	In-person, Email Q&A, Phone interview		
		Dec. 8, 2009, 10:00–12:00 (Approx. 2 h)	In-person		
		Feb. 2, 2010, 09:00–11:30 (Approx. 2.5 h)	In-person		
		Apr. 22, 2013, 10:00–12:00 (Approx. 2 h)	In-person		
		Dec. 9, 2015, 13:30–15:20 (Approx. 2 h)	In-person		
		Jul. 7, 2016, 09:30–11:30 (Approx. 2 h)	In-person		
Lioho Machine Works (Lioho)	Year established: 1971; Number of employees: 1100; Sales amount: N/A	Apr.–Jul. 2000 (Progressive)	In-person, Phone interview, Online survey	Kunshan Liufeng Machinery Industry: Taiwanese president and director (China); Lioho Machinery: PIC of China business (China)	Kunshan Liufeng Machinery Industry (1992); Toyota Industry (1994); Fujiwa Machinery (1995); Fuzhou Lioho Machinery (2000); Kiriu Lioho (2004); Fourteen joint ventures in total
		2005 (Progressive)	In-person		
		Feb. 5, 2006, 09:00–12:30 (Approx. 4.5 h)	In-person		
		Dec. 4, 2009, 10:00–12:00 (Approx. 3 h)	In-person		
		Apr. 30, 2015	Email Q&A		

Source: Compiled by this study based on interviews with the authors.

complementarities across industries such as electronics, IT, automobiles, and food. Japanese corporations often choose Taiwan as a production base, while Taiwanese firms rely on Japanese corporations for technological advancements and capital resources. These collaborations involve joint initiatives in production, sales, and development. As the Chinese market undergoes continuous transformation, these alliances have successfully adapted and expanded their partnerships, establishing a strong presence in terms of both quality and quantity, and driving innovation.

Drawing on empirical research primarily conducted among Japanese and Taiwanese manufacturing corporations since 1990, this study aims to investigate the dynamics of alliance portfolio configuration. We present a succinct overview of the industrial background and subsequently undertake a comprehensive analysis of each case in the subsequent sections. Figs. 2–4 provide an overview of the key trends and developments of the alliance portfolio for each case.

4.1. China Motor Corporation

China Motor Corporation (CMC), a Taiwanese automobile

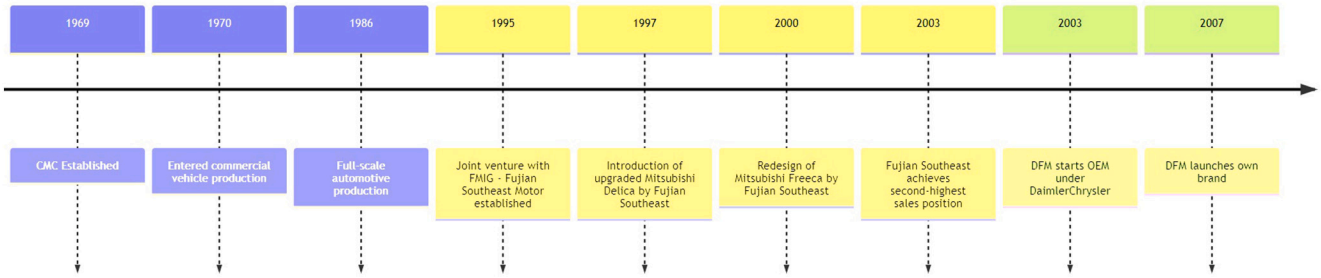

Fig. 2. Key milestones in the development of CMC's alliance portfolio configuration.

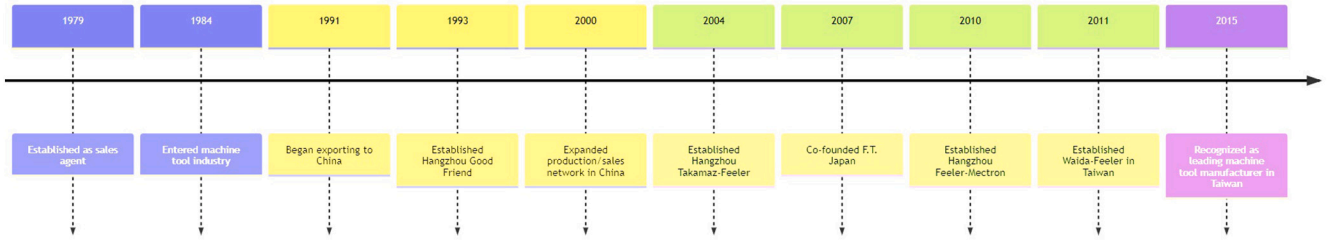

Fig. 3. Key milestones in the development of FFG's alliance portfolio configuration.

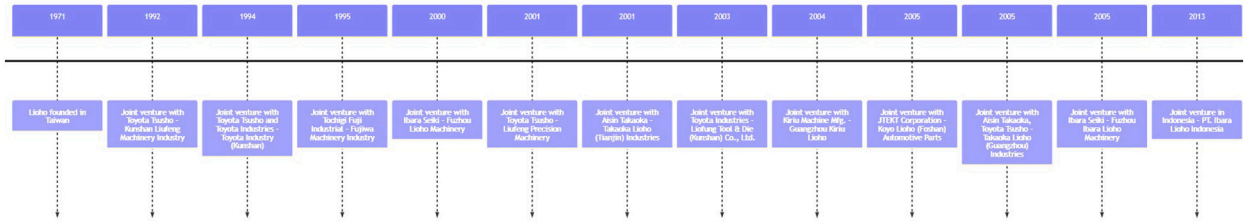

Fig. 4. Key milestones in the development of Lioho's alliance portfolio configuration.

manufacturer established in 1969, entered the commercial vehicle production industry in 1970 through a technology contract with Mitsubishi Motors Corporation (hereafter Mitsubishi Motors). Their partnership paved the way for CMC's full-scale automotive production in 1986, following Mitsubishi Motors' acquisition of an 18 % equity stake, solidifying their enduring sales collaboration. Fig. 2 provides a visual representation of the key milestones that shaped the trajectories of CMC's case.

4.1.1. Formation of CMC's international alliances

4.1.1.1. Joint venture: Fujian Southeast Motor (Fujian Southeast). In 1995, CMC established a joint venture production base in China, "Fujian Southeast Motor" (hereafter Fujian Southeast), in partnership with the Fujian Motor Industry Group (FMIG) (see Table 3). Initially, Fujian Southeast introduced an upgraded model of the Mitsubishi Delica in 1997 and a redesigned Mitsubishi Freeca in 2000. The company achieved a local content procurement ratio exceeding 91 % through highly efficient collaborations with local parts companies.

Fujian Southeast utilized its connections with Japanese corporations to directly procure automotive engines from the engine manufacturing factories of Dongfeng Motor Corporation (DFM) and Shenyang Aerospace Mitsubishi Motors Engine Manufacturing. Additionally, it engaged Taiwanese subcontractors for critical component sourcing and obtained general standard parts from local firms renowned for their production quality. Taiwanese staff members played a pivotal role in local parts procurement and efficient personnel management. The integration of cutting-edge manufacturing equipment from Japan, the United States, and Germany further enhanced production efficiency. As a result, Fujian Southeast secured the second-highest sales position among China's 52 small-sized commercial vehicle manufacturers in 2003. Through CMC's years of experience and collaboration with Mitsubishi Motors and FMIG, it has established itself as a significant player in the automotive industry, with Fujian Southeast serving as a prime example of their successful joint ventures.

Furthermore, Fujian Southeast also ventured into original equipment manufacturing (OEM) under the DaimlerChrysler brand in 2003 and launched its own marque in 2007.

4.1.2. CMC's alliance portfolio configuration strategies

With Fujian Southeast's exponential growth, Mitsubishi Motors strategically acquired a 25 % stake in 2006, while the remaining 75 % was distributed among Chinese and Taiwanese corporations, holding 50 % and 25 % shares, respectively (see Table 3). This restructured capital allocation marked a significant expansion of the international alliance. Recognizing the inherent challenges of entering the China market, Mitsubishi Motors provided comprehensive support to Fujian Southeast. This support encompassed the supply of eight product models, collaborative efforts in business planning, production optimization, and targeted marketing strategies. To ensure meticulous quality control, skilled personnel from Mitsubishi Motors' purchasing department were dispatched to work closely with their counterparts at Fujian Southeast.

By leveraging the extensive supply chain network of Taiwanese companies in China and utilizing the technical expertise and financial resources of their Japanese and American counterparts, Fujian Southeast Motor successfully expedited its business stabilization process and achieved remarkable success. The fruitful collaboration and synergistic efforts arising from this international alliance played a crucial role in driving the company's progress.

After Mitsubishi Motors invested in Fujian Southeast, the company expanded its product range to include Mitsubishi-branded vehicles alongside its own offerings. However, starting in 2010, Mitsubishi Motors significantly reduced its product supply to Fujian Southeast due to underperformance at its Japanese headquarters. By 2014, the

Table 3
The development of China Motor Corporation's (CMC) alliance portfolio.

Joint venture	Year	Product	Capital structure	Alliance partner	Company existence	Area
Fujian Southeast Motor	1995 (Establish ment) 2006	Automobile	50 %:50 % (China:Taiwan) 50 %:25 %:25 % (China: Japan: Taiwan)	Fujian Motor Industry Group (FMIG) Fujian Motor Industry Group (FMIG); Mitsubishi Motors	Survival	Fuzhou, Fujian, China

Source: Compiled by this study based on interviews with the authors.

Table 4
Sales volume changes of Mitsubishi Motors vehicles.

Marque	Year				
	2011	2012	2013	2014	2015 (estimated)
Fujian Southeast: Five models	78,452 (71.0 %)	85,515 (79.9 %)	98,787 (82.60 %)	58,221 (85.0 %)	85,000 (84.5 %)
Mitsubishi: Six models	31,742 (28.7 %)	21,462 (20.1 %)	20,770 (17.4 %)	10,296 (15.0 %)	15,540 (15.5 %)
Chrysler: Two models	248 (N/A)	41 (N/A)	0	0	0
Total (Unit: Vehicle)	110,442	107,018	119,557	68,517	100,540

Source: Compiled by this study based on interviews with the authors.

proportion of Mitsubishi Motors' products in Fujian Southeast's lineup had dropped to around 15 %, down from nearly 30 % in 2011 (refer to Table 4). As a result, Fujian Southeast primarily relied on vehicle models derived from Taiwan CMC, including their in-house-developed models such as the "V5 Lingzhi Sedan" and "V6 Lingshi Hatchback," introduced in 2012. Additionally, the OEM collaboration with DaimlerChrysler, which had been ongoing since 2003, concluded in 2012. For more comprehensive information on CMC's alliance portfolio configuration, please refer to Appendix B.

4.1.3. Overview of CMC's alliance portfolio configuration

CMC's alliance portfolio configuration and strategy is characterized by its strategic focus on resource exploitation and a streamlined alliance portfolio, thereby placing it in the Optimization category. This approach has proven particularly effective at the outset of the partnership between Mitsubishi Motors and CMC. Enabled through CMC's efficient local parts procurement and adept personnel management, this partnership has significantly propelled Fujian Southeast toward achieving an admirable market share in the Chinese small-sized commercial vehicle market, notably through the production of models such as the Mitsubishi Delica and Freeca.

Integral to CMC's resource exploitation strategy is its joint venture with Fujian Motor Industry Group (FMIG), which grants CMC in-depth access to FMIG's resources and local market expertise. This cooperative relationship has unabatedly informed CMC's understanding of the Chinese market, despite the fact that FMIG, lacking experience in development and manufacturing operations, predominantly features as a financial investor.

Concurrently, CMC's condensed and focused alliance portfolio, which includes only a few major alliances such as FMIG and Mitsubishi Motors, has been pivotal in maintaining and developing deep-rooted and impactful relations with these strategic alliances. However, CMC and Mitsubishi Motor's partnership, despite its success, has reached a critical juncture, spotlighted by the top manager of Fujian Southeast. A major challenge lies in China's industrial policy requirement, which mandates that foreign companies accumulate local investments exceeding 50 % of their net assets. Another issue emerged in 2012 when Mitsubishi Motors entered a joint venture with the local Guangzhou Automobile Industry Group (GAIG), forming GAC Mitsubishi Motors (GMMC) to target the SUV market segment. The escalating popularity of GMMC's new models led to Mitsubishi Motors redistributing significant business resources to bolster this alliance, consequentially curtailing the models available to Fujian Southeast.

Despite this, the top manager of Fujian Southeast reassured that the partnership with Mitsubishi Motors is set to continue, bolstered further by the dedication of the CEO of Mitsubishi Motors and the director of CMC who consecutively held three meetings in a five-month span in 2015 to strategize future alliance potential. Moreover, Fujian Southeast has undergone a workforce evolution. While in 2006, the employee composition was diverse, including Japanese, Taiwanese, and Chinese nationals, by 2015, obvious trends toward localizing the workforce were evident with a decrease in Taiwanese personnel.

While CMC's Optimization strategy has largely streamlined operations and enabled capturing considerable market share in the Chinese market, the evolving business landscape and internal changes necessitate an adaptive approach to sustain and augment future growth.

4.2. Fair Friend Group

Established in 1979 as a sales agent for Japanese firms in Taiwan, Fair Friend Group (FFG) entered the machine tool industry in 1984 after several years of merger and acquisition, as well as partnerships with foreign firms from the US, Europe, and Japan. FFG has established a vast network of resources through its many partnerships, enabling the company to become Taiwan's leading machine tool manufacturer as of 2015. Fig. 3 serves as a timeline, illustrating the chronological sequence of significant developments in FFG's case.

4.2.1. Formation of FFG's international alliances

In 1991, FFG Machining Center commenced exporting its products to China through a collaboration with the Japanese company Chatani Industry. Subsequently, in 1993, FFG took a direct approach to penetrate the Chinese market by establishing Hangzhou Good Friend Precision Machinery, focusing on the sales of machine tools. Since 2000, FFG has made significant strides in establishing a comprehensive production and sales network in China, facilitating successful business ventures across diverse markets in China, Japan, and Taiwan. The company has fostered valuable partnerships with renowned global automotive and aircraft manufacturers (see Table 5) and has proactively nurtured new alliances with Japanese firms since 2000.

4.2.1.1. Joint venture: Hangzhou Takamatsu-Feeler. Hangzhou Takamatsu-Feeler was established in 2004 as FFG's first equity alliance, jointly formed with Takamatsu Machinery. It specializes in small-size precision lathes for automotive parts and electronic controls, leveraging technological advantages from both companies. With the

Table 5
Overview of Faire Friend Group's (FFG) alliance portfolio.

Item	The whole group	China area
Affiliated companies	53 (21 domestic firms and 32 overseas firms)	14 firms, 69 offices in each of China's provinces
Machine tool office and factory	13 brands and 23 factories (over 80 % in the Taichung area)	8 factories
Major alliance partners	14 firms, including SKF MEKAN Ab, COSMOS, CIRE, and AXON	No alliances with local firms
Japanese alliance partners	10 firms, including Toyota Tsusho Corporation, T. Chatani, Takamatsu Machinery, and Waida MFG	5 firms, including Takamatsu Machinery, ANEST Iwata, Mectron, and Nippon Cable
Research and development	R&D centers in Taiwan, Japan, Europe, and the US	Hangzhou Xiaoshan R&D center
Manufacturing network	12 bases worldwide with 61 factories (2 in Taiwan, 3 in China, 3 in Japan, and the rest in Korea, the US, and Europe)	3 bases and 10 factories in China (Hangzhou)
Sales network	67 bases worldwide, excluding offices	32 bases in China
Customer network	18 automobile-affiliated firms, 12 aviation-affiliated firms, and 7 molds and general processing-affiliated firms	10 automobile-affiliated firms and others (18 %)

Source: Compiled by this study based on interviews with the authors.

support of FFG's sales offices throughout China, it aims to penetrate the high-end market. The agreement was reached after the executive director of Takamatsu Machinery had sounded out FFG's president at the EMO, a European trade show for manufacturing industries in Milano, Italy, followed by a second visit by the top executive of FFG to Takamatsu Machinery. The success of Hangzhou Takamatsu-Feeler laid the foundation for the establishment of new joint businesses, such as F.T. Japan and Hangzhou Feeler-Mectron, which were formed in rapid succession.

4.2.2. FFG's alliance portfolio configuration strategies

FFG (Fair Friend Group) specializes in the production of machine tools, industrial equipment, and green energy technology. In order to enhance its global production, sales, and parts procurement capabilities, the company has established a robust partnership of international alliances. Table 6 provides an overview of the development of FFG's alliance portfolio. These alliances are forged through joint ventures with partner companies in Japan, China, Europe, and the United States. The strategic alliances with like-minded partner companies have been instrumental in FFG's achievements.

4.2.2.1. Joint venture: F.T. Japan. One example is F.T. Japan, which was co-founded in 2007 by FFG and Takamatsu Machinery, with equal ownership from both parties. Its objective was to enhance production and sales activities in Japan through the effective utilization of advanced technology for joint development. Since then, F.T. Japan's business has consistently grown, and in 2014, it began selling machine tools that integrate FFG's NC design and Takamatsu Machinery's loader design.

4.2.2.2. Joint venture: Hangzhou Feeler-Mectron. In 2010, FFG, Takamatsu Machinery, and Mectron established Hangzhou Feeler-Mectron, a joint venture based in Hangzhou, China. FFG and Takamatsu Machinery each held a 45 % equity stake, while Mectron held 10 %. This joint venture is crucial to FFG's global strategy and operates in China, Japan, and Taiwan. The stable development of the business, including parts procurement, product development, and continuous sales based on regional market trends, heavily relies on mutual trust among the partners.

4.2.2.3. Joint venture: Waida-Feeler Precision Machinery (Waida-Feeler). Furthermore, FFG has formed international alliances with new partners beyond its initial network. One example is Waida-Feeler Precision Machinery (hereafter Waida-Feeler), a joint venture established in Taiwan in 2011 by FFG, Waida Mfg., and two other Japanese companies. The main focus of the company is the procurement and production of parts for the Japanese headquarters, but FFG and Waida Mfg. are also working on long-term business opportunities to meet new market demands in China, Southeast Asia, and Europe. The joint venture has a capital structure of 45 % for FFG, 45 % for Waida Mfg., and the remaining 10 % held by the other two Japanese companies. In 2014, as directed by the Japanese government, Waida Mfg. acquired an additional 10 % stake from the two other Japanese companies, resulting in shared ownership only with FFG.

In one of our interviews, Waida-Feeler's Japanese president stated, "The longevity of international alliances hinges not only on the production technology and human resources management capability of Taiwanese companies but also on the managerial philosophy and mutual understanding among top managers in relation to shared goals." Further details regarding FFG's alliance portfolio configuration are presented in Appendix C.

4.2.3. Overview of FFG's alliance portfolio configuration

FFG's alliance portfolio configuration is pivotal in its international competitiveness and long-term success. These strategic alliance partnerships with Japanese companies provide FFG with opportunities to access new technologies, expand its market presence, and foster resource and expertise sharing. However, building a successful alliance partnership is a complex process that requires a meticulous planning and execution. FFG must ensure that its alliances are mutually beneficial and align with its long-term goals and strategic objectives, while also identifying partners that complement its strengths and address its weaknesses.

Experience gained from collaborating with Japanese firms has underscored the importance they place on mutual understanding, organizational learning, and trust among top managers when forging new business relationships. Japanese firms also prioritize learning from industry experts, maintaining long-term business operations, and actively seeking new customers and products. FFG's proactive engagement in relationship-building initiatives, such as joint training programs or shared research projects, has further strengthened the bonds with its Japanese partners. Notably, the decision-making process of Japanese firms tends to span a longer timeframe, as evidenced by their business activities. Despite this, FFG has demonstrated proactive responsiveness to the Chinese market, leading to the successful expansion of its operations.

By continually expanding and refining its alliance portfolio, FFG can access new markets and technologies, enhance its value proposition, and remain competitive in a rapidly changing industry. FFG's alliance portfolio is essential to the company's long-term success and industry leadership. FFG's approach to alliance shaping includes both resource exploitation through continuous improvement and resource exploration through joint ventures with Japanese companies. FFG's alliance portfolio scope is described as extensive due to its proactive approach in expanding and strengthening its network of corporate alliances. This approach helps FFG achieve its long-term goals and maintain its position as an industry leader.

4.3. Lioho Machine Works Group

Lioho, a Taiwanese company founded in 1971, has achieved remarkable success in manufacturing automotive components, particularly aluminum wheels, and providing comprehensive foundry services, including stamping. This strategic expansion has positioned Lioho as a leading automotive parts manufacturing industry player. Currently,

Table 6
The development of Fair Friend Group's (FFG) alliance portfolio.

Joint venture	Year of establishment	Product	Capital structure (Japan: Taiwan)	Japanese partner	Company existence	Area
Hangzhou Takamatsu-Feeler	2004	CNC lathes	50 %:50 %	Takamatsu Machinery	Survival	Hangzhou, Zhejiang, China
F.T. Japan	2007	Machine tools	50 %:50 %	Takamatsu Machinery	Survival	Takamatsu, Kagawa, Japan
Hangzhou Feeler-Mectron	2010	CNC products	55 %:45 %	Takamatsu Machinery; Mectron	Survival	Hangzhou, Zhejiang, China
Waida-Feeler Precision Machinery	2011	CNC products	55 %:45 %	Waida Mfg.	Survival	Taichung, Taiwan

Source: Compiled by this study based on interviews with the authors.

Lioho operates a total of twenty-three businesses in China, consisting of three independent ventures and three joint ventures with local companies, solidifying its strong market presence. In order to maintain a competitive edge, Lioho has placed great emphasis on agility in adapting to market changes and fostering innovation.

For instance, in 2020, Lioho successfully constructed Taiwan's first flexible car body production line, implementing a production model capable of manufacturing multiple different car models on a single line. This innovative approach effectively addresses the market's demand for customized production in smaller quantities and caters to diverse consumer needs. In addition, the integration of remote monitoring and advanced big data analysis technologies was implemented concurrently, significantly enhancing production and management efficiency. Fig. 4 chronicles the pivotal events that marked the evolution of Lioho's case.

4.3.1. Formation of Lioho's international alliances

Lioho, a prominent customer of Toyota-affiliated companies in Taiwan, has successfully diversified its business portfolio through collaborations with twelve Japanese companies. These partnerships have played a crucial role in Lioho's achievements. Notably, strategic alliances with renowned automotive manufacturers such as Ford and Toyota have provided Lioho with a significant competitive advantage, contributing to approximately 40 % of the company's total sales. The company's growth can be attributed to a diverse portfolio of partnerships and independent ventures.

In the face of a rapidly evolving market, Lioho encounters persistent challenges in sustaining its competitive edge. However, since 1992, Lioho has exhibited a proactive approach by expanding its presence in the Chinese market. Furthermore, the company has consistently nurtured strong partnerships, primarily with Japanese firms (refer to Table 7), to reinforce its position.

4.3.1.1. Joint venture: Kunshan Liufeng Machinery Industry (Liufeng). In 1992, Lioho and Toyota Tsusho established a joint venture, Kunshan Liufeng Machinery Industry (hereafter referred to as Liufeng), in Kunshan Industrial Park. Liufeng specialized in developing simple molds and sourcing high-quality raw materials and parts. It leveraged its Taiwanese partners' network in China and benefited from the knowledge gained from its Japanese partners, including the Toyota Production System (TPS) and the multi-functional U-shaped production line. Since 2000, Liufeng has gradually shifted its business focus to the local Chinese market, actively participating in local procurement and market development.

This joint venture marked the first equity alliance between Lioho and

Table 7
The development of Lioho Machine Works Group's (Lioho) alliance portfolio.

Joint venture	Year of establishment	Product	Capital structure (Japan: Taiwan)	Capital amount (Million USD)	Number of employees	Japanese partner	Company existence	Area
Kunshan Liufeng Machinery Industry	1992	Light alloy	10 %:90 %	$167.9	1380 → 1450	Toyota Tsusho Corporation	Survival	Kunshan, Jiangsu, China
Toyota Industry (Kunshan)	1994	Cast iron, castings, machining	75 %:25 %	$44 → $46.5	341 → 669	Toyota Industries Corporation , Toyota Tsusho Corporation	Survival	Kunshan, Jiangsu, China
Fujiwa Machinery Industry	1995	Cast iron, castings, machining	60 %:40 %	$52.5 → $91.7	800 → 1500	Tochigi Fuji Industrial Co., Ltd. → Sumitomo Corporation (2005)	Survival	Kunshan, Jiangsu, China
Fuzhou Lioho Machinery	2000	Cast iron, castings, machining	11 %:89 %	$29.98 → $65.5	491 → 974	Ibara Seiki	Survival	Fuzhou, Fujian, China
Liufeng Precision Machinery	2001	Light alloy	10 %:90 %	$4.4 → $7.2	70 → 90	Toyota Tsusho Corporation	Survival	Kunshan, Jiangsu, China
Takaoka Lioho (Tianjin) Industries	2001	Cast iron, castings, machining	54 %:46 %	$28.73 → $89.7	180 → 1560	Aisin Takaoka	Survival	Tianjin, China
Liofung Tool & Die (Kunshan) Co., Ltd.	2003	Die casting	35 %:65 %	$14	130 → 186	Toyota Industries Corporation	Survival	Kunshan, Jiangsu, China
Guangzhou Kiriu Lioho	2004	Cast iron, castings, machining	45 %:55 %	$12 → $29	170 → 302	Kiriu Machine Mfg.	Survival	Guangzhou, Guangdong, China
Toyota Industrial Automobile Fittings (Kunshan)	2005	Cast iron, castings, machining	80 %:20 %	$25	398	Toyota Industries Corporation , Toyota Tsusho Corporation	Merged with Toyota Industry in 2013	Kunshan, Jiangsu, China
Koyo Lioho (Foshan) Automotive Parts	2005	Cast iron, castings, machining	70 %:30 %	$12 → $29	120 → 302	JTEKT Corporation	Survival	Guangzhou, Guangdong, China
Takaoka Lioho (Guangzhou) Machinery Industry	2005	Cast iron, castings, machining	54 %:46 %	$6 → $26	95 → 270	Aisin Takaoka, Toyota Tsusho Corporation	Survival	Guangzhou, Guangdong, China
Fuzhou Ibara Lioho Machinery[a]	2005	Cast iron, castings, machining	75 %:25 %	$2 → $4.3	33 → 87	Ibara Seiki	Survival	Fuzhou, Fujian, China; Indonesia[a]
PT. Ibara Lioho Indonesia	2014	Forge- made parts	70 %:30 %	$10	50	Atsumi Kogyo, TMY Corporation	Survival	Indonesia

[a] Indicates the inclusion of new joint business in 2014 in Indonesia.
Source: Compiled by this study based on interviews with the authors

Toyota Tsusho, with a 90:10 ownership ratio. Toyota Tsusho was motivated to form this joint venture by Lioho's exceptional quality in locally manufactured parts and its ability to meet the demands of the Chinese market. This collaboration strengthened their existing partnership, expanded their collaborative efforts with other Japanese companies, and enabled Liufeng, under the Alpha 2000 brand, to successfully export products to European, American, and Japanese markets. Building on their alliance, Lioho and Toyota Tsusho established another light alloy company, Liufeng Precision Machinery (Kunshan) Co., Ltd. (hereafter Liufeng Precision (Kunshan)), in the same area in 2001 with a 90:10 ownership ratio.

Such alliance partnerships have expanded to encompass broader alliance scopes. For instance, to serve automobile customers in China, Aisin Takaoka, a member of the Toyota Motor Group, has progressively established joint ventures with Lioho for cast iron, castings, and machining operations. These include Takaoka Lioho (Tianjin) in 2001 in northeastern China, Takaoka Lioho (Guangzhou) in 2005, Takaoka Lioho (Yunfu) in 2011, and Takaoka Lioho (Wafangdian) in 2020 in southeastern China.

4.3.1.2. Joint venture: Toyota Industry (Kunshan). In 1994, Lioho, Toyota Tsusho, and Toyota Industries Corporation formed an equity alliance called Toyota Industry (Kunshan) in China. The respective shareholder equity ratios were 25 %, 5 %, and 70 %. Initially, Toyota Industry (Kunshan) mainly exported its products to Japan. However, by 2000, its focus had shifted, with 30 % of its products now allocated to the Chinese market. The establishment of Toyota Motors' Tianjin plant further increased the supply ratio of Toyota Industry (Kunshan) to the Chinese market, reaching 50 %. Lioho's alliance portfolio has remained stable since its formation, receiving accolades for its successful establishment of a robust alliance portfolio.

The success of Lioho's inaugural international alliance can be attributed to its proactive approach to collaborative partnerships. Lioho, Liufeng, and Toyota Tsusho collaborated to establish four ventures, each targeting specific regions and customer divisions. This strategic approach enabled the accumulation of new knowledge and expertise. Building upon the experience gained from the local Toyota Industry (Kunshan), Lioho and Toyota Industries founded Liofung Tool & Die (Kunshan) in 2003 and Toyota Industrial Automobile Fittings (Kunshan) in 2005. The latter was merged with Toyota Industry in 2013.

4.3.1.3. Joint venture: Fujiwa Machinery Industry (Fujiwa Kunshan). Fujiwa Machinery Industry, also known as Fujiwa (Kunshan), was established in 1995 as a joint venture between Lioho and Tochigi Fuji Industrial. This partnership showcases their dedication to creating value in the supply chain. The equity distribution was set at 40 % for Lioho and 60 % for Tochigi Fuji Industrial, considering Tochigi Fuji Industrial's exceptional track record in casting technology and investment experience in China.

While Lioho and Tochigi Kunshan maintained competitive relationships with primary clients such as Toyota Motor and Nissan Motors, Tochigi Kunshan recognized and valued Fujiwa Kunshan's specialized capabilities, consistently allocating resources to the joint business. Moreover, the close proximity of Fujiwa Kunshan to Lioho's other affiliated joint ventures, such as Liufeng Kunshan and Toyota Kunshan, suggests the formation of early-stage alliance partnerships.

4.3.1.4. Joint venture: Fuzhou Lioho Machinery (Fuzhou Lioho). In 2000, leveraging the success of previous joint ventures, Lioho received an invitation from Ibara Seiki, a manufacturer of automobile and agricultural machine parts, to establish Fuzhou Lioho Machinery (hereafter Fuzhou Lioho). Fuzhou Lioho specialized in the development and production of castings, forged products, and aluminum parts for the supply chain. This joint venture with Ibara Seiki recognized Lioho's strong management and market development capabilities in the industry. The equity distribution of 89 % for Lioho and 11 % for Ibara Seiki exemplifies the key principles of a joint venture partnership, allocating equity based on the contribution of each partner. Fuzhou Lioho successfully diversified its customer base by expanding beyond the Toyota Group and collaborating with Mitsubishi Motors, a major customer of Ibara Seiki. This strategic move aligns with the strategies of multinational enterprises, seeking new markets and strategic assets to enhance competitive positioning. Subsequently, Fuzhou Ibara Lioho Machinery (2005) was established as a result of the development of Lioho (Fuzhou), a local joint venture owned by Lioho and Ibara Seiki. This expansion facilitated the accumulation of new knowledge and expertise.

Following their initial international alliances in China, Lioho and Ibara Seiki extended their cooperation to Indonesia, establishing a new joint venture in 2014. A new factory was swiftly constructed in 2014 to supply steering-related products to local parts makers. The existing human network and manufacturing cluster among Taiwanese companies in China played a vital role in efficiently securing business orders, even before the joint venture was fully established, effectively excluding potential local competitors from the competition.

4.3.2. Lioho's alliance portfolio configuration strategies

Since 2001, Lioho has successfully developed an alliance portfolio comprised of over ten joint ventures, which has evolved into a robust and stable structure. This accomplishment can be attributed to Lioho's proactive approach to forming alliance partnerships. By actively engaging in collaborations, Lioho has facilitated growth and advancement in new regions and customer segments. The company's alliances are established through an exploratory focus, enabling the identification and establishment of new partnerships that drive innovation and progress. Consequently, there has been a notable increase in Japanese investors seeking local collaboration with Lioho, even in the presence of existing competitive relationships. These collaborations have brought valuable knowledge and expertise to Lioho and facilitated the exchange of the company's expertise with its partners.

Lioho's approach to resource management in its alliance partnerships exemplifies its unwavering focus on innovation. Initially, the ownership ratios of joint ventures are determined based on the respective contributions in terms of management, technology, and order quantity. However, as time progresses, the initial ownership ratio may no longer align with the actual levels of contribution. This situation has been observed in joint ventures such as Takaoka Lioho (Tianjin) Industries, Toyota Industry (Kunshan), and Fuzhou Ibara Lioho Machinery. To tackle this issue, Lioho organizes seasonal and biannual “Business Review Meetings” at its headquarters in Taiwan to assess the investment ratio of subsidiaries and their performance in China. These meetings serve as platforms for collaboration, not only engaging key investors and alliance partners but also facilitating the exchange of customer information across regions. This fosters collaborative relationships among stakeholders. The regular meetings play a pivotal role in the decision-making process for establishing future joint ventures, enabling Lioho to effectively align resources and maximize the benefits of its partnerships. By carefully reviewing the investment ratio of subsidiaries and evaluating their performance in China, Lioho ensures a fair distribution of ownership and resources among its alliance partners. These regular meetings serve as a platform for open communication and collaboration, fostering trust and mutual understanding. As a result, Lioho can make informed decisions regarding the establishment of new joint ventures, leveraging its resources effectively to drive innovation and achieve shared success.

Lioho's commitment to innovation has played a crucial role in establishing and maintaining a stable alliance partnership, leading to successful collaborations and expansion into new regions and customer segments. By 2015, Lioho's international alliances with Japanese corporations had exhibited sustainable development, indicating the potential for further cooperative opportunities. The configuration of Lioho's alliance portfolio encompasses both the management of alliance

resources and the scope of the portfolio, which have evolved over time due to changes in the ownership ratios of joint ventures and business integration.

For instance, when the previously mentioned Fujiwa (Kunshan) experienced a reduction in its 60 % equity stake, which was previously held by Tochigi Fuji Industrial (later renamed GKN during organizational restructuring), Sumitomo Corporation entered as a shareholder, acquiring a 40 % ownership. According to a representative from Sumitomo Corporation, they chose to participate through capital investment while seeking collaboration with an experienced Taiwanese automobile group in China. This example highlights Lioho's strategic approach to exploring collaborations with like-minded firms, resulting in new avenues for growth and expansion. Lioho's resource management strategy has also facilitated effective collaboration among its partners, leading to mutual benefits and overall success. For further details regarding Lioho's alliance portfolio configuration, please refer to Appendix D.

4.3.3. Overview of Lioho's alliance portfolio configuration

Lioho's alliance shaping strategy balances exploration and exploitation strategies, ensuring competitive advantage through innovation. The company invests heavily in research and development, collaboration with external partners, and strategic alliances to explore emerging technologies and market trends. This approach, coupled with partnerships with leading automotive manufacturers and technology firms, enables Lioho to leverage emerging technologies such as electric vehicles and artificial intelligence to develop new products and services, thus maintaining its market position.

Resource exploration is a crucial aspect of Lioho's alliance shaping strategy, evident in its numerous joint ventures with Japanese companies, such as Ibara Seiki and Fujiwa Machinery Industry (Fujiwa Kunshan). These joint ventures have enabled Lioho to access new technologies, expertise, and markets, even tap into the Indonesian market, and develop new relationships with local parts makers. In addition to resource exploration, Lioho employs an exploitation strategy to optimize existing resources and generate steady revenue streams. Initiatives such as lean manufacturing, supplier development programs, and automation of production processes enhance operational efficiency and cost reduction. By striking a balance between exploitation and exploration, Lioho embraces ambidexterity, simultaneously managing both strategies to sustain a competitive advantage. In addition to resource exploration, Lioho employs an exploitation strategy to optimize existing resources and generate steady revenue streams. Initiatives such as lean manufacturing, supplier development programs, and automation of production processes enhance operational efficiency and cost reduction. By striking a balance between exploitation and exploration, Lioho embraces ambidexterity, simultaneously managing both strategies to sustain a competitive advantage.

Furthermore, Lioho boasts an extensive alliance portfolio, encompassing numerous joint ventures with diverse companies across a broad spectrum of products and services. These include Toyota, Honda, Nissan, Samsung, and Sony. This extensive alliance portfolio has helped Lioho to reduce risk and expand its reach into new markets. The company's alliance portfolio includes joint ventures with companies in various industries, including automotive, aerospace, and electronics. Lioho's initial alliance development type can be categorized as Optimization. Its early joint ventures were focused on leveraging its existing capabilities and resources to improve its performance. However, over time, Lioho's alliance portfolio has evolved to become more diversified, with the company establishing joint ventures with a wider range of companies covering a wider range of products and services. This diversification has helped Lioho expand its market reach and reduce risk.

In conclusion, Lioho's alliance shaping strategy exemplifies how firms can leverage their alliance portfolio to optimize operations while pursuing growth and innovation opportunities. By combining exploration and exploitation strategies along with an extensive alliance portfolio scope and diversified development type, Lioho has successfully positioned itself as an innovative leader in the industry.

5. Qualitative case study findings

Proposition 1. In firms that engage in long-term alliances, the establishment of mutual trust between top-level management and equity commitments assumes a pivotal role in facilitating the sustained longevity of alliances with existing partners. Consequently, such dynamics foster a gradual expansion of alliance portfolios, underscored by the deliberate pursuit of innovative combinations of new resources in collaborative endeavors with well-established partners.

For firms oriented toward long-term alliances, positive incentives, such as trust between top managers, are also factors that make them prioritize alliances with existing partners. Over time, mutual trust among top managers increases (Cullen et al., 2000), providing a foundation for new resources not previously offered to collaborative projects (Kale et al., 2000). For example, in the cases of CMC, FFG and Lioho, the mutual trust cultivated through their long-term collaboration facilitated recurrent alliances and innovation with the same Japanese business groups in the Chinese market. This consequently explains that the initial alliance portfolio configuration type starts with the Optimization type.

When the partners in long-term alliances change, this effect becomes more pronounced because meaningful alliance-partner relationships are established over a long period, not in the short term. For example, the CMC case suggests that equity alliances can increase commitment among alliance partners and encourage repeated partnerships with existing partners compared to non-equity blocks. In other words, focal firms refrain from adding new partners because it could lead to problems such as retaliation from existing partners, reputational loss as a partner, and decreased value of current investment capital (Kavusan and Frankort, 2019).

In light of this phenomenon, we have identified distinct alliance portfolio configuration patterns rooted in long-term trust. We sought to elucidate that, within long-term alliances, the capital relationships and mutual trust between top management at CMC and Mitsubishi take precedence in exchanging new resources with existing partners. This inclination results in a diminished pursuit of new partners and potential innovations, classifying it under the Optimization type within our analytical matrix. In sum, firms are reluctant to jeopardize their valuable relationships with existing partners by adding new ones. Negative incentives, such as retaliation from existing partners and reputational loss as a partner, can prevent the dissolution of existing alliances. Therefore, we extended our proposition 1 to the subsequent level.

Proposition 1a. Longer-term alliances characterized by mutual trust between top management and equity commitments are more likely to exhibit an Optimization type of alliance portfolio configuration, defined as a portfolio with a diminished pursuit of new partners and continuous development of new products or services based on existing resources.

Long-term alliance portfolio configurations require trust, but trust alone is insufficient to address dynamic environmental challenges. For example, in the face of the emergence of new markets, industrial deregulation, and disruptive technological innovation, companies may need to seek new partners to support strategic shifts. Additionally, significant organizational culture or technological differences between partners may necessitate exchanging and integrating knowledge or technology to achieve strategic organizational goals.

An illustrative case in point is Lioho, which has continuously established several joint ventures with Toyota Tsusho and Toyota Industries, deepening its resource exploitation relationship and expanding its resource exploration to other areas within the Toyota Group. Over time, Lioho unveiled its ambitious business approach by broadening its collaborative network to include partners outside the Toyota Group. Lioho joined hands with Tochigi Fuji, Ibara Seiki, Kiriu Machine, and Nissan, thereby exemplifying a Diversification configuration within its

alliance portfolio.

Although Lioho's alliance portfolio is complex, the company maintains its partnerships by regularly reviewing the balance of benefits and equity sharing ratios for all parties. The investment share should be proportional to each partner's contribution to the equity alliance, which helps to reduce agency problems, ensure the effectiveness of resource alignment, and sustain the commitment of all partners. In this way, Lioho's alliance configuration strategy further promotes communication and enhances mutual trust.

Proposition 1b. Establishing long-term alliance relationships requires deeper consideration and regular evaluation to ensure smooth operation and achieve longer-term innovation and growth goals. Among the various critical conditions for evaluation, such as top manager replacement and redesign of product models, ownership proportion adjustment may be one of the most significant factors for alliance portfolio configuration.

Proposition 2. In firms engaged in long-term alliances, the proactive approach and competence, as evidenced by factors such as a business expansion orientation, play a crucial role in fostering the establishment of alliances with new partners who possess preexisting resources. Consequently, the firm's alliance portfolio expands, enabling the pursuit of innovation through the strategic integration of existing resources and those contributed by new partners.

As stated in Proposition 1, firms forming long-term oriented alliances prioritize repetitive alliances with existing partners. However, in the event that the alliance portfolio of the focal firm expands, what factors come into play?

By examining our cases, two factors contributed to the expansion of the focal firm's alliance portfolio. The first factor that propels the expansion is proactiveness. While many previous studies focus on the focal firm (Lavie and Miller, 2008), they do not fully consider the attitude and intention of the focal firm. As mentioned earlier, the focal firm cannot independently configure its alliance partners, as this may lead to issues such as retaliation from existing partners, damage to its reputation, and a decrease in the value of its current equity investment (Kavusan and Frankort, 2019).

In our case, the international joint venture Fujian Southeast demonstrated significant business growth by combining the complementary resources of parts procurement from CMC and cutting-edge manufacturing equipment from Mitsubishi Motors. This joint venture also provided Fujian Southeast with access to critical automotive engines.

To optimize the local joint venture's operation, CMC decided to comprehensively localize personnel deployment by replacing Taiwan expatriates with local employees. However, this resulted in a significant decrease in direct communication with Mitsubishi Motors, and thus disrupted continuous learning for CMC at the functional level. When Mitsubishi Motors faced a decreasing market share in Japan, forming a new ally in the Chinese market with a more commensurable equity investment became an attractive option, particularly when CMC was unable to configure its alliance portfolio flexibly by offering associated resources. As a result, despite all the effort and resources from all alliance parties to optimize the joint venture's operation, the cooperation has not been further expanded.

The nature of alliance portfolio configuration is dynamic, and a single change can affect the whole alliance portfolio structure. Even if the joint venture is progressing well, changes in the external environment may require adjustments in resources between the parent companies. In that case, possessing the newly needed resources will be critical to the evolving alliance portfolio structure.

Proposition 2a. The focal firm's proactive approach of continuous learning through joint ventures can reinforce its competitive advantage in traditional manufacturing industries. Specifically, the key emphasis in long-term alliance portfolio configuration in the traditional manufacturing sector should be on the parent company's attitude and commitment toward ongoing learning and evolution rather than simply optimizing the operational aspects of the joint ventures.

Secondly, competence also played a significant role in the expansion of the focal firm's alliance portfolio. If existing partners lack the necessary resources, the focal firm may have to seek resources from new partners. However, identifying suitable new partners can be challenging, and adding new partners who already have existing resources may potentially disrupt current alliance relationships and jeopardize the entire alliance portfolio (Kavusan and Frankort, 2019). Therefore, the competence of the focal firm is a crucial prerequisite for successfully expanding its alliance portfolio.

Over the past two decades, FFG has meticulously constructed a global alliance network dedicated to marketing machine tools, with a particular focus on the high-end market. Driven by an unwavering aspiration to become the global leader in the machine tooling sector, FFG has invested substantial resources in cultivating specialized technical expertise in the manufacturing of small precision lathes and electronic control devices. Leveraging its high-quality manufacturing capabilities and extensive sales network, FFG has firmly established itself as a critical supplier for global automotive and aircraft components manufacturers.

FFG established its first joint venture in China with Japanese companies in equal-capital structures, exemplifying its focused manufacturing capabilities. This strategic move served as a testament to FFG's specialized manufacturing capabilities, which were highly valued by precision-seeking customers. This success further fueled FFG's alliance expansion strategy, aggressively forging partnerships to scale its operations and broaden its product offerings. The extensive network of alliances not only enhanced FFG's market reach but also facilitated a continuous learning process, particularly in the pursuit of high-end products.

Among the three cases analyzed within the automotive manufacturing value chain, FFG stands out as an upstream firm that has effectively configured its alliance portfolio by enlarging a partnership network before capitalizing on the resource utilization from alliance partnerships. FFG's alliance portfolio configuration has undergone a notable transformation, evolving from an Optimization approach to Alliance Portfolio Development and gradually transitioning toward the Diversification type. FFG's efforts to explore potential resources have focused on limited allied partners, such as Takamatsu Machinery. In essence, FFG's alliance portfolio configuration strategy exhibits stronger characteristics of the Alliance Portfolio Development type.

Proposition 2b. Learning-oriented firms positioned upstream from the traditional manufacturing industries in the value chain may prioritize expanding their alliance portfolio over resource utilization to reinforce their competitive advantage.

Proposition 3. Within firms that establish long-term alliances, strategic utilization of accumulated redundant network resources and domain segmentation (market, product, and region) serves as a catalyst for fostering alliances with both new and existing partners possessing either new or existing resources. Consequently, the focal firm's alliance portfolio expands, creating opportunities for innovation through the synergistic combination of existing and new resources with established and new partners.

Engaging in simultaneous partner and resource acquisition poses the risk of destabilizing alliances, prompting firms to prioritize their focus on one aspect at a time (Kavusan and Frankort, 2019). Propositions 1 and 2 illustrate this selective approach to searching for either new alliance partners or new resources. However, the Lioho case presents a unique scenario where both alliance partners and resources were explored concurrently. Given the inherent challenges of this approach, the focal firm adopted the following strategy.

The focal firm expanded its alliance portfolio by leveraging network

resources accumulated through previous alliances (Vanhaverbeke et al., 2009). In our study, Lioho encouraged allied firms to utilize the redundant network resources amassed within the alliance portfolio. These redundant resources facilitated exploratory activities and enabled new partners to initiate ventures in different markets, products, and regions. Successive alliances were formed in the Chinese and Japanese markets, resulting in an expanded alliance portfolio for the focal firm, actively pursuing innovation through exploration and exploitation. In Lioho's automotive parts manufacturing business, joint ventures with Toyota Group companies, such as Toyota Tsusho and Toyota Industries, located in the Central China region, share customer needs information in the automotive industry. Joint ventures with Aisin Takaoka, another major Toyota Group company, located in northeast and southeast China, also enjoy the advantages of sharing accumulated information on local procurement, human resource management, and product development within the alliance network.

To mitigate the risks associated with adding new partners and resources, Lioho segmented business domains into markets, products, and regions where allied firms participated. For the cast iron, castings, and machining business, Lioho formed joint ventures with Toyota and Tochigi Fuji in Jiangsu, the central China region, with Ibara Seiki in northeast and southeast China, and with Aishin Takaoka, Kiryu, and JTEKT in the south China region, respectively. This approach helped reduce conflicts of interest among the alliance partners. When utilizing an existing company's sales network in the Chinese market, the engagement of a new partner was restricted to a specific region and product, thus avoiding competitive situations among allied firms.

In summary, in a long-term equity alliance, the expansion of the alliance portfolio is achieved through domain segmentation within the allied firms' business areas and the accumulation and utilization of redundant network resources by the focal firm. This process involves the pursuit of innovation through the effective deployment of exploratory and exploitative resources.

6. Discussion

Adopting Koza and Lewin's (1998) perspective, this study examines changes in equity alliance portfolio over time. They argue that such portfolio should be analyzed not only based on their size and scope but also on their strategic intent. This intent can be reflected in the diversity of partners, the types of alliances formed, and the goals and objectives pursued through these alliances. Building on previous quantitative studies that analyzed the characteristics and outcomes of an alliance portfolio (Wuyts and Dutta, 2014), this paper provides a comprehensive analysis of how the corporation structured its alliance portfolio in terms of alliance shaping strategy and the scope of its alliance portfolio over time. By doing so, this study contributes to the understanding of alliance portfolios beyond their size and scope and builds upon previous quantitative analyses of alliance portfolio characteristics and outcomes, such as those conducted by Lavie and Miller (2008).

6.1. Theoretical implication

This study contributes to the literature on alliance portfolio configuration by shedding light on several important factors that influence the composition and configuration of long-term alliance portfolios, specifically for traditional manufacturing companies. These companies play a fundamentally important role in the economy but often do not receive significant attention in academic research as discussed previously. Additionally, we highlight critical theoretical issues that are important for company strategy development.

Firstly, within the realm of social network theory, research on long-term alliances has predominantly centered on social capital factors, such as mutual trust, that contribute to their success. While these factors undoubtedly play a critical role, our case study compels us to recognize the heightened significance of equity distribution when a deep-rooted level of trust exists among alliance partners. Additionally, we highlight the profound yet latent impact of functional-level strategies, such as human resource management policy governing expatriate deployment, on the sustainability of alliance partnerships. This perspective underscores the potential influence of alliance portfolio configuration on the dynamics of long-term alliances, deviating from the insights gleaned from previous studies.

In traditional manufacturing industries, which face less pressure for evolutionary product or service demands from customers, innovation tends to be more progressive, requiring a longer time to acquire resources from the external environment. According to the existing literature, mutual trust among top management plays a crucial role in facilitating the exchange of new resources with existing partners. As a result, there is a decreased likelihood of seeking new partners and exploring potential innovations due to the higher risk of destabilizing current alliances. As illustrated in Fig. 1, within our conceptual framework, the risk and cost associated with shifting the strategy from Optimization to Alliance Portfolio Development are higher compared to Resource Development.

Nevertheless, traditional manufacturing companies in the FFG cases of Section 4.2 prioritize alliance portfolio expansion over resource utilization to build competitive advantage. Additionally, Lioho adopted an extensive alliance portfolio scope by collaborating with many partners (Section 4.3). Across all investigated cases, including CMC in Section 4.1, strong relationships and trust were cultivated with alliance partners while equity distribution was meticulously reviewed. While social network theory explains alliance formation, this study suggests that sustained long-term alliance portfolios require a balanced approach encompassing trust, effective equity distribution management, and effective functional-level strategies involving both parent companies and their joint ventures, reflecting the fact that benefits derive from substantial capability.

Secondly, our findings indicate that trust, equity distribution, and competence alone cannot fully explain changes in alliance portfolio configuration over time. Innovation has been regarded as one of the most effective strategies for pursuing new business opportunities, where alliance portfolio coordination plays an important role. Our case study suggests that the proactiveness of alliance expansion is the driving force when companies have organizational slack for redundant networks.

Existing literature claims that alliance proactiveness plays a more important role, primarily in the initial stages of alliance formation, compared to alliance portfolio coordination. In the early stages of an alliance, proactiveness based on organizational determination is crucial in identifying opportunities and engaging in new alliances (Sarkar et al., 2009). Alliance proactiveness has a significant impact on shaping the alliance portfolio during the process of resource utilization and strategic decision-making. While some research suggests that alliance proactiveness has a positive impact only on radical and fast-changing innovation, but not on incremental innovation based on quantitative analysis (Inigo et al., 2020; Wang and Rajagopalan, 2015), our study may present different findings.

For instance, in our study, proactiveness encompasses resource acquiring, competence building, and organizational learning at functional levels. When searching for existing resources, companies may collaborate with existing or new partners, as demonstrated in our cases of FFG in Section 4.2 and Lioho in Section 4.3. A broad scope of alliance collaboration facilitates the integration of incremental innovation into the firm's core activities in the long run, providing more than just access to new alliance partners. On the other hand, companies with a focused alliance portfolio scope may enjoy this advantage only in the initial period of partnership formation and before the occurrence of critical environmental changes. In this sense, within the context of long-term alliance portfolio configuration in traditional manufacturing industries, alliance proactiveness can be significant throughout the alliance process, contingent upon the company's specific context, including managerial philosophy at corporate-level strategy and functional-level

strategy in the context of traditional manufacturing sectors, particularly in contrast to competitive strategy in rapidly changing environment.

Collectively, our study provides new insights that challenge the existing theory of alliance portfolio formation and development, and suggest that a more nuanced view of the determinants of alliance portfolios is needed.

6.2. Managerial implication

In a long-term alliance, which is different from short-term partnerships and emphasizes prior planning and complementarity, managers must consider organizational factors that cannot be accounted for in the original plan and be prepared to adjust based on changing circumstances. However, once an alliance is initiated, managers cannot control the alliance portfolio solely through the initial equity alliance relationship.

Managers should exercise caution regarding the composition of their alliance portfolio, depending on the type of innovation they intend to pursue. They can use the previously discussed critical elements as a guide to design their alliance portfolio, taking into account partner diversity, the types of alliances formed, and the goals and objectives of the partnerships. New resources need to be acquired for exploratory innovation, whereas existing resources need to be obtained for exploitative innovation, developing new resources exclusively from new partners is unnecessary, and existing resources can be obtained from something other than existing partners. Managers can also consider the potential for co-opetition, where they collaborate with competitors to acquire the necessary resources. By separating allied firms and resources, managers can flexibly combine the resources required for innovation. New resources must be developed for exploratory innovation, while existing resources must be acquired for exploitative innovation, It's not mandatory to obtain new resources solely from new partners, and existing resources don't necessarily have to be additionally obtained from existing partners.

Overall, our analysis of long-term alliances provides a more comprehensive understanding of the issues that determine their composition, which previous studies have yet to explore fully.

6.3. Limitations and future research

This study has several limitations that need to be addressed in future research. Firstly, this study is limited to a qualitative analysis of a few cases, limiting its generalizability. Unfortunately, due to the limited case numbers, we did not find representative samples for the Resource Develop type in our analysis. Therefore, future research should expand the scope of the study by including various case studies in specific industrial alliances to increase the validity and reliability of the findings. Additionally, it is recommended to use mixed-methods research to triangulate data from multiple sources and further enhance the robustness of the results.

Secondly, this study only points to the possibility of exploratory or exploitative innovation by a corporation group through combinations with existing and new resources. Future research is needed to reveal what types of innovation outcomes actually resulted from the different expansion of the alliance portfolios of a focal firm. Specifically, quantitative studies can be conducted to investigate the effect of alliance portfolio expansion on innovation performance and to identify the mediating or moderating factors in the relationship.

Thirdly, the present study focuses on the effects of alliance portfolio expansion on innovation but does not delve into other potential outcomes such as efficiency, competitiveness, and financial performance. Future research should delve deeper into the broader effects of alliance portfolio expansion on firm performance and identify the mechanisms underlying these effects. This can be achieved through longitudinal studies that track the development of firms' alliance portfolios over time and examine the consequences of portfolio changes.

Finally, this study only examines the perspective of focal corporations in alliance portfolios but does not explore the views of partner firms or the overall network structure. Future research can adopt a network perspective to investigate the dynamics of alliance portfolios and how they affect the performance of the focal company, its partners, and the network as a whole.

Code availability

Not applicable.

Declaration of competing interest

Not applicable.

Data availability

The authors do not have permission to share data.

Acknowledgments

The research leading to these results received funding from “the Sumitomo Foundation Grant for Japan-related Research Projects” under Grant Agreement Reg. No. 138633, “the Taiwan's Ministry of Science and Technology” under Grant MOST105-2410-H-029-052, and “the Japan Society for the Promotion of Science” under Grant JP22K01693 and JP19K01862.

Appendix A

Companies associated with the case study: business relationships, company details, and abbreviations.

Case	Relationship	Full company name	Abbreviation	Founded Year (JV)	HQ
China Motor Corporation (CMC)	JV partner	Fujian Motor Industry Group	FMIG		China
		Mitsubishi Motors Corporation	Mitsubishi Motors		Japan
		Yulon Group	Yulon		Taiwan
	JV	Fujian Southeast Motor	Fujian Southeast	1995	China
	Alliance partner	DaimlerChrysler	–		Germany
		Dongfeng Motor Corporation	DFM		China
		Shenyang Aerospace Mitsubishi Motors Engine Manufacturing	SAME		China
	Other	Guangzhou Automobile Industry Group	GAIG		China
		GAC Mitsubishi Motors	GMMC		China

(continued on next page)

(*continued*)

Case	Relationship	Full company name	Abbreviation	Founded Year (JV)	HQ
Fair Friend Group (FFG)	JV partner	T.Chatani	Chatani		Japan
		Mectron	–		Japan
		Takamatsu Machinery	–		Japan
		Waida Mfg	–		Japan
	JV	Hangzhou Takamatsu- Feeler	Takamatsu- Feeler (Hangzhou)	2004	China
		F.T. Japan	–	2007	Japan
		Hangzhou Feeler-Mectron	Feeler-Mectron (Hangzhou)	2010	China
		Waida-Feeler Precision Machinery	Waida-Feeler	2011	Taiwan
Lioho Machine Works (Lioho)	JV partner	Aisin Corporation	Aisin		Japan
		Ibara Seiki	–		Japan
		Kiriu Machine Mfg.	Kiriu Machine (Japan)		Japan
		Nissan Motor	Nissan		Japan
		Tochigi Fuji Industrial	Tochigi Fuji		Japan
		Toyota Industries Corporation	Toyota Industries		Japan
		Toyota Motor Corporation	Toyota Motor		Japan
		Toyota Tsusyo Corporation	Toyota Tsusho		Japan
	JV	Kunshan Liufeng Machinery Industry	Liufeng (Kunshan)	1992	China
		Toyota Industry (Kunshan)	–	1994	China
		Fujiwa Machinery Industry	Fujiwa (Kunshan)	1995	China
		Fuzhou Lioho Machinery	Lioho (Fuzhou)	2000	China
		Liufeng Precision Machinery (Kunshan)	Liufeng Precision (Kunshan)	2001	China
		Takaoka Lioho (Tianjin) Industries	Takaoka Lioho (Tianjin)	2001	China
		Liofung Tool & Die (Kunshan)	–	2003	China
		Guangzhou Kiriu Lioho	Kiriu Lioho (Guangzhou)	2004	China
		Toyota Industrial Automobile Fittings (Kunshan)	–	2005	China
		Koyo Lioho (Foshan) Automotive Parts	Koyo Lioho (Foshan)	2005	China
		Takaoka Lioho (Guangzhou) Machinery Industry	Takaoka Lioho (Guangzhou)	2005	China
		Fuzhou Ibara Lioho Machinery	Ibara Lioho (Fuzhou)	2005	China
		Takaoka Lioho (Yunfu) Industries	Takaoka Lioho (Yunfu)	2011	China
		PT. Ibara Lioho Indonesia	Ibara Lioho Indonesia	2014	Indonesia
		Aisin Takaoka Lioho (Wafangdian) Industries	Takaoka Lioho (Wafangdian)	2020	China

The headquarters of China Motor Corporation (CMC), Fair Friend Group (FFG), and Lioho Machine Works (Lioho) are all situated in Taiwan. In the table, "JV" denotes a joint venture partnership.

Appendix B

Data structure of China Motor Corporation's (CMC) alliance shaping strategy and alliance portfolio scope.

Categories	Corresponding facts
Alliance shaping strategy	
1. Changes in resource ownership	
	Mitsubishi Motors acquired an 18% equity stake in CMC. Mitsubishi Motors acquired a 25% stake in Fujian Southeast in 2006. The remaining 75% was distributed among Chinese and Taiwanese corporations. Mitsubishi Motors holds a 25% stake in Fujian Southeast but began allocating more resources to GAC Mitsubishi Motors, a joint venture with GAIG in which both parties hold equal ownership. (※China's industrial policy demands foreign companies to have local investment exceeding 50% of net assets.)
2. Replacements of top managers and employees (Improved management practices)	
	Skilled personnel from Mitsubishi Motors' purchasing department were dispatched to Fujian Southeast. The number of Fujian Southeast employees changed from 2006 to 2015, with a reduction in Taiwanese staff and an increase in local Chinese employees. CEO of Mitsubishi Motors and the director of CMC conducted three meetings within five months until May 2015.
3. Modifications of production models (Competition in product markets and changes in resources offered in alliances)	
	In 1997, Fujian Southeast introduced an upgraded model of the Mitsubishi Delica and in 2000, a redesigned Mitsubishi Freeca. Fujian Southeast received a supply of eight Mitsubishi product models. 2012 Fujian Southeast introduced in-house-developed models, including the V5 Lingzhi Sedan and V6 Lingshi Hatchback. Mitsubishi Motors narrowed its model portfolio for Fujian Southeast due to a strategic shift to prioritize GAC Mitsubishi Motors.
4. Integration of new technology with alliance partners (Technological competition)	

(*continued on next page*)

(*continued*)

Categories	Corresponding facts
	Fujian Southeast integrated cutting-edge manufacturing equipment from Japan, the United States, and Germany. Collaborative efforts in business planning, production optimization, and targeted marketing strategies. Suppression of R&D activities at Fujian Southeast, which lagged behind market needs.
Alliance Portfolio Scope	
1. Iterative processes and experiences among existing alliance partners	
	Long-term collaboration between CMC and Mitsubishi Motors since 1970. After Mitsubishi Motors' investment, Fujian Southeast expanded its product range to include Mitsubishi-branded vehicles alongside its own offerings. Mitsubishi Motors reduced its product supply to Fujian Southeast due to underperformance at its Japanese headquarters. The cooperative relationship with Mitsubishi Motors faced challenges, including reallocating resources to GAC Mitsubishi Motors and a shift in staffing at Fujian Southeast. Discussions between the top manager of Fujian Southeast and Mitsubishi Motors regarding the future of their business relationship, considering Mitsubishi Motors' new focus.
2. Establishment of new alliance relationships with potential partners	
	Establishment of Fujian Southeast in 1995 as a joint venture between CMC and the Fujian Motor Industry Group (FMIG). Fujian Southeast's collaborations with local parts companies resulted in a local content procurement ratio exceeding 91%. Direct procurement of automotive engines from Dongfeng Motor Corporation (DFM) and Shenyang Aerospace Mitsubishi Motors Engine Manufacturing. Engagement with Taiwanese subcontractors for critical component sourcing and partnerships with local firms for general standard parts. Leveraging the supply chain network of Taiwanese companies in China. Utilizing technical expertise and financial resources from Japanese and American counterparts for Fujian Southeast's business stabilization. OEM collaboration with DaimlerChrysler that concluded in 2012. Mitsubishi Motors formed a new business alliance, GAC Mitsubishi Motors, with Guangzhou Automobile Industry Group (GAIG) in 2012, focusing on SUVs.

Appendix C

Data structure of Fair Friend Group's (FFG) alliance shaping strategy and alliance portfolio scope.

Categories	Corresponding facts
Alliance shaping strategy	
1. Changes in resource ownership	
	FFG established Hangzhou Good Friend Precision Machinery in 1993 to focus on the sales of machine tools in China. Hangzhou Takamaz-Feeler was established in 2004 as FFG's first equity alliance. The company has formed joint ventures with partners in Japan, China, Europe, and the U.S., as outlined in Table 6. F.T. Japan was co-founded in 2007 by FFG and Takamatsu Machinery with equal ownership. Hangzhou Feeler-Mectron was established in 2010, with FFG and Takamatsu Machinery each holding 45% and Mectron holding 10%. Waida-Feeler was formed in 2011, with a capital structure of 45% for FFG, 45% for Waida Mfg., and 10% shared by two other Japanese companies.
2. Replacements of top managers and employees (Improved management practices)	
	The executive director of Takamatsu Machinery initiated discussions with FFG's president. This collaboration was further cemented by the top executive of FFG's visit to Takamatsu Machinery. Waida-Feeler's Japanese president emphasized the importance of managerial philosophy and mutual understanding among top managers.
3. Modifications of production models (Competition in product markets and changes in resources offered in alliances)	
	FFG transitioned from being a sales agent for Japanese firms in Taiwan to Taiwan's leading machine tool manufacturer in 2015. FFG expanded its product offerings in China, Japan, and Taiwan through comprehensive production and sales networks. Hangzhou Takamaz-Feeler specialized in producing and selling small-sized CNC lathes for processing multifunctional and highly accurate automotive parts. F.T. Japan began selling machine tools that combine FFG's NC design and Takamatsu Machinery's loader design. Waida-Feeler focuses on procuring and producing parts for the Japanese headquarters, with an eye on new market demands.
4. Integration of new technology with alliance partners (Technological competition)	
	FFG established an R&D center in Hangzhou Xiaoshan. Hangzhou Takamaz-Feeler leveraged technological advantages from both companies. F.T. Japan utilized advanced technology for joint development. Hangzhou Feeler-Mectron's development heavily relies on mutual trust among the partners.
Alliance portfolio scope	
1. Iterative processes and experiences among existing alliance partners	
	FFG commenced exporting its products to China in collaboration with the Japanese company Chatani Industry in 1991. Established numerous partnerships with renowned global automotive and aircraft manufacturers. Hangzhou Takamaz-Feeler's success paved the way for establishing new joint businesses like F.T. Japan

(*continued on next page*)

(*continued*)

Categories	Corresponding facts
2. Establishment of new alliance relationships with potential partners	and Hangzhou Feeler-Mectron. FFG has had consistent growth with its joint ventures like F.T. Japan. Waida-Feeler and FFG are working on long-term business opportunities in various regions. FFG nurtured new alliances with Japanese firms since 2000. Major alliance partners include firms like SKF MEKAN Ab, COSMOS, CIRE, and AXON. Japanese alliance partners include companies like Toyota Tsusho Corporation, T. Chatani, Takamatsu Machinery, and Waida MFG. FFG established joint ventures as outlined in Table 6, including alliances with Takamatsu Machinery, Mectron, and Waida Mfg. FFG expanded its international alliances beyond its initial network, as seen with Waida-Feeler. Waida Mfg. increased its stake in Waida-Feeler in 2014.

Appendix D

Data structure of Lioho Machine Work Group's (Lioho) alliance shaping strategy and alliance portfolio scope

Categories	Corresponding facts
Alliance shaping strategy	
1. Changes in resource ownership	Lioho operates 23 businesses in China, including three independent ventures and three joint ventures with local companies. Lioho has successfully diversified its business portfolio through collaborations with twelve Japanese companies. Lioho formed multiple equity alliances: Toyota Industry (Kunshan) in 1994, Fujiwa Machinery Industry in 1995, Fuzhou Lioho Machinery in 2000, and Fuzhou Ibara Lioho Machinery in 2005. The establishment of Toyota Motors' Tianjin plant increased the supply ratio of Toyota Industry (Kunshan) to the Chinese market. Lioho's alliance portfolio has grown to include up to 10 joint ventures since 2001. Ownership ratios of joint ventures are initially determined based on contributions. However, these ratios can change over time as contributions evolve. Joint ventures such as Takaoka Lioho (Tianjin) Industries, Toyota Industry (Kunshan), and Fuzhou Ibara Lioho Machinery have observed shifts in ownership ratios.
2. Replacements of top managers and employees (Improved management practices)	The diversification of Lioho's alliance portfolio to include a wider range of companies and services demonstrates a managerial focus on risk reduction and market expansion. The balanced use of exploration and exploitation strategies to maintain competitive advantage through innovation reflects a sophisticated managerial approach to leveraging alliances. Establishing "Business Review Meetings" to assess performance and investment ratios suggests an improvement in management oversight and resource allocation.
3. Modifications of production models (Competition in product markets and changes in resources offered in alliances)	Lioho has positioned itself as a leader in automotive parts manufacturing, especially aluminum wheels. They emphasize agility in adapting to market changes and fostering innovation. The initial focus of Toyota Industry (Kunshan) was export to Japan, but it shifted in 2000 to serve the Chinese market. Lioho, Liufeng, and Toyota Tsusho jointly established ventures targeting specific regions and customer divisions. Lioho organizes "Business Review Meetings" to assess its subsidiaries' performance and investment ratios. These meetings also facilitate the exchange of customer information.
4. Integration of new technology with alliance partners (Technological competition)	Strategic alliances with major automotive manufacturers like Ford and Toyota contribute to approximately 40% of the company's total sales. The partnership with Toyota Tsusho led to utilizing the Toyota Production System (TPS) and the multi-functional U-shaped production line. Lioho formed a joint venture with Tochigi Fuji Industrial due to the latter's superior casting technology and investment experience. Fuzhou Lioho specialized in developing castings, forged products, and aluminum parts for the supply chain. Lioho's focus on innovation is evident in its approach to resource management and the establishment of new joint ventures.
Alliance portfolio scope	
1. Iterative processes and experiences among existing alliance partners	Lioho has faced challenges in maintaining its competitive edge in a rapidly evolving market. They have a history of successful collaborations with eight Japanese companies. The joint venture strengthened the alliance with Toyota Tsusho, leading to expanded collaborative efforts with other Japanese partners. Lioho's alliance portfolio has remained stable since its formation. Four ventures were established with Liufeng and Toyota Tsusho. Lioho's first international alliance was marked by proactive collaboration. Subsequent ventures were established based on the experience gained from prior collaborations. Lioho's alliances have provided it with access to new regions and customer segments. The company actively engages in collaborations to identify and establish new partnerships that drive

(*continued on next page*)

(*continued*)

Categories	Corresponding facts
2. Establishment of new alliance relationships with potential partners	innovation. Japanese investors have increasingly sought collaboration with Lioho. Lioho has expanded its presence in the Chinese market since 1992. Lioho has fostered strong partnerships, primarily with Japanese firms. New ventures like Kunshan Liufeng Machinery Industry, have been established to tap into new markets and technological innovations. Fujiwa (Kunshan) was a demonstration of the partners' commitment to creating value in the supply chain. The close proximity of Fujiwa Kunshan to other Lioho-affiliated joint ventures suggests early-stage alliance partnerships. Fuzhou Lioho was established in response to an invitation from Ibara Seiki. Fuzhou Lioho successfully diversified its customer base by collaborating with Mitsubishi Motors. Lioho and Ibara Seiki extended their cooperation to Indonesia, establishing a new joint venture in 2013. The company's alliances encompass both resource management and portfolio scope. Changes in ownership ratios and business integration have influenced Lioho's alliance portfolio configuration. Fujiwa (Kunshan) experienced a shift in equity stake from Tochigi Fuji Industrial to Sumitomo Corporation.

References

Adler, P.S., Kwon, S.W., 2002. Social capital: prospects for a new concept. Acad. Manage. Rev. 27 (1), 17–40.

Anand, B.N., Khanna, T., 2000. Do firms learn to create value? The case of alliances. Strat. Manag. J. 21 (3), 295–315.

Bae, J., Gargiulo, M., 2004. Partner substitutability, alliance network structure, and firm profitability in the telecommunications industry. Acad. Manage. J. 47 (6), 843–859.

Bakker, R.M., 2016. Stepping in and stepping out: strategic alliance partner reconfiguration and the unplanned termination of complex projects. Strat. Manag. J. 37 (9), 1919–1941.

Boehe, D., 2013. Collaborate at home to win abroad: how does access to local network resources influence export behavior? J. Small Bus. Manag. 51 (2), 167–182.

Castro, I., Casanueva, C., Galán, J.L., 2014. Dynamic evolution of alliance portfolios. Eur. Manag. J. 32 (3), 423–433.

Cui, A.S., 2013. Portfolio dynamics and alliance termination: the contingent role of resource dissimilarity. J. Mark. 77 (3), 15–32.

Cui, A.S., Calantone, R.J., Griffith, D.A., 2011. Strategic change and termination of interfirm partnerships. Strat. Manag. J. 32 (4), 402–423.

Cullen, J.B., Johnson, J.L., Sakano, T., 2000. Success through commitment and trust: the soft side of strategic alliance management. J. World Bus. 35 (3), 223–240.

Cyert, R.M., March, J.G., 1963. A Behavioral Theory of the Firm. Prentice-Hall, Englewood Cliffs, N.J.

Das, T.K., Teng, B.S., 2000. A resource-based theory of strategic alliances. J. Manag. 26 (1), 31–61.

David, K.T., Pan, Y., Au, K.Y., 1997. How MNCs choose entry modes and form alliances: the China experience. J. Int. Bus. Stud. 28 (4), 779–805.

Dyer, J.H., Singh, H., 1998. The relational view: cooperative strategy and sources of interorganizational competitive advantage. Acad. Manage. Rev. 23 (4), 660–679.

Edgington, D.W., Hayter, R., 2012. New relationships between Japanese and Taiwanese electronics firms. Environ Plan A 44 (1), 68–88.

Eisenhardt, K.M., 1989. Building theories from case study research. Acad. Manage. Rev. 14 (4), 532–550.

Eisenhardt, K.M., Graebner, M.E., 2007. Theory building from cases: opportunities and challenges. Acad. Manage. J. 50 (1), 25–32.

Faems, D., Janssens, M., Neyens, I., 2012. Alliance portfolios and innovation performance: connecting structural and managerial perspectives. Group Org. Manag. 37 (2), 241–268.

Goerzen, A., 2007. Alliance networks and firm performance: the impact of repeated partnerships. Strat. Manag. J. 28 (5), 487–509.

Greve, H.R., Baum, J.A., Mitsuhashi, H., Rowley, T., 2010. Built to last but falling apart: cohesion, friction, and withdrawal from interfirm alliances. Acad. Manage. J. 53 (2), 302–322.

Gulati, R., 1999. Network location and learning: The influence of network resources and firm capabilities on alliance formation. Strateg. Manag. J. 20 (5), 397–420.

Gulati, R., 2007. Managing Network Resources: Alliances, Affiliations, and Other Relational Assets. Oxford University Press, England, UK.

Gulati, R., Wohlgezogen, F., Zhelyazkov, P., 2012. The two facets of collaboration: cooperation and coordination in strategic alliances. Acad. Manag. Ann. 6 (1), 531–583.

Guo, M., Yang, N., Wang, J., Zhang, Y., Wang, Y., 2021. How do structural holes promote network expansion? Technol. Forecast. Soc. Chang. 173, 121129.

Han, W., Chen, F.-W., Deng, Y., 2018. Alliance portfolio management and sustainability of entrepreneurial firms. Sustainability 10 (10), 3815.

Hillman, A.J., Withers, M.C., Collins, B.J., 2009. Resource dependence theory: a review. J. Manag. 35 (6), 1404–1427.

Hite, J.M., Hesterly, W.S., 2001. The evolution of firm networks: from emergence to early growth of the firm. Strat. Manag. J. 22 (3), 275–286.

Hitt, M.A., Dacin, M.T., Levitas, E., Arregle, J.-L., Borza, A., 2000. Partner selection in emerging and developed market contexts: resource-based and organizational learning perspectives. Acad. Manage. J. 43 (3), 449–467.

Hoffmann, W.H., 2007. Strategies for managing a portfolio of alliances. Strat. Manag. J. 28 (8), 827–856.

Huemer, L., 2006. Supply management: value creation, coordination and positioning in supply relationships. Long Range Plann. 39 (2), 133–153.

Inigo, E.A., Ritala, P., Albareda, L., 2020. Networking for sustainability: alliance capabilities and sustainability-oriented innovation. Ind. Mark. Manag. 89, 550–565.

Inkpen, A.C., 2000. Learning through joint ventures: a framework of knowledge acquisition. J. Manag. Stud. 37 (7), 1019–1044.

Inkpen, A.C., Beamish, P.W., 1997. Knowledge, bargaining power, and the instability of international joint ventures. Acad. Manage. Rev. 22 (1), 177–202.

Isobe, T., Makino, S., Montgomery, D.B., 2000. Resource commitment, entry timing, and market performance of foreign direct investments in emerging economies: the case of Japanese international joint ventures in China. Acad. Manage. J. 43 (3), 468–484.

Kale, P., Singh, H., Perlmutter, H., 2000. Learning and protection of proprietary assets in strategic alliances: building relational capital. Strat. Manag. J. 21 (3), 217–237.

Kavusan, K., Frankort, H.T., 2019. A behavioral theory of alliance portfolio reconfiguration: evidence from pharmaceutical biotechnology. Strateg. Manag. J. 40 (10), 1668–1702.

Kharrazi, A., Rovenskaya, E., Fath, B.D., 2017. Network structure impacts global commodity trade growth and resilience. PloS One 12 (2), e0171184.

Kogut, B., 1989. The stability of joint ventures: reciprocity and competitive rivalry. J. Ind. Econ. 38 (2), 183–198.

Koza, M.P., Lewin, A.Y., 1998. The co-evolution of strategic alliances. Org. Sci. 9 (3), 255–264.

Lavie, D., 2007. Alliance portfolios and firm performance: a study of value creation and appropriation in the US software industry. Strat. Manag. J. 28 (12), 1187–1212.

Lavie, D., Miller, S.R., 2008. Alliance portfolio internationalization and firm performance. Organ. Sci. 19 (4), 623–646.

Lavie, D., Rosenkopf, L., 2006. Balancing exploration and exploitation in alliance formation. Acad. Manage. J. 49 (4), 797–818.

Lavie, D., Singh, H., 2012. The evolution of alliance portfolios: the case of Unisys. Ind. Corp. Chang. 21 (3), 763–809.

Liang, J., Shao, P., 2019. Sequential alliance portfolios, partner reconfiguration and firm performance. Sustainability 11 (21), 5904.

Lu, J.W., Ma, X., 2015. Partner resource asymmetry and IJV survival. Asia Pac. J. Manag. 32 (4), 1039–1064.

Madhok, A., Keyhani, M., Bossink, B., 2015. Understanding alliance evolution and termination: adjustment costs and the economics of resource value. Strateg. Organ. 13 (2), 91–116.

Makino, S., Lau, C.M., Yeh, R.S., 2002. Asset-exploitation versus asset-seeking: implications for location choice of foreign direct investment from newly industrialized economies. J. Int. Bus. Stud. 33 (3), 403–421.

March, J.G., 1991. Exploration and exploitation in organizational learning. Org. Sci. 2 (1), 71–87.

Marion, T.J., Eddleston, K.A., Friar, J.H., Deeds, D., 2015. The evolution of interorganizational relationships in emerging ventures: an ethnographic study within the new product development process. J. Bus. Ventur. 30 (1), 167–184.

Meschi, P.-X., Wassmer, U., 2013. The effect of foreign partner network embeddedness on international joint venture failure: Evidence from European firms' investments in emerging economies. Int. Bus. Rev. 22 (4), 713–724.

Nam, K.M., 2011. Learning through the international joint venture: lessons from the experience of China's automotive sector. Ind. Corp. Chang. 20 (3), 855–907.

Parise, S., Casher, A., 2003. Alliance portfolios: Designing and managing your network of business-partner relationships, 17 (4), 25–39.

Parkhe, A., 1991. Interfirm diversity, organizational learning, and longevity in global strategic alliances. J. Int. Bus. Stud. 22 (4), 579–601.

Pfeffer, J., Salancik, G.R., 2003. The external control of organizations: a resource dependence perspective. In: Stanford, California, USA: Stanford Business Books.
Radicic, D., Pugh, G., Douglas, D., 2020. Promoting cooperation in innovation ecosystems: evidence from European traditional manufacturing SMEs. Small Bus. Econ. 54 (1), 257–283.
Rindova, V.P., Yeow, A., Martins, L.L., Faraj, S., 2012. Partnering portfolios, value-creation logics, and growth trajectories: a comparison of Yahoo and Google (1995 to 2007). Strateg. Entrep. J. 6 (2), 133–151.
Rogbeer, S., Almahendra, R., Ambos, B., 2014. Open-innovation effectiveness: when does the macro design of alliance portfolios matter? J. Int. Manag. 20 (4), 464–477.
Rousseau, D.M., Sitkin, S.B., Burt, R.S., Camerer, C., 1998. Not so different after all: a cross-discipline view of trust. Acad. Manage. Rev. 23 (3), 393–404.
Sarkar, M., Aulakh, P.S., Madhok, A., 2009. Process capabilities and value generation in alliance portfolios. Org. Sci. 20 (3), 583–600.
Scaringella, L., Radziwon, A., 2018. Innovation, entrepreneurial, knowledge, and business ecosystems: old wine in new bottles? Technol. Forecast. Soc. Chang. 136, 59–87.
Shukla, D.M., Mital, A., Qureshi, I., Wang, T., 2020. Valuation effects of alliance portfolio expansion speed and strength: evidence from high-tech firms. J. Bus. Res. 113, 370–383.
Sivakumar, K., Roy, S., Zhu, J., Hanvanich, S., 2011. Global innovation generation and financial performance in business-to-business relationships: the case of cross-border alliances in the pharmaceutical industry. J. Acad. Mark. Sci. 39 (5), 757–776.
Spithoven, A., Clarysse, B., Knockaert, M., 2011. Building absorptive capacity to organise inbound open innovation in traditional industries. Technovation 31 (1), 10–21.
Stuart, T.E., 2000. Interorganizational alliances and the performance of firms: a study of growth and innovation rates in a high-technology industry. Strat. Manag. J. 21 (8), 791–811.
Tsang, E.W., Yip, P.S., 2007. Economic distance and the survival of foreign direct investments. Acad. Manage. J. 50 (5), 1156–1168.
Van Wijk, R., Nadolska, A., 2020. Making more of alliance portfolios: the role of alliance portfolio coordination. Eur. Manag. J. 38 (3), 388–399.
Vanhaverbeke, W., Gilsing, V., Beerkens, B., Duysters, G., 2009. The role of alliance network redundancy in the creation of core and non-core technologies. J. Manag. Stud. 46 (2), 215–244.
Wang, Y., Rajagopalan, N., 2015. Alliance capabilities: review and research agenda. J. Manag. 41 (1), 236–260.
Wassmer, U., 2010. Alliance portfolios: a review and research agenda. J. Manag. 36 (1), 141–171.
Williamson, O.E., 1975. Market and Hierarchy: Analysis and Antitrust Implications. Free Press, New York, USA.
Williamson, O.E., 1979. Transaction-cost economics: the governance of contractual relations. J. Law Econ. 22 (2), 233–261.
Wuyts, S., Dutta, S., 2014. Benefiting from alliance portfolio diversity: the role of past internal knowledge creation strategy. J. Manag. 40 (6), 1653–1674.
Xia, J., 2011. Mutual dependence, partner substitutability, and repeated partnership: the survival of cross-border alliances. Strat. Manag. J. 32 (3), 229–253.
Yin, R.K., 1989. Case Study Research: Design and Methods. Sage Publications, Newbury Park, CA., USA.
Zidorn, W., Wagner, M., 2013. The effect of alliances on innovation patterns: an analysis of the biotechnology industry. Ind. Corp. Chang. 22 (6), 1497–1524.