

Examining the relationship between strategic alliances and the performance of small entrepreneurial firms in telecommunications

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Abstract:

An alliance is an effective strategy for knowledge-intensive businesses in competition. Yet, little is known about how strategic alliances work within small firms in the telecommunications industry, which plays an essential part in the COVID-19 pandemic infrastructure. The purpose of this article is to examine the impact of strategic alliance on firm performance among small entrepreneurial firms (SEFs) in the telecommunications industry. The study uses structural equation modeling to analyze primary data obtained from a sample of 74 small entrepreneurial firms in the telecommunications sector. We find that strategic alliances significantly and positively impact partners' performance in terms of financial, operational, and organizational effectiveness among small entrepreneurial firms in the telecommunication sector. Drawing on the findings, we recommend small entrepreneurial firms pay particular attention to pre-alliance and post-alliance issues, including partner similarity, alliance experience, partner' reputation, complementary skills, industry scope, commitment to improving trust and skill, and collaboration to boost performance. In addition, based on the results of this study, we discuss research implications for challenges of telecommunications SEFs in the time of the COVID-19 pandemic crisis.

Keywords: developing economies | firm performance | small entrepreneurial firm | strategic alliance | telecommunication industry

Article:

Introduction

Strategic cooperation has become an essential aspect of strategy literature (Huang et al., 2015; Ireland et al., 2002). Researchers have recently paid particular attention to the way firms ally and the advantages, hurdles, and barriers they encounter during alliances (Albers et al., 2014; Flatten et al., 2011; Hong, 2020). An alliance with another company provides many advantages. These include technology transfer, organizational effectiveness, reduction of costs in design and after-sales services, improvement of financial performance, and opportunity creation (Cumming et

al., 2017; Ireland et al., 2002; Kang et al., 2014). However, cooperation alone is not enough to achieve positive results. An impactful alliance requires actions and capabilities that drive company success, such as pre-alliance and post-alliance activities (Meier, 2011; Nielsen & Nielsen, 2009). These activities cover different stages during the alliance development and explain various aspects of relationship development, resource and knowledge sharing, and commitment to cooperation (Nielsen, 2007).

The role of small firms, the industry, and the geographic context are each recognized as important factors contributing to economic growth and development (Franco & Haase, 2016; Haber & Reichel, 2005). Since the development of the telecommunications industry, these factors have garnered policymakers' attention due to their vital role in national economic development. Hence, this industry deserves further study and investigation to find practical remedies to survival and growth barriers. Furthermore, the telecommunications industry is one of the key industries in Iran, which is a driving force behind many technological and entrepreneurial ventures. Therefore, developing capability and enhanced performance in this field will significantly impact the country's economic development.

Existing evidence stress numerous survival and growth barriers small telecommunications companies are confronted with, such as the lack of resources, defective networking capabilities, and financial issues (Pannone, 2001). Furthermore, encouraging local telecommunications companies to work in close collaboration with their competitors can improve their competitive position relative to the international market leaders and bring about economic progress.

The literature stresses the growing importance of strategic alliances for small firms, especially in crises where large corporations and global market leaders dominate local markets, leaving small-sized competitors with no choice but to exit business (Klein & Todesco, 2021). Moreover, interfirm learning enabled by strategic alliances can compensate for the small firms' shortage of resources (Subramanian et al., 2018), which perhaps explains why governments open local markets for international competition while encouraging local businesses to collaborate to compete effectively against global rivals.

Entrepreneurship studies show that the alliance perspective is a useful theoretical perspective (Alvarez & Barney, 2001; Hong, 2020; Moghaddam et al., 2016). Although alliance-building is an effective strategy for knowledge-intensive small, competitive businesses (Lee, 2007; Moghaddam et al., 2016; Talebi et al., 2015), little is known about how strategic alliances work among small firms in the telecommunications industry. This study focuses on strategic alliances in the telecommunications industry among small entrepreneurial firms (SEFs) in Iran. The research makes two main contributions to the strategic alliance literature. First, it adds new insights to the context of SEFs that operate in the telecommunications sector by examining the impact of strategic alliances, characterized by pre- and post-alliance activities, on firm performance. Second, this research examines the effect of alliances on financial, operational, and organizational performance effectiveness. Multiple measures are more robust value creation indicators of performance than solo accounting measures at the firm level (Bonardo et al., 2010; De Geuser et al., 2009; Kaplan & Norton, 1992).

This research responds to recent calls in literature for a deeper understanding of strategic alliance-firm performance linkage. Previous research has raised questions about the contexts and conditions in which alliances take place (Geleilate et al., 2021), the response to environmental dynamics during the alliance period (Huang, 2020), and the determinants and consequences of alliance formation (He et al., 2020). To better respond to these calls, our study takes the pre- and post-alliance formation perspective (Jennings et al., 2000; Nielsen, 2007) that helps break down the multiple-stage process of alliance formation and, in turn, investigate the performance characteristics of such activities more effectively. Highlighted by seminal works in the field (e.g., Nielsen, 2007), the inclusion of both pre- and post-alliance formation factors into the study of strategic alliances helps explain the various aspects of alliance performance within each subtest. In addition, the existing alliance performance research focuses primarily on accounting and financial measures of performance inspired by seminal studies of Arino (2003) and Lee (2007). We attempt to extend this research to subjective measures that include the alliance partners' abilities to manage internal business operations and adapt to environmental dynamics.

Another aspect of the originality of this study lies in the context of SEFs in the telecommunications sector. SEFs refer to small-sized enterprises that possess a strong desire to introduce new products, services, or processes frequently, enter or create new market niches regularly, undertake risky yet lucrative investments, or seize new-to-the-industry opportunities ahead of the competition (Shane & Venkataraman, 2000; Yu et al., 2014). Given that resource constraints widely characterize SEFs due to their small business network and a lack of financial and human capital, strategic alliances seem to be a solution that enables resource, knowledge, and risk-sharing (Moghaddam et al., 2016). However, given the high failure rate of strategic alliances (Chiang et al., 2020), SEFs should supposedly be reluctant to such practices as they cannot afford the resulting financial losses. Therefore, it is crucial to investigate the alliance-performance relationship in this context. Besides, the telecommunications sector is highly relevant as the value co-creation practices between mobile communication and information service providers have proven the benefits to customers (Babu et al., 2020). Commonly observed in this sector, customers, motivated by promotional incentives, switch service providers frequently, and therefore collaborative relationships between telecommunication firms facilitate the switching procedure (Feller et al., 2009).

Drawing on the arguments developed so far, we identify a gap in existing analyses of alliance-performance relationships in the context of telecommunication SEFs, particularly in times of crisis such as the COVID-19 pandemic. Therefore, this research aims to answer how strategic alliances affect the performance of SEFs that operate in the telecommunication industry and face economic shocks.

The organization of the remainder of this article is as follows: we first conduct a literature review on alliance strategy and business performance. We then propose hypotheses along with the conceptual research model. Following this, the methodology section includes the study design, measures, and validated data. Next, we present the results of the research model employing the statistical procedures in section four. Finally, we provide discussion, concluding remarks, and implications for the telecommunication industry in the COVID-19 crisis.

Theory and hypotheses

Strategic alliances

An alliance refers to cooperation between two or more companies created to enter a developing market or overcome the current business environment (Leiblein & Reuer, 2004). Strategic alliances are collaborative relationships built to achieve mutual strategic goals and enhance long-term market positioning (Cravens et al., 2000; Franco et al., 2020; Reuer & Arino, 2007). A strategic alliance can also be defined as a long-term relationship between two or more firms that intend to improve their competitive position and performance through sharing resources and competencies (Beamish & Killing, 1997).

Access to resources, knowledge, technology, skills, and markets is the main reason for developing an alliance strategy (Brockstedt & Carr, 2005), as gaining such benefits is much more difficult individually (Conn & Bitran, 2004). According to Giura (2015), the resource-based view of the firm highlights resources as the primary reason for the formation of alliances. Other research stresses the importance of developing new skills and abilities and reducing external business risks to succeed in highly competitive business environments (Huang et al., 2015).

While alliances are sometimes formed at lower levels of commitment or for shorter periods with respect to the partners' different interests and objectives, companies can also coalesce at higher levels of trust and find common ground around most issues (Zoogah & Peng, 2011). IBM (International Business Machines Corporation) is an example of the former type engaging in frequent short-term alliances. This company forms alliances with many small and medium-sized enterprises to produce software systems in many different areas. On the other side, Fuji Xerox, as an illustration of strong tie alliances, was built between Fuji Films and Rank Xerox, both recognized as well-established printing companies in Japan (Lee, 2007).

Alliances as key growth strategies are commonplace in many industries, such as airlines, telecommunications, software, hardware, biotechnology, educational services, and automotive industries (e.g., Hsu & Prescott, 2016; McNaughton, 2001; Reuer & Arino, 2007). Focusing on the software industry, McNaughton (2001) highlights the soundness of alliance strategy to promote access to key resources that software developing companies need to offer more desirable products. Citing R&D alliances in the pharmaceutical industry as an example, Brockstedt and Carr (2005) believe that this strategy brings about the expected advantages of cooperation and reaps hidden strategic benefits. Sambasivan et al. (2011) stress the importance of alliances between supply chain partners as one of the most common types of inter-organizational cooperative activities, leading to a better flow of information and creating more commitment and trust. In addition, closer cooperation between supply chain parties contributes to greater stability and solidarity, leading to enhanced performance (Sambasivan & Yen, 2010).

Previous literature recognizes multiple types of interfirm relationships. One common way to categorize these is by the focus or purpose of cooperation. For example, firms form cooperative contractual arrangements such as licensing or franchising products and services to take advantage of new markets. Similarly, firms can undertake direct exporting to reach new foreign markets. Outsourcing and subcontracting are other forms of interfirm cooperation in which the

company pays a third party to complete part of the work. In a subcontract, the contractor can control the operations, and there is less potential for autonomy and control over the activities during outsourcing. Firms engage in joint ventures to gain access to shared resources, and depending on the level of joint activity, partake in mergers and acquisitions (i.e., the purchasing company acquires the ownership and control of the target company's assets), strategic alliances, or supply chain relations (i.e., a partnership with suppliers, buyers, or distributors).

Different types and categories of strategic alliances are described in previous literature. Depending on the acquisition of equities, alliances can be either equity (e.g., affiliates) or non-equity (e.g., research and development cooperatives) (Lee, 2007). Focusing on the industry characteristics and resources, alliances can be either horizontal (i.e., the partners belong to the same industry) or vertical (i.e., the partners belong to different industries). Alliances can also be symmetric (i.e., the exchanged resources are homogenous) or asymmetric (i.e., the resources exchanged are heterogeneous) (Yasuda & Iijima, 2005). Further, alliances can be either exploration or exploitation alliances depending on the purpose of cooperation. While exploration alliance partners aim to achieve something new (e.g., product, service, or market), exploitation alliances are formed to develop specific skills and capabilities needed to pursue existing opportunities (Lee, 2007). A body of scholars stress the functional scope and categorize alliances based on the focused functional activities of partners such as product or service development, marketing, or sales (Kalaighnam et al., 2007). The geographical context is another criterion used to classify alliances. In this context, alliances can either be international (i.e., alliance with a foreign partner) or domestic (i.e., partners operate in the same country or region) (Franco & Haase, 2016). Finally, given the partner's position in the supply chain, alliances can be built with suppliers, customers, competitors, or third-party actors such as universities or research centers (Duysters & Lokshin, 2011). Table 1 presents an overview of different types of interfirm relationships with clarification of the differences and similarities.

Table 1. Different types of interfirm relationships and differences/similarities with strategic alliances

Interfirm relationships	Differences	Similarities
Cooperative contractual arrangements (e.g., licensing or franchising)	There is minimal control over the work in cooperative contractual arrangements	Partners share knowledge and resources
Outsourcing and subcontracting	There are no or limited resource sharing practices in outsourcing or subcontracting	A contract is established between two parties
Merger and acquisition	Merger and acquisition results in one partner purchasing the other one	Long-term goals are sought
Supply chain relations	In supply chain relations, the partners belong to the same value chain	A close relationship between the partners is built

The process of creating a strategic alliance can be divided into two main stages of pre- and post- (i.e., during and after) alliance formation (Jennings et al., 2000; Nielsen, 2007). This perspective has contributed to the theoretical development of strategic alliances. Categorizing the factors related to an alliance into the two sub-categories helps explain the alliance process and identify the determinants of success (Meier, 2011). Like the input-output system, this approach is helpful to specify antecedents (i.e., factors leading to the formation of an alliance) as well as consequences (i.e., factors resulting from the formation of an alliance) of an alliance (Nielsen & Nielsen, 2009).

The most critical factors in the pre-alliance phase include similarity, previous experience, reputation, managers' interactions, complementary skills, risk reduction, legal and regulatory factors, and industry-related issues. Correspondingly, partner similarity refers to the common features of partners, which are reflected in organizational culture (Nielsen, 2007). In general, these partner similarities are developed in marketing, production, raw materials, accounting, information systems, firm structure, technology, customer relationship management, goals and strategies, leadership styles, decision making, and human resources. The previous experience between parties addresses the importance of partners' former cooperation from simply buyer-supplier relationships to strategic alliances. The reputation of alliance parties originates from the reputation of the managers, product/service functions, financial standing, good relationships with other firms, and the firm's size. Reputation is commonly reflected in the brand and positively affects the market value of the partner, often just by the public announcement of the alliance (Houston, 2003). Managers' interactions include personal relationships with close friends, family members, or former colleagues (Dubini & Aldrich, 1991). Based on interpersonal contact theory, Li and Chen (2016) specify four modes of interconnections: task interplay (i.e., interactions to develop market and product problem-solving strategies), cross-functional training (i.e., interactions created in collective learning processes), helping behavior (i.e., to share resources with those in need), and senior management emphasis (i.e., the involvement of top managers in lower-levels organizational issues). Skills complementarity pertains to each partner's distinct capabilities from the other partner (Chung et al., 2000). Sharing these skills can compensate for each other's weaknesses. Risk reduction means that there is a lower probability of failure (Das & Teng, 2001). This incentive encourages many companies to engage in alliances with the premise that they can count on their partner in uncertain times. Legal and regulatory issues refer to the role of government in supporting alliances by lessening legal barriers to interfirm collaborations (Collins & Fabozzi, 1999). Finally, Industry-related factors highlight the scope of activities companies undertake in each industry (Damodaran, 1997). For example, some industries require firms to invest more financial capital, whereas others rely on strong networks.

After allying, post-alliance activities play an essential role in the failure or success of the alliance. In this study, these factors include the improvement of inter-relationships due to higher levels of trust between parties that allow each alliance member to access knowledge (Moore, 1998). Mistrust between alliance members results in the discontinuation of the alliance. Commitment to achieving mutual objectives builds better relationships. Skills and knowledge sharing are the other key alliance outcomes (Giura, 2015; Meier, 2011). Close collaboration and collective problem-solving activities play a significant role in providing the alliance members with new practical capabilities. Pre-alliance formation factors influence the situation (i.e., complementary skills). Finally, the commitment to continue cooperation stresses the enthusiasm and responsibility for the alliance's success (Jennings et al., 2000; Moore, 1998). Effective and frequent communications between the parties can strengthen this commitment.

Concerning the main effects and benefits of a strategic alliance, a literature review reveals that successful alliance engagement leads to effective knowledge transfer and technology diffusion (Vivarelli, 2013; Wang & Nicholas, 2005). Through international alliances, born-global firms gain access to local markets and customers (Cumming et al., 2017; Franco & Haase, 2016). Scholars also recognize the hidden benefits of collaborative alliances, such as greater access to

sources of innovation, better external network relationships, and increasing internal competition inside the network (Brockstedt & Carr, 2005). This strategy can serve as a source of competitive advantage, especially for smaller enterprises seeking to expand overseas with scarce resources (Arranz & Arroyabe, 2016). Although a considerable number of alliances fail chiefly due to a lack of management in strategic, technological, financial, cultural, and political issues, the prevailing business environment conditions have left enterprises with no choice but to develop partnerships (Conn & Bitran, 2004).

Alliance strategy has attracted a great deal of attention from management scholars. Different perspectives and theories have been adopted to explain the strategic alliance phenomenon. Considering international trade theory, scholars explain global strategic alliances as practical strategies to seize new opportunities in international markets (Franco & Haase, 2016). The resource-based view of the firm is applied to describe further the resource-sharing processes involved in alliance relationships and the challenges and opportunities of resource management over the alliance life cycle (Giura, 2015). Other scholars (e.g., Vivarelli, 2013) build on knowledge management and organizational learning theory to explain the knowledge or technology transfer processes and manage information flows in strategic alliances. Finally, several researchers (e.g., Geurts & Van der Zee, 2001; Sambasivan et al., 2011) take the supply chain network theory to explore how supply chain partners can engage in strategic alliances and how supply chain alliances differ from other types of interfirm relationships.

Firm performance

Senior managers need to have a clear understanding of their firm for appropriate decision-making, and firm performance is one of the most relevant criteria in determining efficiency and effectiveness (Adams & Sykes, 2003). However, the measurement of firm performance is always challenging and requires collecting precise and accurate information to assess the firm's status in a specific context (Galbreath et al., 2020).

In line with previous research, analysis of financial statements and other accounting reports helps measure company performance (Lee, 2007). Nevertheless, measuring performance solely by financial records might be too narrow in assessing the alliance's success, particularly when a long-term analysis is needed (i.e., new product development) (Rikhardsson et al., in press). Moreover, there is a lack of consensus about the appropriate methods for measuring alliance performance (Carton & Hofer, 2010). Nevertheless, objective indicators (e.g., increases in revenue, profits, and market value) (Do & Mai, in press), along with subjective measures (e.g., the development of new products or services and customer satisfaction) (Shirokova et al., 2021), can be employed to evaluate alliance performance. Many studies include both objective and subjective measures of alliance performance (Haber & Reichel, 2005).

Performance has been measured in multiple ways. Hudson et al. (2001) introduce several dimensions: quality, flexibility, time, finance, customer satisfaction, and human resources. They argue that these dimensions cover all the aspects of firm performance. The first four dimensions (i.e., quality, flexibility, time, and finance) measure operational performance. In contrast, the customer satisfaction dimension measures the external dimension of performance, and the human resources dimension assesses the firms' cultural aspects. Omran et al. (2021) highlight both

financial and non-financial dimensions of firm performance. Hooley et al. (2005) explain firm performance based on three dimensions: customer performance (e.g., loyalty and satisfaction of customers), market performance (e.g., growth in sales and market share), and financial performance (e.g., accounting indicators, such as profit margin and return on investment). Based on the Balanced Scorecard concept, scholars demonstrate that the measurement of firm performance is limited to internal factors, such as sales and revenue growth, and external factors, such as the number of customers and their perceptions (Lim & Ok, 2021). The proposed model includes financial measures, operational measures, employee learning and growth measures, and customer satisfaction. Therefore, scholars agree that an inclusive measure of performance should consist of both objective and subjective measures.

Arino (2003) presents six performance dimensions relating to alliances that include overall performance satisfaction, strategic goal fulfillment, net spillover effects of the alliance on the parent firms, the alliance's longevity, contractual changes in the ownership structure, and survival of the alliance. Drawing on the work of Venkatraman and Ramanujam (1986), Arino (2003) proposes three levels of performance: financial performance for alliances with explicit financial objectives, operational performance for alliances built on non-financial goals, and organizational effectiveness when the fulfillment of both sides' interests is considered. Since the advantages of alliance engagement are often long-term and performance evaluation is considered a strategic issue (He et al., 2020), operational performance is as important as financial performance when evaluating success. Arino (2003) contends that organizational effectiveness works the best as it encompasses the other measures.

Hypotheses development

There are few studies conducted in the domain of strategic alliance and firm performance in small firms (Hong, 2020; Moghaddam et al., 2016), let alone small entrepreneurial firms (SEFs) in the telecommunications industry (Schaper & Volery, 2007). However, some investigations of the relationship between strategic alliance and performance study the two constructs from different perspectives (e.g., Alvarez & Barney, 2001; Arend & Amit, 2005; Flatten et al., 2011; Lee, 2007).

Organizational culture, organizational structure, entrepreneurship, and social capital are variables that potentially play important roles in the strategic alliance and performance relationship (Sambasivan & Yen, 2010; Talebi et al., 2015; Walter et al., 2007). The recent literature on alliance and performance relationships suggests that interfirm cooperatives generally improve the party's performance as they engage in the relationship with a pre-defined purpose that helps to enter and grow in novel markets (Cacciolatti et al., 2020). Interfirm learning, resource sharing, risk reduction, and other advantages of strategic alliances potentially pave the way for partners to respond to environmental changes and outperform the competition (Babu et al., 2020). The win-win situation achieved through strategic alliances enables the partners to foster innovation to introduce new products, services, or processes (Cacciolatti et al., 2020).

Pansiri (2007) studied the impact of alliance partners' characteristics on performance, concluding that the commitment and trust between the parties positively affect the performance of alliances measured in terms of market share growth and profitability, and consequently, increase their

satisfaction level. Tsaur and Wang (2011) highlight the role of the partners' owners or managers in successful mutual decision-making processes. They find that a healthy relationship between the managers mediates the relationship between the strategic alliance and performance, while the competitive intensity moderates the relationship. The study of the alliance-performance relationship is of fundamental importance, especially for SEFs that encounter severe economic shocks. On the one hand, the business downturn leaves SEFs with no other choice than cooperation to access additional resources. On the other hand, the financial risks of alliance failure can be devastating for SEFs (Chiang et al., 2020). Moghaddam et al. (2016) examine the relationship between alliance formation and the market performance of the SEFs in the pre-IPO stage. While alliance formation positively and significantly impacts these firms in the software industry, the large number of alliances negatively impacts performance valuations. Drawing on the prior research, we argue that strategic alliances potentially influence partners' SEF performance. Therefore,

Hypothesis 1. Strategic alliances have a positive impact on SEFs' performance in the telecommunications industry.

Entrepreneurial firms ally with specific firms to obtain rare, costly, and non-substitutable resources, which help them to form and exploit unique opportunities in their target market (Alvarez & Barney, 2001), all other factors being equal. To the extent that strategic alliances accomplish these objectives, partner firms will increase value (Stuart & Sorenson, 2007; Wang et al., 2012). Within strategic alliances, entrepreneurial firms often use their partners' tangible and intangible capabilities vital to commercializing new technologies, products, or services (Babu et al., 2020; Coombs et al., 2006; Deeds et al., 2004; Moghaddam et al., 2016; Rindova et al., 2010). SEFs operate in more uncertain business environments, so they need more of the partners' tangible and intangible capabilities. These uncertain environments often force SEFs to focus on a particular segment of the market or niche markets. This can be even more crucial in Iran due to the high degree of uncertainty in the business environment, the unstable political environment, and regulatory uncertainty, making business planning more difficult (Emami & Klein, 2020).

An alliance is successful if the parties achieve their intended objectives (i.e., achieving mutual goals and individual purposes) (Cashman, 1998). Success refers to the positive consequences of alliances, such as the growth in sales or market value, reduction of expenses, or expanding the communication network (Spekman et al., 2000), and sustainability (the durability of an alliance) (Agarwal et al., 2010). Performance success has been chiefly characterized by accounting measures (Deeds et al., 1997, 2004; Hong, 2020). This study measures success by financial, operational, and organizational effectiveness that can yield a long-term competitive advantage for small firms (Arino, 2003). In addition, we posit that SEFs need to act appropriately in both pre- and post-alliance formation activities to achieve success. For example, a telecommunications company has signed a highly profitable contract to install unique (very tall and light) telecommunication towers to take the radio and telephone signals to a deprived area. However, such a tower structure does not exist. Based on its reputation and expertise, the telecommunications company allies with a structural engineering company to create the tower. As such, the telecommunications company will financially support the structural engineering company's work. This is an example of a common alliance among firms in this industry, even if

the firms are rivals (Gholami et al., 2004). If both entities develop the trust and commitment to share their skills, knowledge, and problem-solving techniques (Kale et al., 2001), they should be able to boost their short-term and long-term objectives through collaboration. In addition, they will learn from this experience to increase their effectiveness in responding to market changes (Moghaddam et al., 2016). The literature also argues that alliance fulfillment creates a shared vision between partners, which positively influences their performance (Khalid & Larimo, 2012). Nielsen (2007) confirmed the positive impact of alliance experience on partners' ability to create new, effective methods of operations and concluded that better communication between partners facilitates further cooperation activities.

In summary, we argue that SEFs utilizing pre- and post-alliance formation activities obtain better financial, operational, and organizational performance outcomes. Therefore:

Hypothesis 2a. Strategic alliances between SEFs in the telecommunications industry lead to improved financial performance.

Hypothesis 2b. Strategic alliances between SEFs in the telecommunications industry lead to improved operational performance.

Hypothesis 2c. Strategic alliances between SEFs in the telecommunications industry lead to improved organizational effectiveness.

A conceptual model is proposed as follows.

Research methodology

Sampling and data collection

The sample consists of the founders and upper-level management of small firms in the telecommunications industry in Iran. The selected respondents are most familiar with strategic planning, alliance agreements, and networking strategies, and therefore are best to respond to the questionnaire (Bodunde et al., 2020). Although the telecommunications industry is principally a state-owned sector in the country, dominated by the Telecommunication Company of Iran (TCI), there is an increasing number of small high-tech firms in this sector. Some of these firms are TCI subsidiaries, while the rest are privately owned. Some are in science and technology parks and university incubators, while the rest are scattered throughout the country. We used a two-stage sampling design with data collected between 2017 and 2018 and Schaper and Volery's small firm definition (2007, p. 83), which describes small firms as independently owned, individually managed, or managed by a few owners, and employing five to nineteen individuals.

We obtained a list of firms in the telecommunications industry from science and technology parks and university incubators in the first stage. In the next step, we administered an online questionnaire containing items determining the degree of entrepreneurial orientation as selection criteria for determining the final sample of the SEFs. Entrepreneurial orientation enables small firms to proactively recognize opportunities to attain key value creation advantages (Martins & Perez, 2020) and is recommended for alliance research (Reuer et al., 2006; Talebi et al., 2015).

Firms with higher levels of entrepreneurial orientation are characterized by rapid responses to environmental disruptions, creating new opportunities rather than exploiting the existing ones, balanced account of short-term and long-term objectives, and creative destruction of existing structures (Khalid & Larimo, 2012). In addition, entrepreneurially oriented firms can discover and penetrate less competitive market niches quickly, saturate the market's needs before competitors, and exit the market when the competition is stiff (Galbreath et al., 2020). Three firm-level constructs widely measure entrepreneurial orientation: innovativeness, risk-taking, and proactiveness (see Pittino et al., 2017). We adapted six innovativeness items, three risk-taking items, and three proactiveness items from Covin and Wales (2012) and Lumpkin and Dess (2001).

Using Emami and Dimov's (2017) threshold score method, we included respondents with mean scores (based on the twelve items) greater or equal to the sample mean in the primary data collection. The selection process indicates that our cohort in this study is likely to represent the target population. Ultimately, we are left with 203 cases satisfying our criterion. Next, we administered the final questionnaire containing the items of strategic alliance and firm performance. Of these, 74 SEFs (108 respondents) operating in different subsectors of the telecommunications industry gave complete information on all measures. Table 2 shows the profile of the respondents in terms of demographic characteristics of respondents (i.e., gender and age), their professional experiences with strategic alliances, and the operational scope of the sample. Firms that participated in the research are further characterized by the number of alliances developed so far. The sample includes heterogeneous groups of enterprises who have not yet formed any partnerships to groups with more than five alliances. This helps cover different viewpoints towards the implications of strategic alliances for SEFs.

Table 2. Respondent profiles

Percent (approximate)	Number	Groups	Feature
29	31	Female	Gender
71	77	Male	
11	12	Less than 30 years old	Age
43	47	Between 30 and 40 years old	
46	49	More than 40 years old	
3	3	Less than 1 year	Work experience
13	14	Between 1 and 5 years	
15	17	Between 5 and 10 years	
69	74	More than 10 years	
13	15	Long-distance carriers	Subsectors
6	5	Foreign telecom services	
10	11	Processing systems and products	
14	15	Diversified communication services	
12	13	Wireless communications	
7	8	Processing systems and products	
38	41	Communications equipment	Number of alliances formed so far by cases
22	16	No	
42	31	1–2	
24	18	2–5	
12	9	More than 5	

Measures and validity/reliability assessment

The research questionnaire consisted of 57 items in which questions are divided into three sections of pre-alliance formation factors, post-alliance formation factors, and firm performance. All questions used a 5-point Likert scale with answers ranging from 0 (strongly disagree) to 5 (strongly agree). The pre-alliance formation construct is made up of five dimensions, each measured with multiple items. The dimensions focus on different levels, namely individual (e.g., managers), organizational, and industrial, allowing for a comprehensive examination of factors leading to the formation of strategic alliances. In addition, the post-alliance formation construct comprises three dimensions, each measured with several indicators. The three dimensions explain three key consequences of engaging in alliances that lead to enhanced firm performance if managed effectively. Finally, the firm performance construct is explained by three dimensions that cover objective measures and subjective indicators to allow for a more accurate assessment of alliance performance. Table 3 presents the constructs, dimensions, and the number of questions that measure each latent variable.

Table 3. Dimension constructs

Constructs	Dimensions	# of items
Pre-alliance formation factors	Reputation of the parties	6
	Managers' interactions	3
	Skills complementarity	3
	Risk sharing	3
	Legal and contractual factors	3
	Industry-related factors	3
Post-alliance formation factors	Improvement of the relationship	3
	Skills and knowledge sharing	3
	Commitment to continue collaboration	4
Firm performance	Financial performance	3
	Operational performance	6
	Organizational effectiveness	3

Data analysis and results

We employ the structural equation modeling (SEM) technique due to its advantage in accounting for measurement errors, treating latent variables using their indicators, and simultaneous assessment of constructs' intercorrelations (Golob, 2003). Further, using this technique in analyzing business performance is widespread (e.g., Pandi et al., 2016). We conduct the modeling analysis within two sections of the measurement model and structural model. The variables are divided into latent (i.e., construct) and observed (i.e., item) variables. Here, strategic alliance and firm performance are considered second-order latent variables, their dimensions as first-order constructs. The questions used to measure the constructs are considered the manifest or observed variables (Hulland, 1999).

We use Smart PLS software to execute the SEM method. This software can analyze complex models (i.e., models containing more constructs and relationships). It is not sensitive to data distribution, and it enables analyses of the measurement models with a few items. Since our sample size is small, the normality distribution of responses is hard to meet. Due to the high

number of latent variables in the model (i.e., complexity), we could not use other SEM techniques. Employing PLS, the model fitness is checked in terms of reliability and construct validity. The latter is analyzed in terms of convergent and discriminant validity, where convergent validity refers to the degree to which the measures agree, and discriminant validity explains the degree to which the constructs are different. The initial results of running the model (Table 4) indicate adequate reliability and convergent validity. Regarding reliability, Cronbach's alpha and the composite reliability (CR) values are higher than 0.7 and therefore are in the adequate range as suggested by Nunnally (1994). In assessing convergent validity, the average variance extracted (AVE) is higher than the cut-off of 0.5, as indicated by Hulland (1999).

Table 4. Reliability and convergent validity assessment

Organizational effectiveness	Operational performance	Financial performance	Strategic alliance	Constructs
.75	.83	.84	.84	Alpha
.86	.87	.90	.83	CR
.66	.53	.75	.65	AVE

Evaluating discriminant validity, as suggested by Fornell and Larcker (1981), we compared the square roots of latent variables' AVEs (diagonal elements of the matrix shown in Table 5) and the correlation coefficients between them (off-diagonal elements). As can be seen in Table 5 below, each variable's AVE square is sufficiently greater than the correlation coefficients, indicating sufficient divergent validity.

Table 5. Discriminant validity assessment

Organizational effectiveness	Operational performance	Financial performance	Strategic alliance	Constructs
			.81	Strategic alliance
		.87	.40	Financial performance
	.73	.55	.47	Operational performance
.81	.61	.42	.43	Organizational effectiveness

After the measurement model assessment in terms of reliability, convergent validity, and discriminant validity, the causal relationships between strategic alliance and firm performance and its dimensions are assessed. Employing a PLS algorithm and bootstrapping algorithm via Smart PLS, the results are shown in Figs. 1 and 2 and confirm the positive and significant impact of strategic alliance on firm performance dimensions, namely financial performance, operational performance, and organizational effectiveness (at the level of 99.9%). Further, the 'operational performance' dimension receives the highest influence from the strategic alliance construct.

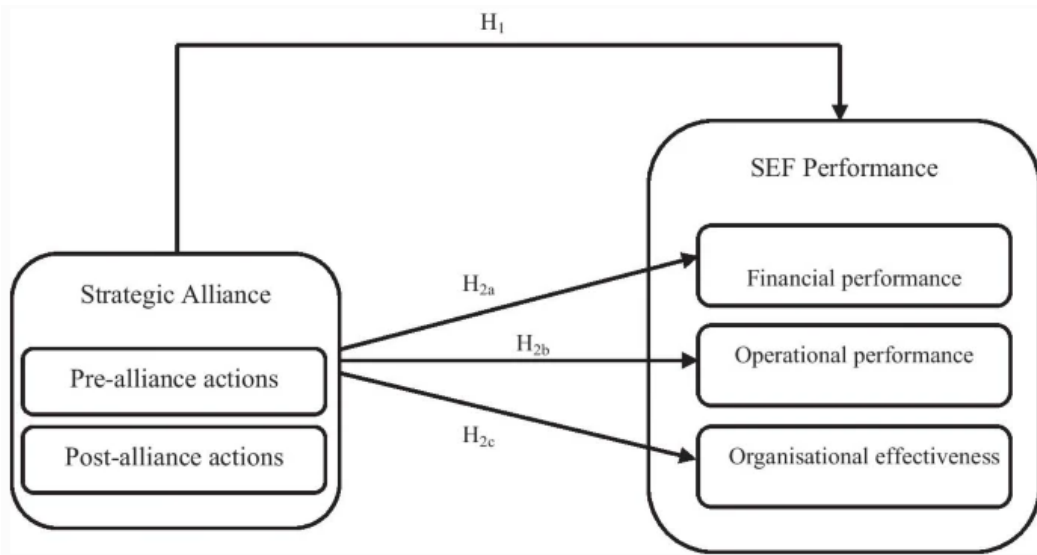
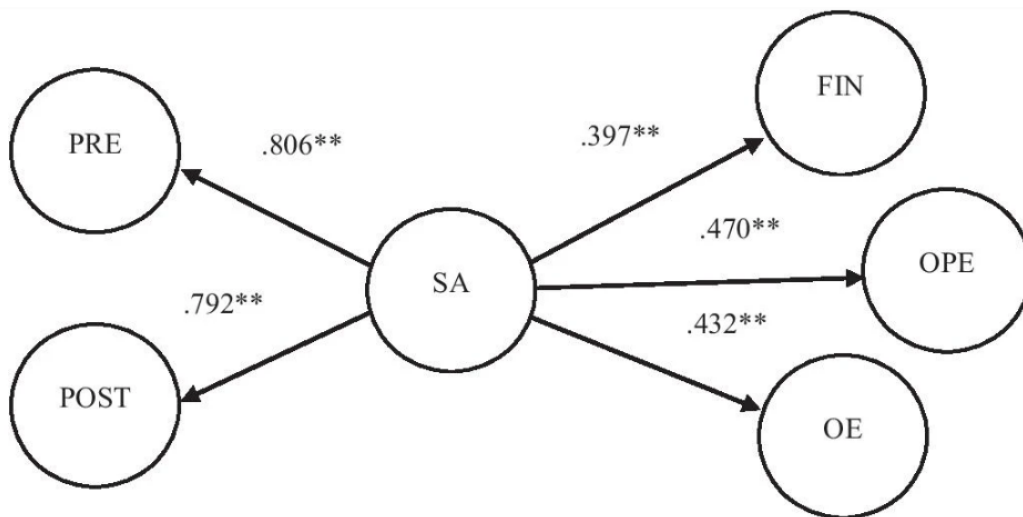


Fig. 1. Conceptual model



PRE: Pre-alliance formation factors; POST: Post-alliance formation factors; SA: Strategic alliance; FIN: Financial performance; OPE: Operational performance; OE: Organizational effectiveness. ** $p < .01$

Fig. 2. Results from PLS algorithm and bootstrapping procedures

In addition to the graphical illustration, the model results are displayed in Table 6. Accordingly, the hypotheses are all confirmed at the level of 99.9%, which confirms the positive effect of strategic alliances on SEFs' performance in terms of financial, operational, and organizational effectiveness, thus supporting previous research (e.g., Arend & Amit, 2005; Flatten et al., 2011). Given that there is no considerable difference between the three path effects, strategic alliances produce a balanced effect on three aspects of firm performance: financial performance, operational performance, and organizational effectiveness. Furthermore, the t-values are remarkably higher than the shortcut value suggesting a strong relationship between strategic alliances and firm performance dimensions. Our findings corroborate prior research that uses multiple aspects of firm performance rather than solo financial criteria (e.g., Bonardo et al., 2010; De Geuser et al., 2009).

Table 6. Hypotheses testing

Results	Standardized coefficients	t-value	Hypotheses
Confirmed	.397	4.953	Strategic alliance financial performance
Confirmed	.470	6.286	Strategic alliance operational performance
Confirmed	.432	5.684	Strategic alliance organizational effectiveness

Discussion and Conclusion

The investigation of the strategic alliance-performance relationship in this study contributes to an understanding of how alliances impact the success of small firms. Small firms can engage in strategic alliances to survive in competitive environments. Moreover, synergies resulting from these collaborations help partners overcome the negative consequences of environmental change, uncertainty, and effective growth (Cacciolatti et al., 2020).

Consistent with previous research confirming the significant positive impact of strategic alliances on partners' performance (e.g., Alvarez & Barney, 2001; Arend & Amit, 2005; Flatten et al., 2011; Lee, 2007), the results of this study confirm the impact of strategic alliances on all three dimensions of performance-financial, operational, and organizational effectiveness.

In agreement with Giura (2015), an important advantage of alliance strategy is that it facilitates access to resources and assets, improving partners' competitiveness and financial performance. Moreover, Arino (2003) states that the enhancement of partners' financial performance is one of the primary motivations for forming alliances. In addition, Sarkar et al. (2001) conclude that strategic alliance strategies are positively associated with factors, such as new technology implementation, prevention of threats posed by competitors, and quality enhancement of products and services. These indices are close to firms' operational performance, which is proposed as one of the dimensions of firm performance in this study. Moreover, Walter et al. (2007) found that the alliance portfolio effectively reduced internal operating expenses due to knowledge transfer. Finally, concerning the COVID-19 pandemic in the telecommunications industry and the rise of demand for services provided in this sector, alliances can provide SEFs with ample opportunities to expand their customer base and meet their recurrent needs. Although the pandemic has had devastating effects on some sectors such as tourism and hospitality, telecommunication companies can capitalize on the emerging market needs and sustain their competitive advantages.

Research implications for the telecommunications SEFs in the COVID-19 crisis

With the Coronavirus (COVID-19) onset in late 2019 and early 2020, the world has witnessed an unexpected crisis in transactions, especially in business interactions. Many believe the world is permanently changed as a result of the pandemic. Although numerous incentives at the local, regional and national levels have ensued, such as reducing environmental uncertainty, new investment opportunities, transferring technical knowledge, and gaining footholds into new markets, the impact on small firms is immense (Emanuel et al., 2020). While some will not survive, other small firms will develop alliance strategies in the COVID-19 catastrophe. However, the cooperation between companies is not free of the side effects of the pandemic (Kuckertz et al., 2020). Based on the results of this research, we provide practical and theoretical suggestions.

Concerning managerial implications, one of the positive outcomes of the COVID-19 crisis is that the telecommunications industry has now been recognized as vital, which could bring many opportunities (threats) for SEFs managers. Making it possible for employees to telework from home and students to complete their assignments, for example, has opened new product markets. Conversely, due to the transmission of the virus, it can reduce the quantity and quality of trust, expectation, and commitment in alliances due to limited personal contact. Supply and value chains have been disrupted, resource exchange has been limited or non-existent, and alliance risk has risen (e.g., both sides demand unconventional cooperation), such as unyielding requests for more scarce resources, withdrawing resources from alliances, and putting heavier pressure or responsibility on the partner's shoulder (Emanuel et al., 2020). Moreover, concerns about non-physical resources may not be as big an issue (e.g., knowledge and financial), but physical resources are particularly sensitive. This is particularly critical for businesses that have foreign partners and operate internationally. For example, when a country focuses more internally, critical obstacles are created for these companies with international alliance partners (Kuckertz et al., 2020).

Without the internal competencies and relying solely on partners' capabilities, the alliance is unlikely to work despite incentives. Both partners must contribute, which is even more evident in times of crisis. Miles et al. (1999) found that firms highly reliant on their strategic partners' capabilities exhibit lower performance, while firms with genuine capabilities and an alternative among a set of available strategic alliance partners exhibit greater performance.

Concerning theoretical implications, we conclude from the results of this research that pre- and post-alliance activities significantly affect the performance and success of SEFs in the telecommunications industry. Therefore, it is crucial to pay special academic attention to these activities to adapt to the situation more than ever. Moreover, in the non-telecommunications industry or industries with more consumer-oriented, such as cars, home appliances, or computers, mass production is the most important factor to compete. Soft factors such as design, research, technical knowledge, and research are insignificant in comparison. Conversely, in the telecommunications industry, these soft factors come first (BMI Research, 2020). In this case, SEFs in telecommunications should focus on these areas in their pre-alliance stage and ally with other firms. However, post-alliance factors should not be overlooked, such as commitment to improving trust, skills, and collaboration efforts to boost performance. However, SEFs should be cautious concerning the scope of the underlying alliance. Pursuing technologies that are exclusive to certain countries will only lead to a waste of resources and jeopardizing performance (Arranz & Arroyabe, 2016). The number of alliances that SEFs take on should be an important issue in a crisis. According to Moghaddam et al. (2016), SEFs benefit from strategic alliances more if they engage in a moderate number of alliances rather than being overwhelmed with a great number of alliances.

The results of this study indicate that SEFs can benefit from strategic alliances and enhance their entrepreneurial performance in terms of innovativeness, risk-taking, and proactiveness. First, the complementary skills developed through strategic alliances pave the way to introduce new products, services, or processes by SEFs. Secondly, the alliance partnership enables SEFs to share the financial and operational risk so that in cases of downturn scenarios, the recovery in

business investments is more rapid and effective. Finally, the sharing of resources and knowledge through strategic alliances equip SEFs with the capability to exploit new-to-the-market opportunities more quickly than competitors.

Our results have implications for future studies concerning SEFs operating in the telecommunications industry in the time of the COVID-19 catastrophe or similar crises. Future studies should pay special attention to the selection mechanism of the companies for alliance engagement, as the cooperation with a partner in a time of crisis could bring in strategic advantages and, at the same time, threats (Kuckertz et al., 2020). Moreover, partnering with a similar enterprise might not work due to possible differences between parties providing complementary skills. Which alliance partner has priority? How is this determined? Additionally, will the protection of proprietary assets in a time of crisis impact partners' managers sharing key information during an alliance process? Finally, future research may explore how alliance challenges vary as SEFs pass through different points in their growth stages (Alvarez et al., 2006) during this crisis by examining multiple-industry samples and using longitudinal analysis.

Limitations

Considering that this study is one of the first attempts to examine the impact of strategic alliances on the performance of SEFs in the telecommunications industry, this study has limitations. First, data was limited, and access to some variables, including foreign trade transactions, the extent to which foreign sanctions affected the SEFs, their governance composition, the degree to which it is established or matured, and investments in innovation, may also affect the performance valuation. Data availability is a significant challenge in the context of telecommunications firms in Iran. Another limitation of this research pertains to the generalization of the findings. Our sample includes only one industry, and the data is cross-sectional. Industry-related factors might encourage or discourage alliance formation. For example, industry features, such as environmental uncertainty, increase the desirability and feasibility of alliances and influence the choice of alliance modes followed by SEFs (Dickson & Weaver, 1997; Moghaddam et al., 2016).

Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on request.

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