

# The Effect of Performance Feedback on Firms' Decision to Form an International Strategic Alliance and Performance in the Korean Manufacturing Industry

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## Abstract

**Purpose** – International strategic alliance has been regarded as a strategic decision made by firms' managerial problems and ensure performance growth. From the perspective of the proactive behavior for changing strategies in a global market, this study aims to identify whether performance feedback influences firms' decisions to pursue strategic alliances. This study examines the effects of performance feedback on performance when firms use strategic alliances.

**Design/methodology** – To analyze the impact of performance feedback on forming an international strategic alliance, this study adopt the concept of performance feedback to develop a research model and our hypotheses. Thus, this study used a two-stage least squares unbalanced panel data analysis with random effects. This study is based on 24,543 observations from Korean manufacturing firms from 2007 to 2016.

**Findings** – The results show that firms pursue the formation of strategic alliances more actively, if their past financial and R&D performance are lower than their aspiration level, based on the result of performance feedback. An in split sample analysis for examining the effect of a firm's technology sophistication based on the OECD's classification, negative innovation performance discrepancy has positive effects on the probability of international alliance in high-tech and medium-high-tech industries. Financial performance also improves when a firm decides to form a strategic alliance based on the results of performance feedback.

**Originality/value** – This research extends recent efforts to better understand the effect of performance feedback on firms' performance when they use strategic alliances. These findings suggest that the CEOs and managers of firms should consider the performance feedback perspective when deciding to pursue a strategic alliance to improve performance. In other words, the decision-makers in a firm must analyze and consider various complex variables inside and outside the firm and expand such subjects of examination to more complex and dynamic factors.

**Keywords:** Aspiration level, Behavioral theory of the firm, International strategic alliance, Performance feedback, Problemistic search

**JEL Classifications:** L10, M10, M16

## 1. Introduction

International strategic alliance is a strategic management behavior used to ensure and maintain competitive advantage with limited resources in the increasingly fierce environment of global competition (Gulati, 1998; Sklyar et al., 2019). Indeed, many firms secure competitive advantage by exploring targets for international strategic alliances in different industrial sectors—both upstream and downstream in their value chains—and by engaging in such

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international alliances to acquire tangible and intangible resources that they do not possess or to avoid risks in uncertain business environments. In line with this, over recent decades, extensive theoretical and practical research has been conducted on international strategic alliances (Christoffersen, 2013; He et al., 2020).

Although research on strategic alliances has been concretized and expanded to specific microscopic areas, previous studies have not sufficiently discussed dynamic aspects, a characteristic of strategic management, as the fundamental motivation for strategic alliances. Dynamic aspects refer to the behavioral characteristics of firms when making strategic management decisions (Cummings, 1984). This is because firms engaging in strategic alliances can make decisions regarding their necessity through internal evaluation. This also includes voluntarily and actively making decisions on target alliances, structures, and methods through external evaluation. Although previous studies have focused on the behavioral characteristics of strategic alliances, discussions have focused on the motivations as well as the structures and types of alliances that emerge when strategic alliances are pursued by firms (Doz et al., 2000). Moreover, studies have thus far focused on static and unilateral assumptions and variables such as environmental and internal factors. However, they have overlooked the dynamic aspects of firms' strategic activities, through which firms develop and implement strategies based on a multifaceted examination of environmental changes and mutual interactions. In addition to the direct effects of diverse variables on performance through alliances, many studies have consistently noted the need to account for and clarify complex relations of influence, such as mutual interactions (Becheikh et al., 2006).

Therefore, this study seeks to identify the effects of performance feedback as a component of the dynamic aspects of firms in the global competition environment, which has thus far not been represented in research on strategic alliances. Previous studies have treated performance feedback as a risk-taking behavior of firms based on the behavioral theory of the firm (BTOF) (Cyert and March, 1963; Ref and Shapira, 2017). According to this theory, decision-makers in firms use specific aspiration levels as a reference against which to evaluate performance. For example, if a firm's performance is to be lower than the aspiration level, risk-prone behavior increases, as it conducts problemistic search to derive a solution. Conversely, if performance is higher than the aspiration level, the firm recognizes that it holds excess resource capacity and engages in slack search and risk-seeking behavior (Cyert and March, 1963; March, 1988). Both problemistic search and slack search may be seen as risk-taking behaviors by a firm (Joseph et al., 2016). Thus, performance feedback is a dynamic aspect that emerges in firms' strategic management activities and can affect decisions such as those on strategic alliances.

Given this context, this study answers the call for further longitudinal research into whether performance feedback influences firms' decisions on strategic alliances in the context of Korea manufacturing industry. This study also examines the effects of performance feedback on a firm's performance when firms use international strategic alliances. In other words, this study hypothesizes that performance feedback is a dynamic determinant of firms' decisions on forming international strategic alliances, while previous research has typically focused on static factors such as alliance motivation, structures, and types. By focusing on performance feedback as a dynamic aspect, we can better assess how firms improve their performance by using international strategic alliances on the basis of changing their strategic position based on performance feedback.

Overall, this research extends the existing disclosures to better understand the effect of performance feedback on firms' decisions on strategic alliances. This study also seeks to shed light on international strategic alliances by taking into account firms' performance feedback

behavior as an antecedent of such alliances. In doing so, it expands exiting research by explaining the decision-making that led to international strategic alliances, in conjunction with performance feedback driven by risk-taking behavior, based on the behavioral theory of the firm. Our findings also suggest a managerial implication that firms should consider the performance feedback perspective when deciding to pursue an international strategic alliance to improve their performance. In other words, the decision-makers in a firm must analyze and consider various complex variables inside and outside the firm and expand such subjects of examination to more complex and dynamic factors.

The structure of the remainder of this paper is as follows. In the next section, the literature on strategic alliances and performance feedback are reviewed and hypotheses are proposed. The methodology and data are described in Section 3, the empirical results is presented in Section 4 and discuss our results in the context of the literature. The theoretical and practical implications are highlighted in Section 5.

## 2. Literature Review and Hypothesis Development

### 2.1. Theories of Strategic Alliances and Performance Feedback

Previous studies have discussed the definitions and concepts of strategic alliances according to their various types and purposes (Doz et al., 2000). However, they commonly include strategic concepts such as sharing resources, achieving joint objectives, specializing, and outsourcing efficient business activities to partners, without accounting for the firm's independent actions (Christoffersen, 2013; Yang et al., 2019). In this context, the international strategic alliance is a cooperation between companies based on the agreement in which two or more firms use their resources collectively for a certain period of time in order to achieve their goals (Contractor and Lorange, 1988). Studies of strategic alliances ultimately depend on their diverse motivating factors and purposes, including those on international strategic alliances.

Theories that explain the motivation to pursue strategic alliances include transaction cost theory, organizational learning theory, the resource-based view (RBV), and network theory. First, transaction cost theory finds transaction costs to be the fundamental cause of actions for forming an alliance (Williamson, 1987). In other words, the firm selects a method that incurs the minimum transaction cost through internalization, in accordance with market failures in the transaction process, such as the increase in transaction costs following information asymmetry, environmental changes, opportunistic behavior by the transacting counterparty, and market inefficiency (Williamson, 1988). On the contrary, external partnerships through strategic cooperation are used in cases in which transaction costs decrease.

Organizational learning theory deems learning as an important factor and an opportunity for the firm to generate competitive advantage. It emphasizes learning as an important objective for strategic management (Dyer and Singh, 1998). In particular, studies on strategic alliances find that transferring and internalizing an external partner's knowledge and capability to the internal scope of a firm through partnerships are key alliance activities. For this purpose, firms' external knowledge search, acquisition, learning, exploration, and exploitation capabilities are crucial to the success of an alliance (Spithoven and Teirlinck, 2015).

The RBV deems that the basis for improving a firm's performance essentially lies in core competence (Cassiman and Veugeles, 2006). Core competence is a resource formed through long-term learning and investment by a firm, and is a decisive factor for competitive advantage (Prahalad and Hamel, 1990). Under the assumption that core competence

comprises allocations of the different resources held by firms, the RBV claims that the effective and efficient management of diverse demand resources is an important objective in firm management. The resources held by firms generally refer to tangible and intangible assets, including financial assets, expertise, technical knowledge, and information (Barney, 1991; Cuervo-Cazurra, 2018). When a resource that a firm does not possess is held by a partnering firm, a complementary relationship is formed and subsequently a strategic alliance is organized (Buckley et al., 2009). According to the RBV, intellectual properties such as technology and knowledge are important for strategic alliances (Wade and Hulland, 2004), as the creation and maintenance of a firm's competitive advantage are determined by the characteristics of internal resources (Barney and Wright 1998). Thus, the RBV expands its discussion to knowledge-based theories in conjunction with organizational learning.

Network theory defines strategic alliances as the establishment and maintenance of long-term relationships with strategic intent based on trust, while different stakeholders maintain independence (Powell, 1990). This theory has been discussed in conjunction with other theories that explicate strategic alliances. In terms of the motivation of the alliance, through the establishment of a network, firms can secure economic feasibility and efficiency by reducing transaction costs, or sharing risks, as they procure relatively less important sectors from firms within the network (Jarillo, 1988). In addition, this theory has been discussed in conjunction with the RBV (Wissema and Euser, 1991), as the formation of a network through alliances enables the acquisition of new market information and development of industrial standards. In particular, network theory emphasizes post-alliance interactions under the assumption of the formation of trust between partners (Grant and Baden-Fuller, 2004), whereby the consistent integration of resources and competence following an alliance enhances the performance and continuation of that alliance through networks (Lee et al., 2012).

Previous studies explaining the theoretical motivations for strategic alliances have addressed the economic feasibility, knowledge acquisition, resource complementation, and trust-based networks as important factors for motivation and influence of strategic alliance (Buckley et al., 2009; Lee et al., 2012; Spithoven and Teirlinck, 2015). However, such studies have insufficiently discussed whether a firm can evaluate its performance against or learn based on a reference group. As noted earlier, the research has gaps—for example, it has predominantly focused on static assumptions and variables such as internal factors, including competence and assets. This focus has led to an insufficient representation of firms' actual strategic management activities. Indeed, some recent studies have noted that despite the need for strategic alliance studies to consider rapid, influential, and complex changes in the business environment, such as digital transformation, such issues are still insufficiently addressed (He et al., 2020; Kohtamäki et al., 2018). In other words, a firm must continually develop strategies based not only on its internal competence or resources, but also on external changes in the environment as well as their interactions. However, research has been insufficient in this regard. Therefore, it is necessary to elucidate how the activities of a firm that is objectively evaluating itself based on an external reference affect decision-making, including strategic alliances. To this end, this study analyze the effect of performance feedback activities on firms' strategic alliances and determine whether they ultimately improve performance.

Performance feedback theory refers to the evaluation of an organization's performance based on its goals and use of evaluation results in decisions on strategic change (Greve, 2003a, 2003b). In the BTOF, performance feedback has been used to explain the active change in organizations' strategic positions within their groups. Indeed, some organizations pursue the essential goals of strategic management, including performance enhancement, competitive-

ness enhancement, and core competency acquisition and maintenance (Sklyar et al., 2019). Such firms tend to establish their own aspiration levels in comparison with not only their past achievements (i.e., historical aspirations), but also the performance of competitors within the reference group (i.e., social aspirations), such as same industry (Cyert and March, 1963; Levinthal and March, 1981). So setting of the aspiration level is an important element in the performance feedback theory (Cyert and March, 1963). Thus, the conceptualization of aspirations is a weighted function of past performance and the performance of others (Cyert and March, 1963; Greve and Gaba, 2017). In this line of research, historical aspiration is based on a firm's own prior performance and social aspiration based on the performance of other reference firms in the same industry. In general, historical aspirations have the advantage that the basic information for the analysis of potential and competence is clear and obtainable (Barney, 1991; Greve, 2003b). However, it is difficult to actively represent changes in the external environment using historical aspirations. Therefore, it is also necessary to consider social aspirations based on the performance of external reference groups (e.g., those in the same industry; Cyert and March, 1963). In BTOF, with performance feedback, firms compare these aspiration levels with their own performance to conduct a problemistic search to identify the cause and resolution in cases of underperformance. Eventually, this problemistic search results in decisions that attempt strategic changes with reference to the success or failure perceived by the firm through performance evaluation (Greve, 1998, 2011; Schimmer and Brauer, 2012).

## 2.2. International Strategic Alliances as a Firm's Response to Performance Feedback

According to previous research, organizational goals and aspiration levels make organizations decide to change their strategic activities to attain organizational goals (Simon, 1964; 1997). Performance feedback theory suggests that performing above the aspiration level is satisfactory, while performing below aspiration level is problemistic (Kotiloglu et al., 2021). Therefore, in the BTOF, lower performance to aspiration level may trigger the firm to do some organizational activities to bring performance back to their aspiration level. Extensive research in line of this has also suggested that firms adjust the extent of risk-taking, R&D intensity, product innovation, investment and growth, and strategic change (Greve, 2003b). In this context, problemistic search aims to achieve firms' performance goals (Cyert and March, 1963). It leads to little strategic change because the risk-taking tendency is not marked when the difference between the aspiration level and performance is not significant. However, the bigger the difference, the greater is the tendency for risk-taking and strategic change (Greve, 1998, 2003b; Posen et al., 2018). In addition, the type of problemistic search becomes broader and more complex and the tendency to seek solutions from outside the firm increases (Baum et al., 2005; Cyert and March, 1963; O'Brien et al., 2014). Thus, a lot of research argued that performance shortfalls not only make decision makers search for solutions, but also make them more likely to accept risky solutions (Baum et al., 2005; Greve, 2003a; Ref and Shapira, 2017). Also, in organizational learning theory, when a firm underperforms relative to its aspiration level, it alters its existing strategies (Audia et al., 2015; Eggers, 2012).

In this study, I regard an international strategic alliance as a firm's response to performance feedback in improving their performance through problemistic search. This is because, as discussed earlier, the fundamental purpose of international strategic alliances is to improve competitiveness as well as gain and sustain competitive advantage (Barney, 1991; Barney and Wright, 1998). Furthermore, such motivations for firms' actions impel strategic change and

subsequently international strategic alliances to resolve issues despite the risks of uncertainty and information asymmetry. As such, when firms face poor performance compared to aspiration levels, they will feel the strain and will be forced to decide organizational activities to respond performance feedback, which can be a kind of risk-taking behavior (Xu et al., 2019). In RBV, firms may be motivated to initiate international strategic alliances for ensuring the complementary resources that they do not have or perceive shortfalls. (Buckley et al., 2009; Wade and Hulland, 2004). In the perspective of exploitation vs. exploration activity (Lu and Wong, 2019), the negative performance feedback (i.e., performance below aspirations) triggers a response that differs fundamentally from the problemistic search behavior (Cyert and March, 1963; Greve, 2003a). In other words, when the performance is below the aspiration level, firms are willing to shift their search behavior by increasing the exploratory for immediate problem solving (Lu and Wong, 2019). Thus, in BTOF, firms actively decide international strategic alliances to resolve the issues at hand under the assumption that such an action will strategically contribute to future performance improvements (Baum et al., 2005), although international strategic alliances require firms to take potential risks to select partners.

On the contrary, firms are not motivated to do some immediate activity, when the performance is above the aspiration level (Levinthal and March, 1981). In this situation, firms continue and routinize their current behavior and do not have any motivation to initiate new organizational actions (Cyert and March, 1963; Levinthal and March, 1981). At the managerial cognition level, managers are also likely to interpret the high performance as a kind of success and, would be willing to keep track of the current strategy. In other words, they do not feel the need to change any successful strategies and become unwilling to take any risky organizational response (Greve, 2007; Hoskisson et al., 2017) such as international strategic alliances. Similarly, while the theories explain why firms opt for international strategic alliances, firms may recognize that they have enough resources and external networks to ensure further growth and expansion when the performance is above the aspiration level. Thus, when the performance is higher than the aspiration level, firms exhibit risk-averse behavior towards the outcome of performance feedback (Lu and Wong, 2019). The theories of problemistic search that form the core of experiential learning theory also suggest that when the organization performs above its aspirations, little or no problemistic search is triggered, and the organization continues its prior behavior because its performance is judged to be successful (Cyert and March, 1963; Greve, 2003a). Therefore, based on the discussions in previous studies on international strategic alliances and performance feedback, I assume that a firm would actively engage in an international strategic alliance to resolve issues if its performance was evaluated in accordance with their performance feedback, when it is lower than its aspiration level.

*Hypothesis 1(H1). If a firm's financial performance is lower than its aspiration level, it pursues an international strategic alliance.*

*Hypothesis 2(H2). If a firm's R&D performance is lower than its aspiration level, it pursues an international strategic alliance.*

### 2.3. International Strategic Alliances and Firms' Performance via Performance Feedback

From the perspective of performance feedback, an international strategic alliance is a decision-making process based on a firm's internal and external resources and performance

evaluations. Further, strategic alliances aim to improve performance as a part of repositioning in itself, which changes a firm's strategic position. In this context, problematic search or slack search conducted in accordance with the results of performance feedback are the decision-making outcomes that a firm strategically pursues. This connects to firms' practical actions such as the decision to pursue strategic alliances. Indeed, firms reposition through performance feedback to change their strategic positions in the form of differentiation or isomorphism (Schimmer and Brauer, 2012). This is because, as discussed earlier, diverse environmental variables in global market must be considered when firms conduct strategic decision-making given the increase in environmental variables such as the continuous intensification of market competition, and an increase in the influence on firms by interested parties such as shareholders (Schimmer and Brauer, 2012). Therefore, international strategic alliances may be deemed a strategic repositioning that a firm undertakes as a part of active, competitive, and proactive strategic management activities such as performance feedback. For example, firms can acquire complementary assets such as knowledge and patents (Miotti and Sachwald, 2003) as, it acquires resources that it does not own through its strategic alliance partners, for the resolution of issues perceived through performance feedback (George et al., 2001). Indeed, firms can indirectly identify their partners' diverse portfolios of resources and competence to improve performance through alliances, which provides opportunities for such firms to access the skills to remedy insufficient technical knowledge or market information. Such diverse sources of knowledge and information enable partnering firms to reinforce their capacities and ultimately improve performance (Laursen and Salter, 2006). In particular, the expansion of access to implicit knowledge (e.g., ideas and technology), which firms informally communicate in joint tasks with partners, is a key factor in the improvement of performance (Kogut and Zander, 1992). Thus, an international strategic alliance is a useful strategy for a firm to access the necessary resources to generate new value or improve performance. Therefore, many previous studies have confirmed that the competence of a firm is improved through international strategic alliances and that this ultimately contributes to the improvement of economic or innovative performance (Jiang et al., 2015).

Nevertheless, there is no clear consensus on the effect of strategic alliances in itself. Many empirical studies on strategic alliances demonstrate their positive effects on performance, while others do not (Su and Vanhaverbeke, 2019). Previous studies initially examined the direct effects within the relationship between strategic alliances and firm performance, but have expanded to analyze qualitative variables such as partner firm characteristics, structures, trust, strength of alliance ties and competence (Jiang et al., 2015; Shakeri and Radfar, 2017) as well as the effects of various characteristics of alliances such as external factors, including uncertainty, on performance (Gomes et al., 2016). These studies mainly argue that the effect on performance depends on the quantitative or qualitative nature of the alliance, such as the motivation or type of strategic alliance, as described earlier (He et al., 2020; Jiang et al., 2017). For example, it has been found that performance improves as the number of strategic alliances (Laursen and Salter, 2006), trust between partnering firms (Jiang et al., 2015), and firm size (Beamish and Jung, 2005) increase. In addition, in terms of the quality of the alliance, cultural distance (Chiao et al., 2009), partnership governance (Chio, 2020), and experience (Shakeri and Radfar, 2017) have also been found to influence the performance of the alliance.

Moreover, previous studies on strategic alliances are also limited in that the relationship between determinants and performance is directly assumed. In other words, there has been insufficient consideration of the foregoing motivations for strategic alliances, such as performance feedback, strategic decision-making, and past performance. Indeed, some studies have identified variables mediating the relationship between strategic alliances and

performance (Kang and Park, 2018; Jiang et al., 2020). However, they have been limited to qualitative factors following the engagement in an alliance, such as the structure of the strategic alliance and partner competence. As discussed earlier, they overlook the actions that a firm actively performs until it decides to engage in a strategic alliance. As a result, most previous studies that have examined the relationship between strategic alliances and performance focus on the nature of the alliance itself and do not provide an integrated picture of how firms' decision to engage in strategic alliances ultimately affects their performance.

Based on these discussions, this study assume that the performance feedback is an antecedent in firms' decisions on international strategic alliances, which can influence the nature of the international strategic alliance as well as the decision to pursue such an alliance. Indeed, a firm repositions itself in accordance with the results of its performance feedback, and enters into such alliances as a part of strategic management. Therefore, it is necessary to consider the complex factors driving the behavior of the firm toward raising its performance rather than the simple causal relationships such as those between performance feedback and performance or strategic alliance and performance. The necessity for an analysis based on such a comprehensive model can also be found in many meta-analysis studies that have examined the determinants of the motivation and performance of strategic alliances (Gomes et al., 2016; Russo and Cesarani, 2017). Therefore, this study assume that the performance feedback actively conducted by a firm leads to international strategic alliances and it ultimately improve the firm's performance.

*Hypothesis 3. If a firm engages in an international strategic alliance based on the results of performance feedback, its performance improves.*

### 3. Methodology

#### 3.1. Data and Sample, and Measurement

I used a firm-level panel data set from the Survey of Business Activities in Korea from 2006 to 2017. The Business Activities Survey provides statistics for business structure and activities and management strategies for enterprises. The survey, which is conducted every year, covers all enterprises with 50 regular employees or more and with more than mil. KRW 300 (approximately USD 250,000) in capital. Among the 153,427 observations from the panel data set of 2006 to 2017 surveyed in 2018, this study only used firms in manufacturing industry for the empirical analysis. Among the data, some specific industries in manufacturing industry which were for one year or had extremely unbalanced panels were excluded. Consequently, a data pool for this study was confirmed with 24,543 observations between 2007 and 2016. Table 1 summarizes the variables. A firm's performance, as the dependent variable, was measured by the growth in sales, which are measured as growth relative to the previous year (Fonseka et al., 2014).

#### 3.2. Measurement

##### 3.2.1. Dependent Variable

In our empirical model, two dependent variables were used. The first is a firm's financial performance which is measured as the sales growth rate of a focal firm by calculated the percentage change in sales from the previous year. The sales growth rate has been widely used



as a dependent variable for evaluating the firm's performance (Chandler, 1962; Penrose, 1959) because it provides a much clear signal about a firm's position in the market (Zang and Gong, 2018). Another dependent variable is an alliance dummy variable which measured whether a firm engaged in international strategic alliance or not. The Survey of Business Activities which was used to ask whether a Korean firm in the manufacturing industry made any agreements like co-marketing, co-branding, collaborative R&D, or co-production with foreign firms. It is a binary indicator equal to one if the firm engaged in international strategic alliance during the time window, and zero otherwise. The alliance dummy variable is also used as an independent variable in the empirical model.

### 3.2.2. Independent Variables

This study used two different performance feedback variables as the independent variables. First, to measure the financial performance of a focal firm, this study used sales growth which has been an important dimension of performance feedback (Greve, 2008; Zang and Gong, 2018). The other performance feedback variable is the innovative performance of a firm, which is measured firms' innovation performance as the patent/R&D ratio: for a given year, the number of firm's patents divided by R&D expenditures (Gompers and Lerner, 2004; Kortum, 1993). Several studies pointed out that the innovation performance affected on the firm's financial performance (Kostopoulos et al., 2011; Lee et al., 2015). According to Gompers and Lerner (2004), normalizing the number patents by R&D expenditure is important since it eliminates technological opportunity effects, and it controls for scale effects while facilitating comparisons across firms and industries marked by varying levels of R&D investments and technological opportunities (Gaba and Bhattacharya, 2012).

The results of performance feedback are measured with the firm's performance minus the aspiration level. Thus, we needed to decide the aspiration level in advance. In this regard, there are three commonly used aspiration models - weighted average model, additive model, and switching model (Bromiley and Harris, 2014). The weighted average model use a weighted combination of historical and social aspirations. The additive model regards the historical and social aspirations as independent references. And the switching model is based on the theoretical conceptualization that switches the attention from the social to historical references when the performance is above the social aspirations. In this study, I adopted the switching model to set a firm's aspiration level. Because, it is more theoretically grounded in the concept of BTOF and offers a single aspiration level from the perspective of Cyert and March (1963) (Bromiley and Harris, 2014). According to Bromiley and Harris (2014), switching and additive models perform better in predicting change than the weighted average model in their comparison of three aspirational measure models. The switching model is also widely used and takes into account the asymmetric behavior of decision makers (Audia and Brion, 2007; Bromiley and Harris, 2014; Washburn and Bromiley, 2012). On the other hand, additive model cannot provide consistent feedback and its results may be confusing to the decision makers (Lucas et al., 2018). In a real firm context, using the historical and social aspirations may give decision makers different meanings and interpretations (Kim et al., 2015). And it will lead to ambiguity and complexity in the manager's decision-making process (Blettner et al., 2015; Joseph and Gaba, 2015). I, therefore, used the switching model following the exact formula. The first step was to evaluate the social aspiration level to mean of same industry firms. If a firm's performance is above the mean value, the aspiration level is 1.05 times of historical performance. But if the performance is below the mean value of the same industry, then the aspiration level is at the industry average.

$$\text{Aspirations}_{it-1} = I(P_{i,t-1} < SA_{i,t-1}) * SA_{i,t-1} + I(P_{i,t-1} > SA_{i,t-1}) * 1.05 * HA_{i,t-2} \quad (1)$$

In this formula,  $\text{Aspiration}_{it-1}$  is the aspiration level of a firm  $i$  at  $t-1$ . The  $I(\cdot)$  is an index function that has a value of one if the statement in the brackets is true, and zero otherwise.  $P_{i,t-1}$  is the performance of a firm  $i$  at  $t-1$  and  $SA_{i,t-1}$  is the social aspiration which is measured by the average performance value of firms in the same industry.  $HA_{i,t-2}$  is defined as the performance of firm  $i$  at the  $t-2$ . According to Bromiley (1991), when the performance is below the industry mean, the aspiration level is set at 5% improvement on its historical performance. Next, in the second step, we calculate the difference between the performance and aspiration level as an output of performance feedback. So there are two measures created – below performance-aspiration, having a value of less than zero, and above performance-aspiration having a value greater than zero. Although this study did not assume the effect of positive performance feedback on international strategic alliance, the above performance-aspiration were added and simultaneously tested them in the same empirical model for confirmation and removing the self-selection bias.

### 3.2.3. Control Variables

This study used seven control variables. I controlled for the previous year's sales by applied the natural logarithm, since past performance could affect current performance (Cohen et al., 2000). R&D intensity was used as a control variable when examining the effects of an international strategic alliance on the firm's performance. Previous studies have found that the R&D intensity can affect the decision to enter into a strategic alliance (Katila and Mang, 2003). For controlling a firm's size effect in performance feedback (Greve, 2011), I included the amount of the total assets and the number of employees which were log transformed to reduce skewness. The foreign capital ratio was included as a control variable, as it can be regarded as an openness that could significantly affect the firms' performance. And I included a firm's status as a binary variable, based on whether is listed in the stock market or not, because an IPO (initial public offering), which could be easier to finance, could affect the financial performance (Biddle and Hilary, 2006). The IPO dummy is measured as one if a firm has been listed in the stock market, and zero otherwise. Lastly, Vissa et al. (2010) suggested that the performance feedback and the performance of a focal firm were based on the organizational form of whether they were affiliated with business groups or not. Thus, a group affiliated with the firm dummy was used as one of the control variables in our empirical model, which is measured as one if a firm was affiliated to a business group (having a mother firm), and as zero otherwise.

### 3.3. Empirical Analysis

To develop the research hypotheses, this study assumed that performance feedback activities, as firms' strategic management activities, are linked to the decision to pursue strategic alliances and ultimately contribute to improving sales, an economic achievement. In other words, the growth in sales—as an indicator of financial performance improvement in firms—is directly affected by international strategic alliances, and also indirectly influenced by strategic management. This may result in endogeneity, in which the error term in the model determining international strategic alliances is correlated not only with performance, but also with the error term of firms' international strategic alliance activities. This is because a firm's performance feedback can affect improvements in both international strategic alliances and

financial performance. Therefore, the two-stage least squares (2SLS) method using instrumental variables was used to solve the endogeneity issue and verify the mediating effects assumed in the hypotheses:

$$\text{alliance\_dum} = \beta_0 + x'_{it}\beta_1 + \gamma_i + \delta_{it} \quad (2)$$

$$\text{sales\_growth} = \alpha_0 + x'_{it}\alpha_1 + \widehat{\text{alliance\_dum}}\alpha_2 + \varepsilon_i + \mu_{it} \quad (3)$$

The 2SLS estimation using instrumental variables is divided into two stages. In Step 1 (Eq. 2), the effect on international strategic alliances was measured using performance feedback activity, which was used as an instrumental variable. In Step 2, (Eq. 3), the predicted value of the international strategic alliance variable was calculated and its effect on sales growth was included in the analysis model. However, in this process, a logistic panel multiple regression model had to be adopted on behalf of the general OLS, as the dependent variables for estimation using the Step 1 instrumental variables corresponding to Eq. 1 are binary variables consisting of 0 and 1. In addition, as the data used in this empirical analysis is a panel, the random effects and the selective application of random effects verified through the Hausman specification test prior to the regression analysis revealed the random effects model to be more feasible, which was therefore applied to the logistic panel analysis. Here,  $x_{it}$  represents the independent variables excluding the constant,  $\alpha_0$  and  $\beta_0$  are intercepts,  $\alpha_1$  and  $\beta_1$  are parameters,  $\gamma_i$  and  $\varepsilon_i$  are unobservable individual and firm-specific effects as a time invariant, and  $\delta_{it}$  and  $\mu_{it}$  are idiosyncratic error terms.

According to Woodridge (2010), conducting the estimation using the OLS method may risk errors entering the 2SLS model. Therefore, the 2SLS estimation was reconducted by recalculating the predicted value of the strategic alliances variables in Step 1 and using this value as the instrumental variable. The analysis in this study was performed in STATA 16.1.

In addition, exiting research suggests that international strategic cooperation takes a certain period of time to produce results, and time-lag effects may appear in the process of producing performance depending on the type and strength of the strategic cooperation being targeted (Nielsen and Gudergan, 2012). Studies that have analyzed the performance of international strategic alliances in the form of co-R&D mainly applied a span of two to four years (Belderbos et al., 2004). However, the type of strategic alliance targeted in this study is not limited to R&D collaboration; it covers front-end processes in the value chain that create added value such as co-marketing, joint ventures, co-production, and co-branding. Therefore, I applied a one-year lag, which was shorter than those used in previous studies.

Finally, a sectoral classification based on the firm's technology level was applied to the empirical analysis, because the relationship between a firm's strategic management activities and performance may vary depending on the industry (Pavitt, 1984; Escribano et al., 2009). Following Galindo-Rueda and Verger (2016), I categorized the manufacturing industry into high-technology industries, medium/ high-technology industries, medium-technology industries, and medium/low-technology industries by OECD's technology sophistication, ISIC REV. 4.

## 4. Results

Table 1 presents the descriptive statistics and correlations for the 24,543 observations used in this study.

**Table 1.** Descriptive Statistics and Correlations

No.	Variables	Mean	S.D.	1	2	3	4	5	
1	Firm's sales growth	0.041	0.227	1.000					
2	International alliance	0.102	0.293	0.157***	1.000				
3	Financial Performance -Aspirations<0	-0.359	0.840	0.211***	-0.136***	1.000			
4	Financial Performance -Aspirations≥0	0.215	0.224	0.059	0.008	0.001	1.000		
5	Innovation Performance -Aspirations<0	-0.049	0.061	0.203***	-0.154**	-0.056	0.010	1.000	
6	Innovation Performance -Aspirations≥0	0.310	1.640	0.015	0.054*	0.020	0.030	0.001	
7	Amount of Sales (log)t-1	10.762	1.268	-0.363***	0.130***	0.101***	-0.130***	0.103*	
8	R&D Intensity	0.027	0.037	-0.118***	0.054	-0.146***	0.182***	0.271***	
9	Amount of asset (log)	10.411	1.170	0.170***	0.130***	0.139***	-0.165***	-0.106	
10	Number of employee (log)	5.032	0.791	0.101***	0.134***	0.141***	-0.259***	0.095***	
11	Foreign investment ratio	10.007	23.339	-0.072	0.093***	0.114*	-0.107***	-0.160*	
12	IPO dummy	0.135	0.341	0.120***	0.107***	0.095**	-0.095**	0.030*	
13	affiliated firm dummy	0.170	0.375	0.203*	0.223***	0.141**	-0.127***	-0.118***	
No.	Variables	6	7	8	9	10	11	12	13
6	Innovation Performance -Aspirations≥0	1.000							
7	Amount of Sales (log)t-1	0.027*	1.000						
8	R&D Intensity	-0.169***	-0.127***	1.000					
9	Amount of assets (log)	0.020	0.911***	0.002	1.000				
10	Number of employees (log)	0.228**	0.798***	-0.006	0.793***	1.000			
11	Foreign investment ratio	0.030	0.207***	-0.037***	0.166***	0.162***	1.000		
12	IPO dummy	0.040	0.366***	0.111***	0.429***	0.335***	-0.080***	1.000	
13	affiliated firm dummy	-0.002	0.210***	-0.059***	0.172***	0.143***	0.601***	-0.101***	1.000

Notes: 1. N=24,543.

2. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$ .

Table 2 presents the results of the logistic panel multiple regression model analysis for Hypothesis 1 and Hypothesis 2. As shown in Table 2, Model 1 provides the results for the full sample, whereas Models 2–5 show the results of the split approach based on the OECD classification of industries by technology sophistication levels according to the R&D intensity. As mentioned in the subsection on independent variables, this study hypothesize that the relationship between negative attainment discrepancy and a firm's probability of engaging in an international strategic alliance is positive. To examine these propositions, this study include both a firm's negative attainment discrepancy and also the positive one for removing the self-selection bias and confirmation. It is noteworthy at this point that the negative coefficient means that the independent variable has a positive effect on the probability of an international strategic alliance because an underperforming firm has a negative value of performance to aspiration in the measurement. Thus, in support of Hypotheses 1 and 2,

Model 2 in Table 2 shows that the impact of prior negative financial attainment discrepancy on the probability of an international strategic alliance is negative ( $z=-2.66$ ,  $p<0.001$ ), and prior negative innovation attainment discrepancy is also in the same direction ( $z=-2.81$ ,  $p<0.001$ ). Thus, we can confirm that a firm is more likely to pursue an international strategic alliance as an organizational activity following performance feedback if a firm's financial or innovation performance is lower than its aspiration level.

**Table 2.** Effects of Performance Feedback on Strategic Alliances (H1 and H2)

Dependent variable= international strategic alliance	Model 1	Model 2	Model 3	Model 4	Model 5
	Full Sample	Sub group-H	Sub group-MH	Sub group-M	Sub group-ML
Financial Performance -Aspirations<0 (t-1) (H1)	-0.292*** (0.110)	-0.294 (0.212)	-0.035 (0.052)	-0.123 (0.307)	0.874** (0.311)
Financial Performance -Aspirations≥0 (t-1)	0.048 (0.041)	0.220 (0.861)	0.133 (0.157)	0.311 (1.837)	0.723 (0.683)
Innovation Performance -Aspirations<0 (t-1) (H2)	-1.045*** (0.372)	-0.711*** (0.246)	-0.108*** (0.041)	-0.207 (0.766)	0.228 (0.357)
Innovation Performance -Aspirations≥0 (t-1)	0.203 (0.623)	0.714 (0.861)	0.166 (0.209)	0.878 (0.934)	0.348 (0.670)
Amount of Sales (log) (t-1)	0.445*** (0.160)	0.778*** (0.297)	0.287 (0.226)	0.841* (0.431)	1.930 (0.552)
Amount of assets (log) (t-1)	0.187*** (0.062)	0.457*** (0.108)	0.194*** (0.071)	0.200* (0.112)	0.037 (0.110)
Number of employees (log) (t-1)	0.276*** (0.085)	0.217 (0.134)	0.261*** (0.097)	0.338* (0.175)	0.452** (0.159)
Foreign investment ratio (t-1)	0.002 (0.002)	0.002 (0.003)	0.000 (0.002)	0.006 (0.004)	0.006 (0.005)
IPO dummy (t-1)	-0.034 (0.114)	-0.073 (0.160)	0.248** (0.113)	0.133 (0.218)	0.171 (0.269)
affiliated firm dummy (t-1)	0.336** (0.144)	0.173 (0.253)	0.069 (0.136)	0.102 (0.255)	0.298 (0.251)
Constant	-6.348*** (0.411)	-6.536 (0.712)	-6.302*** (0.454)	-7.169*** (0.756)	-6.404*** (0.785)
Log likelihood	-3,553.259	-1,264.450	-3,614.102	-1,031.758	-921.306
LR-test chi-square	175.78***	66.89***	465.22***	110.35***	76.96***
observations	24,543	4,066	10,983	5,369	4,125

**Notes:** 1. Year dummy variable is included in the models, but not shown in the table.  
 2. H: high technology industries, MH: medium-high technology industries, M: medium technology industries, ML: medium-low technology industries.  
 3. \* $p<0.1$ , \*\* $p<0.05$ , \*\*\* $p<0.001$ .

We cannot confirm Hypothesis 1 in the split sample analysis of Models 2, 3, 4, and 5. For Hypothesis 1 in Model 5, there is also the unexpected result that the prior negative financial attainment discrepancy on the probability of an international strategic alliance is positive ( $z=2.81$ ,  $p<0.05$ ). This result shows that there are some industry differences in deciding the organizational activity to respond to performance feedback. In other words, it could be

inferred that high-tech industries use more innovation performance than low-tech industries for changing their strategies. However, for Hypothesis 2, Model 2 and Model 3 report that the relationship between innovation performance to aspirations and the probability of an international strategic alliance is positive ( $z=-2.89, p<0.001$ ) ( $z=-2.63, p<0.001$ ) when a firm's performance is below the aspiration level.

**Table 3.** Effects of Strategic Alliances on Firm Performance (H3)

dependent variable= growth rate of sales	Model 6	Model 7	Model 8	Model 9	Model 5
	Full Sample	Sub group-H	Sub group-MH	Sub group-M	Sub group-ML
International Alliance (t-1) (H3)	0.722*** (0.210)	0.786*** (0.241)	0.208* (0.119)	-0.141 (0.152)	0.179 (0.155)
Amount of Sales (log) (t-1)	-0.100*** (0.020)	-0.210*** (0.047)	-0.083*** (0.013)	-0.460*** (0.024)	-0.040* (0.024)
R&D intensity (t-1)	-0.743*** (0.202)	-0.578*** (0.175)	-0.686 (0.535)	0.247 (0.785)	0.914* (0.520)
Amount of assets (log) (t-1)	-0.110*** (0.034)	-0.219** (0.077)	-0.009 (0.021)	0.216*** (0.030)	0.156*** (0.025)
Number of employees (log) (t-1)	-0.094** (0.043)	-0.200** (0.080)	0.005 (0.024)	0.150*** (0.034)	0.143*** (0.027)
Foreign investment ratio (t-1)	0.001*** (0.001)	0.002** (0.001)	0.001* (0.001)	0.001 (0.001)	-0.001 (0.001)
IPO dummy (t-1)	-0.045*** (0.008)	-0.051** (0.018)	-0.024*** (0.007)	-0.049*** (0.015)	-0.046*** (0.012)
affiliated firm dummy (t-1)	0.009 (0.008)	-0.027 (0.024)	0.012 (0.008)	0.060** (0.021)	0.015 (0.014)
Constant	4.907*** (1.432)	9.975*** (3.056)	1.673** (0.821)	1.542* (0.783)	3.702*** (1.086)
R-squared	0.163	0.162	0.152	0.237	0.119
Wald Chi-squared	273.59***	71.70***	246.66***	1,039.80***	175.23***
observations	24,543	4,066	10,983	5,369	4,125

**Notes:** 1: Instrumented: strategic alliance(1/0), Instruments: Financial Performance-Aspirations<0(t-1), Financial Performance-Aspirations≥0(t-1), Innovation Performance-Aspirations<0(t-1), Innovation Performance-Aspirations≥0(t-1)

2. Year dummy variable is included in the models, but not shown in the table.

3. H: high technology industries, MH: medium-high technology industries, M: medium technology industries, ML: medium-low technology industries.

4. \* $p<0.1$ , \*\* $p<0.05$ , \*\*\* $p<0.001$ .

An important assumption I hold in this study is that international strategic alliance has a positive effect on a firm's performance. Model 6 in Table 3 shows that prior International strategic alliance which was decided by organizational activity to performance feedback positively affects a firm's performance ( $z=3.43, p<0.001$ ). In the subsample analysis, the relationship between engaging international strategic alliance (when above financial and innovation aspiration) is significantly related to a firm's performance only in high-tech industries ( $z=3.26, p<0.001$ ) (Model 7) and medium-high-tech industries ( $z=1.75, p<0.1$ ) (Model 8).

## 5. Conclusions and Discussion

The primary objective of this study was to examine the effect of performance feedback, and particularly, negative discrepancies between firm performance and aspiration level on the decision to engage in an international strategic alliance. Thus, based on the BTOF, this study regard an international strategic alliance as an organizational behavior to performance feedback to relieve underperforming. In addition, an empirical analysis was conducted to determine whether such firms' strategic behavior ultimately contribute to the improvement of financial performance.

This study provide support to the role of performance feedback in affecting the decision to engage in an international strategic alliance, a factor that has received relatively little attention in the extensive literature that has examined the antecedent of such strategies (Christoffersen, 2013; Lee et al., 2012; Spithoven and Teirlinck, 2015; Yang et al., 2019). Table 4 summarizes the findings from the validation of our hypotheses.

**Table 4.** Results of The Hypothesis Testing

	Hypotheses	Full Sample	Sub group-H	Sub group-MH	Sub group-M	Sub group-ML
H1	Financial Performance-Aspirations<0	(-) <sup>***</sup>				(+) <sup>**</sup>
H2	Innovation Performance-Aspirations<0	(-) <sup>***</sup>	(-) <sup>***</sup>	(-) <sup>***</sup>		
H3	The effect of international strategic alliance on firm's financial performance	(+) <sup>***</sup>	(+) <sup>***</sup>	(+) <sup>***</sup>		

**Notes:** 1. H: high technology industries, MH: medium-high technology industries, M: medium technology industries, ML: medium-low technology industries.

2. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$ .

The results show that, as performance falls below aspiration, a firm's probability of engaging in an international strategic alliance increases. This shows that the tendency to engage in an international strategic alliance is different for firms that are in the neighborhood of aspiration level compared to those that are well below or above it. As discussed earlier, these results may be explained by the strategic change adopted for problem-solving purposes as a type of problemistic search activity that a firm promotes to ultimately improve its performance. In other words, a firm can pursue an international strategic alliance to address the challenges it faces. Thus, if the performance feedback of a firm is lower than that in the previous year relative to its aspiration level, it has an incentive to conduct a problemistic search (Cyert and March, 1963). We can discuss these results based on organizational learning theory, which argues that a firm can learn valuable experiences from firms' performance feedback by assessing their past experiences; such feedback also sends signals that allow the firm to recognize issues in previous strategies (Levitt and March, 1988). In this case, the firm shifts its strategic position by exploring and implementing new strategies (Eggers, 2012). In other words, the recognition that their performance is lower than the aspiration level is a motivation for the firm to pursue other radical and progressive strategies (Abrahamson, 1996; Abrahamson and Fairchild, 1999).

This study also conducted split sample analysis for examining the effect of firm's technology sophistication based on the OECD's classification (Galindo-Rueda and Verger,

2016). For Hypothesis 1, we cannot find a significant relationship between negative financial performance discrepancy and the probability of international strategic alliance. But, for Hypothesis 2, negative innovation performance discrepancy has significantly positive effects on the probability of international strategic alliance in the high-tech and medium-high-tech. subsample industries.

As previously discussed, an international strategic alliance may independently affect the performance of a firm, but its effect varies depending on the motivation and nature of the alliance (Chio, 2020; Shakeri and Radfar, 2017). This study find performance feedback to be a leading factor in international strategic alliances. Indeed, the results for high-technology industries are particularly notable. As such, based on these results, a technology intensive firm decides to enter into an international strategic alliance based on their performance feedback when the innovation performance is below its aspiration level. High-technology firms may decide to change their strategy through problemistic search and strategic alliances. Indeed, they can access external sources of knowledge through strategic alliances (Steensma and Fairbank, 1999), which can increase a firm's innovation capacity through the exploitation of novel technologies, thus increasing its problem-solving capacity and providing it with new solutions (Ahuja and Lampert, 2001; Amabile, 1988). Such reinforcement of capacity spurs innovation and new product development (Deeds and Hill, 1996) and ultimately enhances the firm's growth and profitability (Dyer and Singh, 1998; Gulati, 1998). That is, high-technology firms pursue international strategic alliances in problemistic searches that follow performance feedback, thereby securing complementary resources and improving performance.

This study integrates key ideas from both the BTOF and alliance theories to gain new insights into the effect of performance relative to aspiration level, on the decision to form an international strategic alliance. Although the two theories are different, they do have some similarities. For example, a firm evaluates and responds to its performance and makes changes to its strategies when there are substantial factors to adjust the current strategy, which has largely gone unnoticed in the literature. I believe that integrating these two theories can be a fruitful path for future research, in particular, to help us better understand a firm's alliance strategy and performance feedback.

This study provides the following theoretical implications. First, it expanded the scope of exiting research by explaining strategic decision-making regarding international strategic alliances, in conjunction with performance feedback driven by risk-taking behavior, based on the BTOF. In particular, dynamic factors such as performance evaluation based on historical and market comparisons were considered in addition to internal capacity, alliance structure, and partner attributes. Second, from the perspective of performance feedback, previous studies have addressed international strategic repositioning. However, this study demonstrated that such a repositioning may result in specific strategic decisions such as international strategic alliances. Third, patent - innovation performance - was used as a strategic activity conducted to improve performance rather than limiting the target of performance feedback to firm performance only. The level of patents ratio to R&D investment is widely used for examining the effect on strategic change and financial performance (Kostopoulos et al., 2011; Lee et al., 2015). Therefore, this study may contribute to extend the arguments on how firms change their strategy, and whether they could make a decision on forming an international strategic alliance or not.

This study also provides several practical implications. First, this study found that firms should consider performance feedback as a dynamic aspect of firms' strategic decisions such as those regarding international strategic alliances. In other words, the decision-makers in a firm must analyze and consider various complex variables inside and outside the firm and



expand such subjects of examination to more complex and dynamic factors. Second, performance feedback for strategic decision-making enables a firm to forecast and analyze the future of the whole industry by analyzing its position in the market (Schimmer and Brauer, 2012). As such, the firm can change its strategic position in an ever-changing competitive environment and make strategic decisions such as those regarding international strategic alliances to secure core competencies and competitive advantage.

When interpreting the results of this study, one must bear in mind its limitation. This study conducted a group-by-group analysis using firms' technology levels classified by the OECD based on R&D intensity, but this analysis was limited to the manufacturing industry. The BTOF generally assumes that the reference group comprises firms in the same industry, but this may differ from the actual reference group perceived by firms. Indeed, firms' perceptions of their competitors affect their behavior and ultimately performance (Tsai et al., 2011). This point should be considered in future research. Another limitation is that, our data did not cover the current unexpected COVID-19 pandemic which could affect the strategic change of firms. Therefore, to further enhance our understanding, future research should examine the effects of a kind of global economic shocks by extending the panel data set.

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