

조직 양면성과 장기 성과: 상대적 탐색 및 활용의 조절효과

Organizational Ambidexterity and Long-term Performance: The Moderating Effect of Relative Exploration and Exploitation

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요약

조직 양면성과 장기 성과 간의 관계를 조절하는 변수에 관한 일련의 연구가 있었지만, 전략적 관점에서의 조절변수에 관한 연구는 부족하였다. 본 연구는 기업의 상대적 탐색과 활용이 조직 양면성과 장기 성과와의 관계에 미치는 조절효과를 8,916개의 기업 표본을 바탕으로 분석하였다. 가설 검증 결과, 조직 양면성은 기업의 장기 성과(Tobin's q)에 유의한 정(+)의 영향을 미치는 것으로 나타났다. 기업의 상대적 탐색은 그 관계에 긍정적인 조절효과를 보이고, 기업의 상대적 활용은 부정적인 조절효과를 보이는 것으로 나타났다. 본 연구는 조직 양면성 연구와 전략 연구를 통합했다는 점에서 의미를 가진다. 조직 양면성이 장기 성과의 미치는 긍정적 영향은 기업이 차별화 전략을 사용할 때 더 강화되고 지속되는 반면, 원가우위 전략을 사용할 때는 더 약화되고 지속되기 어렵다.

■ 중심어 : | 상대적 탐색과 활용 | 조직 양면성 | 장기 성과 | 조절효과 | Tobin's q |

Abstract

There has been a stream of literature studying moderators of the relationship between organizational ambidexterity and firm performance, but there remains a lack of research on moderators with a strategic perspective. We examined the effect of organizational ambidexterity on a firm's long-term performance and the moderating effect of a firm's relative exploration and exploitation based on a sample of 8,916 firms. We found a positive relationship between organizational ambidexterity and long-term performance measured by Tobin's q. The results also suggest that a firm's relative exploration positively moderates the relationship between organizational ambidexterity and long-term performance, whereas exploitation negatively moderates this relationship. We contribute to the current ambidexterity literature by integrating it with strategy literature. We found that the positive relationship between organizational ambidexterity and long-term performance is enlarged and long-lasting when a firm is a differentiator. In contrast, this positive relationship is lessened and short-lasting when a firm is a cost-leader.

■ keyword : | Relative Exploration and Exploitation | Organizational Ambidexterity | Long-term Performance | Moderating Effect | Tobin's q |

I. Introduction

Organizational ambidexterity is defined as an organization's ability to simultaneously pursue exploration and exploitation[1]. Organizational ambidexterity has been investigated in terms of learning, strategy, and technological innovation. Exploration is associated with experiment, search, and variance increasing, whereas exploitation is associated with productivity increase, variance decreasing, and efficiency. [2] argued that an organization's long-term performance and survival depend on its ability to "engage in enough exploitation to ensure the organization's current viability and to engage in enough exploration to ensure future viability" (p. 105).

Many studies on organizational ambidexterity have provided empirical evidence on its positive effect on firm performance, such as sales growth, subjective ratings of performance, innovation, and market valuation measured by Tobin's q (see the review of [1]). Although there remains a lack of agreement on the operationalization and conceptualization of organizational ambidexterity, the positive relationship between organizational ambidexterity and firm performance has been empirically supported[1][3].

There has been a stream of literature studying moderators of the relationship between organizational ambidexterity and firm performance. Researchers focused primarily on external environments as moderators[1]. For example, the level of dynamism and competitiveness moderated the relationship between organizational ambidexterity and firm performance such that the effect of organizational ambidexterity on firm

performance is stronger when environmental dynamism is high and competitiveness within the industry is high[2][4]. [5] tested the moderating effect of environmental factors on the relationship between organizational ambidexterity and firm performance. They found that organizational ambidexterity is less beneficial for firm performance when environmental munificence, which represents the size of an industry's opportunities and dynamism, is low. In contrast, exploration is more beneficial for firm performance when environmental munificence is high. [6] also suggested that organizational ambidexterity is more needed in times of environmental hostility, which includes regulatory, technological, competitor, and customer hostilities.

Few studies have investigated the internal moderator of the relationship between organizational ambidexterity and firm performance. For example, the effect of organizational ambidexterity on firm performance is contingent on the level of resources such that it is more beneficial to firm performance when the firm has sufficient internal resources[7][8]. Market orientation, defined as the firm's capabilities to respond to current and future customers, positively moderates the effect of organizational ambidexterity on new product performance such that the effect is stronger when a firm has a high level of customer orientation. However, there remains a lack of research on internal factors as a moderator between organizational ambidexterity and firm performance. It is essential to understand a firm's internal aspects concerning organizational ambidexterity because its strategy, structure, and resources are the boundary conditions of organizational

ambidexterity.

This study investigates the moderators between organizational ambidexterity and firm performance by adopting a strategic perspective. We use relative exploration and exploitation to reflect the strategic position in the industry. The integration of a strategic perspective with organizational ambidexterity can explain the internal boundaries or conditions of a firm that intensify or weaken the relationship between organizational ambidexterity and firm performance. However, few studies in the organizational ambidexterity literature have used a strategic perspective.

II. Theoretical background and hypotheses development

1. Ambidexterity and long-term performance

Organizational ambidexterity has been extensively investigated in organizational learning, strategic management, innovation, and organizational design. In this study, we adopted organizational learning and innovation theories to understand the organizational ambidexterity. The definition of exploration and exploitation differs by academy field. However, there is agreement on the definition of organizational ambidexterity as an organization's ability to concurrently pursue or combine both exploration and exploitation[1][9][10]. Organizational ambidexterity enables organizations to survival longer by achieving short-term performance via exploitation and retaining long-term performance via exploration[1][9][10].

Arguments that firms simultaneously pursuing exploration and exploitation are more likely to

achieve higher performance than firms focusing on either exploration or exploitation have been confirmed in many empirical studies[9][10]. For example, [1] conducted meta-analysis about organizational ambidexterity and found that organizational ambidexterity was positively associated with long-term performance. The emphasis on exploitation in the sacrifice of exploration may lead to a "success trap"-firms have organizational inertia inhibiting them from adjusting to new environments, resulting in poor performance[2][11]. In contrast, firms that focus on exploration may be stuck in a "failure trap"-firms underdevelop newly created ideas and thus do not seize opportunities to generate new revenue streams[2]. Therefore, firms that pursue exploration and exploitation simultaneously are more likely to achieve superior long-term performance[12].

H1: Organizational ambidexterity has a positive effect on long-term firm performance

2. The moderating effect of relative exploration and exploitation

Diverse moderators between organizational ambidexterity and firm performance have been investigated including internal aspects such as organizational structure and culture and external aspects such as competitive intensity[9]. We use relative exploration and exploitation to incorporate the strategic perspective based on a firm's strategic positioning within its industry. Scholars contended that the impact of exploration and exploitation is contingent on industry conditions[13][14]. The concept of relative exploration and exploitation suggests considering competitors and industry

conditions in measuring the level of exploration and exploitation[15]. The amount of exploration and exploitation varies by industry. For example, firms in the pharmaceutical industry pursue a high level of exploration, whereas firms in the home appliance industry pursue a relatively low level of exploration, focusing on exploitation. As another example, the research and development (R&D)-to-revenue ratio of firms in the software industry was approximately 14%, whereas that of firms in the chemical and energy industries was only 1% [16]. Therefore, firms with the same amount of exploration or exploitation but in different industries pursue different strategic directions, so the implications of exploration and exploitation might differ. For example, [17] found that the impact of exploration on performance is distinct in the service and manufacturing industries.

We measure and use the degree of exploration and exploitation relative to the industry averages. Relative exploration and exploitation differ conceptually from their absolute counterparts because the relative concept denotes the position in the industry. Strategies concern the difference from or superiority to competitors in the industry. Therefore, relative exploration and exploitation are more appropriate measures from a strategic perspective than their absolute counterparts[15]. A firm's relative exploration and exploitation are the degrees of exploration and exploitation over the averages of the industry to which a focal firm belongs.

Thus, relative exploration (exploitation) is calculated by the level of a firm's exploration (exploitation) divided by the average exploration (exploitation) of firms in the same

industry. A high relative exploration indicates that a firm's level of exploration is higher than its competitors. Firms in different industries have different strategies for choosing exploration and exploitation. The contribution of exploration and exploitation are affected by the levels of exploration and exploitation of competitors; thus, firms choose exploration and exploitation based on the behaviors of competitors[15]. Furthermore, the firms with high relative exploration are more likely to depend on differentiation strategies, whereas those with high relative exploitation are more likely to use a cost-leadership strategy.

According to [12], exploitation involves "refinement, efficiency, implementation and execution," and exploration involves "search, risk-taking, experiment." Other scholars define exploitation as the use of existing knowledge and exploration as the pursuit of new knowledge[2][18]. Exploitation is based on more explicit and less ambiguous knowledge, and the outcome of exploitation tends to be proximate, less uncertain, and predictable [9]. Exploitation requires single-loop learning and a focus on process innovation [9].

As [12] argued, exploitation improves predictable short-term performance. [19] empirically demonstrated that exploitation is beneficial to short-term performance. However, focusing on the refinement of existing skills and technologies might result in obsolete skill sets in the future[20]. Furthermore, variety reduction and adaptation to the current environment might make organizations vulnerable to environmental changes[9]. Therefore, exploration might negatively affect long-term consequences.

In contrast, exploration is based on tacit and implicit knowledge, with distant, uncertain, and

risky outcomes[12][21]. Exploration requires higher-order learning (which includes lower-order learning), implying that exploration is based on double-loop learning [22] and product innovation[9]. Because exploration invests in innovation, new knowledge, and organizations' future adaptability to changing environments[12], exploration would increase organizations' long-term performance. [23] empirically demonstrated that exploration improves long-term performance, measured by market-share growth, more than short-term performance, measured by return on assets.

We integrate the concepts of relative exploration and exploitation with those of exploration and exploitation. It is less complicated for firms with high relative exploration to execute exploitation than it is for those with high relative exploitation to execute exploration. This phenomenon implies that building exploitation on exploration is less challenging than building exploration on exploitation because exploration tends to be ambiguous, uncertain, and implicit and thus requires more time to implement.

For example, firms with high relative exploitation tend to have strengths in process improvement, requiring explicit and exact behavior. The development of implicit and risk-taking behavior for product innovation based on that explicit and exact behavior is challenging in the short term. In contrast, for firms with high relative exploration, the development of explicit and exact behavior for process innovation based on implicit and risk-taking behavior is relatively easy in the short term. Integrating the implications of exploration-exploitation on long-term performance and the strategic perspective of

relative exploration-exploitation, we argue that the effect of ambidexterity on a firm's long-term performance intensifies when a firm has higher relative exploration. In contrast, the effect of ambidexterity on a firm's long-term performance diminishes when a firm has higher relative exploitation.

H2: Relative exploration positively moderates the relationship between organizational ambidexterity and long-term performance.

H3: Relative exploitation negatively moderates the relationship between organizational ambidexterity and long-term performance.

III. Method

Two data sources were used to test our hypotheses. We included all firms in the S&P 500 with relevant data. Patent data from the National Bureau of Economic Research (NBER) were used to measure relative exploration, relative exploitation, and ambidexterity. Compustat data were used to create accounting and financial variables such as R&D expenditure, slack resources, and Tobin's q. The combination of the datasets during 1977 and 2005 generated a total of 8,961 firm-year observations.

1. Dependent variable

The dependent variable, long-term performance, was measured by Tobin's q. Tobin's q has been widely used to measure long-term performance because Tobin's q reflect both short-term performance and long-term performance perspective[24][25]. In addition, there may be a big event which influenced Tobin's q. The

control of year effect can minimized such effect. We adopted the operationalization of Tobin's q by the market value of assets divided by the book value of assets[26-28].

2. Independent variables

Ambidexterity: The independent variable, organizational ambidexterity, defined as an organization's ability to pursue both exploration and exploitation simultaneously, was measured to include firm exploration and exploitation, consistent with previous studies[1]. Firm exploration and exploitation were measured using patent data[29-32]. The technological domains of patent citations were used to classify exploration and exploitation. We regard the citation of a patent as exploration if the technological domain of a patent citation is outside of the accumulated focal firm's patent technological domains of all patents. Similarly, the citation of a patent was classified as exploitation if the technological domain of a patent citation was included in the accumulated focal firm patent's technological domains. Each was log-transformed due to the skewness of the data distribution.

3. Moderating and control variables

Moderating variable: Relative exploration and exploitation were defined as an organizational ability to exploration or exploitation relative to competitors. Thus, they were measured by the number of explorations and exploitations divided by the average number in the focal industry to which the firm belongs. This study followed the US industry classification system. A relative exploration greater than 1 indicates that a firm's exploration is greater than the average number of that in competing firms.

Control variables: We included three variables at the firm level. First, firm size was measured using the number of employees to control a firm's overall capacity of innovation[33]. This variable was log-transformed. Second, slack resources were included to reflect a firm's other available resources[34]. This variable was measured by current assets divided by current liability. Third, innovation performance was included to consider the different innovation capabilities, measured by the number of patents [35]. This variable was also log-transformed due to the skewness of the data distribution. Industry density was created to reflect the degree of competition. We use Tobin's q(t) to correct auto-correlated errors.

IV. Results

The descriptive statistics and correlations among the variables are presented in [Table 1]. Some explanatory variables were correlated. The results of the empirical analysis are presented in [Table 2]. Organizational ambidexterity was positively and significantly associated with Tobin's q (t+1), supporting H1 ($\beta = 0.055$, $p < 0.05$). This finding is consistent with previous empirical studies[1]. The moderating effect of a firm's relative exploration and exploitation on the relationship between organizational ambidexterity and long-term performance was tested in Model 3. The interaction between organizational ambidexterity and relative exploration was significant and positive ($\beta = 0.037$, $p < 0.005$), supporting H2. This finding implies that the positive effect of ambidexterity on long-term performance is strengthened when a firm has

Table 1. Descriptive statistics and correlations

No	Variable	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9
1	Tobin's q (t+1)	2.14	2.65	1								
2	Tobin's q (t)	2.21	2.68	0.53**	1							
3	Firm size	1.92	1.54	-0.19**	-0.2**	1						
4	Slack resources	1.26	0.45	0.08**	0.16**	-0.51**	1					
5	The number of players	5.12	0.91	0.12**	0.15**	-0.41**	0.28**	1				
6	Innovation performance	4.59	1.99	-0.05**	-0.06**	0.68**	-0.31**	-0.26**	1			
7	Ambidexterity	5.27	3.92	0.01**	-0.03**	0.51**	-0.5**	0.09**	0.52**	1		
8	relative exploration (rel_er)	1.10	0.87	-0.02**	-0.06**	0.54**	-0.47**	-0.06**	0.59**	0.83**	1	
9	relative exploitation (rel_ei)	1.13	0.80	-0.06**	-0.09**	0.59**	-0.5**	-0.04**	0.63**	0.85**	0.83**	1

Table 2. Results of the empirical analysis

Dependent Variable	Model 1	Model 2	Model 3
	Tobin's q (t+1)		
Tobin's q (t)	0.277*** (0.01)	0.277*** (0.01)	0.275*** (0.01)
Firm size	-0.393*** (0.05)	-0.392*** (0.05)	-0.384*** (0.05)
Slack resources	-0.402*** (0.08)	-0.321*** (0.09)	-0.362*** (0.09)
The number of players	-0.286*** (0.08)	-0.271*** (0.08)	-0.267*** (0.08)
Innovation performance	0.056* (0.03)	0.030 (0.03)	0.057+ (0.03)
Ambidexterity		0.055* (0.02)	0.019 (0.03)
relative exploration (rel_er)		0.099+ (0.06)	-0.085 (0.07)
relative exploitation (rel_ei)		-0.263** (0.08)	-0.075 (0.10)
rel_er X ambidexterity			0.037*** (0.01)
rel_ei X ambidexterity			-0.031*** (0.01)
cons	2.853*** (0.55)	3.118*** (0.57)	2.911*** (0.57)
Wald x2	1511.03	1540.10	1574.58

high relative exploration. Finally, the interaction between organizational ambidexterity and relative exploitation was significant and negative ($\beta = -0.031$, $p < 0.005$), supporting H3. This finding implies that the positive effect of ambidexterity on long-term performance diminishes when a firm has high relative exploitation. [Figure 1]

illustrates the moderating effects of relative exploration (left graph) and relative exploitation (right graph) on the relationship between ambidexterity and Tobin's q with three values for relative exploration/exploitation representing the mean value and one standard deviation above and below the mean.

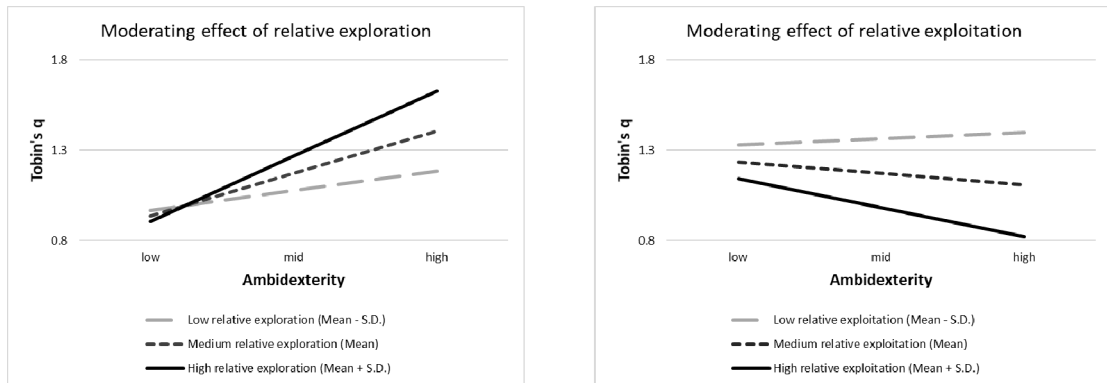


Figure 1. Moderating effect of relative exploration/exploitation on the effect of ambidexterity on Tobin's q

V. Conclusion and discussion

1. Findings and implications

We examined the effect of organizational ambidexterity on a firm's long-term performance and the moderating effect of a firm's relative exploration and exploitation based on a sample of 8,916 firms. The results confirm the positive relationship between organizational ambidexterity and long-term performance as measured by Tobin's q. The results also suggest that a firm's relative exploration (exploitation) positively (negatively) moderates the relationship between organizational ambidexterity and long-term performance.

High relative exploration implies that a firm is more likely to take advantage of a differentiation strategy. It is relatively easy for this firm to add exploitation activities to exploration. This finding implies that this firm is more likely to be prepared to be ambidextrous. Thus, the effect of ambidexterity on long-term performance is enlarged when the firm pursue differentiation. In contrast, high

relative exploitation implies that a firm is more likely to rely on a cost-leadership strategy. It is difficult for this firm to add exploration activities to exploitation. Consequently, this firm requires more effort to be ambidextrous. This implies that the effect of ambidexterity is lessened when the firm adopted cost-leadership.

Our contributions to the current ambidexterity literature are two-fold. First, this study attempts to integrate ambidexterity literature with strategy literature. This research differs from previous studies by adopting strategic internal factors, relative exploration and exploitation, as moderators between organizational ambidexterity and firm performance. Relative exploration (exploitation), which indicates that a firm has an orientation toward differentiation (cost-leadership), positively (negatively) moderates the positive effect of organizational ambidexterity on long-term performance. Consequently, the positive relationship between organizational ambidexterity and long-term performance is more intense and long-lasting when a firm is a differentiator. In contrast, this positive relationship is less intense and short-lasting when a firm is a cost-leader.

Second, the results confirmed the positive effect of organizational ambidexterity on long-term firm performance. There have been many studies on organizational ambidexterity at the firm level[1]. However, the empirical evidence on the positive effect of organizational ambidexterity on long-term performance has not been sufficient to validate this effect.

2. Limitations and directions for future research

This study attempted to extend the understanding of organizational ambidexterity by incorporating a strategic perspective (differentiation and cost-leadership measured by relative exploration and exploitation). However, some limitations exist. First, the empirical test was conducted using a sample of large public firms in the US. Large firms have an advantage in terms of resource utilization; thus, a relatively large portion of firms may have an orientation toward differentiation. However, few small- and medium-sized firms can be orientated toward differentiation due to their small resource utilization. Under such conditions, the results of this study may not be applicable. Future studies should examine the moderating effect of relative exploration and exploitation on the relationship between organizational ambidexterity and long-term performance using a sample of small- and medium-sized firms.

Second, we used patent data to measure four variables: exploration, exploitation, relative exploration, and relative exploitation. Patent data have been widely used in the ambidexterity literature[30-32][36]. However, some limitations exist in patent data. Patent

data reflect only the technological traits of exploration and exploitation. All knowledge and technology related to exploration and exploitation are not patented if a firm finds alternate ways to protect them [37].

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