Internal Capabilities and Technological Innovation of SMEs: Moderating Effect of Performance Evaluation System

Review of Integrative Business & Economics Research

Su-Jung Hwang
Department of Venture Startups, Keimyung University, Daegu, Republic of Korea

Jae-Hyeok Choi*
International Business Management Program, BINUS Business School, Bina Nusantara University, Jakarta, Indonesia

ABSTRACT

In a rapidly changing environment, the technological innovation of SMEs is essential to the survival of companies. In particular, unlike large corporations, SMEs' internal capabilities are recognized as essential due to limited resources, and SMEs are investing a lot in increasing their internal capabilities (entrepreneurship, innovation differentiation strategy, and innovative culture). In addition, the performance evaluation system checks whether a company is faithfully performing its work and performance, and based on these results, it serves as a foundation for external investment or growth. Nevertheless, only some SMEs are interested in implementing the performance evaluation system. Therefore, this study empirically analyzed the effect of SMEs' internal capabilities on technological innovation performance and the moderating effect of the performance evaluation system on the relationship between internal capabilities and technological innovation performance. A survey was conducted on small and medium-sized manufacturing companies for hypotheses testing, and 172 data were used for empirical analysis. As a result of the analysis, it was found that the entrepreneurship and innovation differentiation strategy of SMEs had a positive and significant effect on technological innovation performance. Also, the performance evaluation system moderates the relationship between internal capabilities (entrepreneurship and innovation differentiation strategy) and technological innovation. However, there is no effect of innovative culture on technological innovation. Lastly, the results suggest that the establishment of competitive internal capabilities of SMEs is an important factor in technological innovation, and it is necessary to establish a systematic performance evaluation system.

Keywords: Internal Capabilities, Performance Evaluation System, Technological Innovation, Korean SMEs.

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1. INTRODUCTION

The technological innovation of SMEs is regarded as an important tool for performance improvement, competitiveness enhancement, and sustainable growth (Baker et al., 2016; Adams et al., 2006; McEvily et al., 2004; Senge & Carstedt, 2001). Innovative companies contribute to faster growth and higher returns (Rađenović et al., 2023).

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Therefore, innovation is regarded as a very important factor for a company's survival and growth, and innovation is also recognized as a key economic growth factor at the national and regional levels (Hyland & Beckett, 2004). According to a study by Lee et al. (2001), SMEs fail in market competition due to lack of resources, non-economy of scale, and lack of reputation, and the way to survive is to innovate so that competitors cannot easily imitate. Accordingly, most SME executives adopt technological innovation as a key competitive strategy (Eisenhardt & Brown, 1999), and research results that recognize innovation as the basis of a competitive economy are largely accumulated (Suchek et al., 2021). According to these researchers, competitive success depends on the management of the organization's innovation process, and many factors for successful management of the innovation process are suggested (Ernst, 2002; Griffin & Hauser, 1996).

Most of the existing domestic and foreign studies on technological innovation mainly focus on studies on factors influencing technological innovation. Researchers have considered many determinants of innovation, and technological innovation can be largely divided into internal and external determinants. Until now, studies on innovation have been focused on fragmentary studies on individual influencing factors, and studies on the interaction between internal and external factors and how these factors lead to technological innovation performance are somewhat insufficient.

Studies on the factors influencing technological innovation are mainly based on a resource-based perspective, and the unique resources held by companies, which are valuable, scarce, unlikely to imitate, and difficult to replace, are the main sources of corporate competitiveness and resources with these attributes can become the core foundation of corporate competitiveness and have a great impact on corporate profitability (Mumford, 2000). From a resource-based perspective, innovation can be seen as a result of internal innovation resulting from internal capabilities. In other words, it is believed that all companies have their own unique resources and capabilities, and how they are used efficiently determines the difference in performance.

In this context, previous studies have revealed that internal factors are more important performance determinants than external factors (Hall & Bagchi-Sen, 2002; Hoffman et al., 1998). As a result of reviewing existing domestic and foreign studies related to innovation determinants, variables such as entrepreneurship, strategy, organizational culture, and organizational structure could be derived as important internal factors affecting innovation.

To overcome environmental constraints, SMEs operate based on flexibility, adaptability, and efficient R&D. A management aspect of performance evaluation is required for these management activities to be balanced from a short-term and mid-to-long-term perspective and for internal members to move in one direction. Suppose the performance evaluation criteria do not focus only on the present performance but are balanced for the present and the future. In that case, internal members will freely engage in creative and innovative activities.

Therefore, this study aims to comprehensively analyze the determinants of technological innovation for SMEs by applying the industrial organization theory and the innovation theory from a resource-based perspective. Based on existing studies, we would like to analyze the essential internal influencing factors of technological innovation (entrepreneurship, strategy, and organizational culture, and examine the regulatory role of the performance evaluation system in linking these factors to technological innovation performance.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

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The determinants of innovation in existing studies can be largely divided into internal and external factors. The results of a systematic summary of 108 empirical studies related to technological innovation presented by Becheikh et al. (2006) found that variables related to CEOs, government policy support, networking, knowledge/skill acquisition, and organizational structure were inconsistent about innovation performance. In addition, van der Panne et al. (2003) also summarized the factors affecting the success and failure of innovation based on 43 studies related to innovation projects. According to the research results, studies on R&D intensity among corporate-related factors, organizational structure, innovation differentiation strategy, top executives' support among project-related factors, and technical excellence and innovation among product-related factors did not provide consistent results. In addition, important internal and external factors in innovation decisions were derived by considering the research of Tamhain (2003), who identified the driving factors and obstacles of innovation team performance based on surveys and interviews with 74 R&D project teams at 27 large companies, and the research of Adams et al. (2006), who presented seven organizational abilities to make and manage changes (input, knowledge management, strategy, organizational culture, portfolio management, project management, and commercialization).

A study by Becheikh et al. (2006) and van der Panne et al. (2003) found that innovation is a very complex process caused by various factors and that internal and external factors influence innovation ability. Furthermore, it is explained that it is necessary to pay attention to the fact that the direct influence of related factors and interactions with other factors may cause innovation. In this study, as a result of comprehensively reviewing domestic and foreign studies on determinants affecting innovation performance, the variables related to the CEO, such as entrepreneurship, strategy, and organizational culture, were found to be essential determinants of technological innovation. Accordingly, major internal factors of innovation decisions were derived by considering the determinants of technological innovation that are important to innovation performance, variables that are considered important factors but show inconsistent research results, and variables that have not been sufficiently studied for Korean SMEs. Until now, existing studies on innovation determinants have mainly been fragmented studies on individual influencing factors. This study aims to determine how these factors influence technological innovation performance.

2.1 Internal Capabilities and Technological Innovation

2.1.1 Entrepreneurship and Technological Innovation

In the case of SMEs, the influence of the CEO is great, which can significantly impact the successful innovation process. The more adventurous and entrepreneurial the CEO is, the more active the company can carry out innovation activities and increase innovation performance (Elenkov et al., 2005; Liñán et al., 2020; Munandar et al., 2021). Due to the inherent nature of innovation, the innovation process requires active intervention and support from the CEO. While many resources such as money, manpower, and time must be invested in promoting an innovation differentiation strategy, the effect is uncertain, so the will and determination of the CEO to take responsibility for the outcome are essential (Blanchard, 2020; Nina et al., 2022).

2.1.2 Innovation Differentiation Strategy and Technological Innovation

A company's strategy brings a competitive advantage, and the company's survival and development depend on choosing and implementing an excellent strategy. Existing

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studies have shown that SMEs with strategic management perform better than those without (AlQershi, 2021; Hauser et al., 2020). Several studies have argued that a company's differentiated strategy has a positive and significant relationship with innovation (Beneito, 2003; Debackere et al., 1996; Galende & De la Fuente, 2003: Zahra et al., 2000). The suitability of the environment and strategy a company faces acts as a core competency, becoming a source of competitive advantage and improving corporate performance.

Moreover, Souitaris's (2002) empirical study also presented the results of a study that a well-defined strategy increases corporate innovation. Therefore, a company's differentiation strategy not only increases the intensity of innovation but also accelerates the speed of innovation to secure a competitive advantage while being one step ahead of competitors (Zahra et al., 2000).

2.1.3 Innovative Culture and Technological Innovation

To continuously implement technological innovation, an organizational culture that encourages innovation is more important than anything else. In order to continuously promote innovation within an organization, it is possible to establish an appropriate organizational culture, and interest in organizational culture is increasing as a means for sustainable competitive advantage. However, there are very few empirical studies on the impact of culture on innovation (Büschgens et al., 2013; Herbig & Dunphy, 1998). Organizational culture includes a shared vision; the clearer the vision, the more effective the innovation becomes. The reason is that a clear vision can focus on developing new ideas that can be evaluated more specifically (West, 1990). Therefore, organizational culture strongly influences the thinking and behavior of members and creates norms that define individual and group behavior. In other words, organizational culture provides important guidelines for determining the attitudes and behaviors of members, and through this, it also affects innovation behavior.

An organizational culture that actively participates and effectively responds to the changing environment inspires an organizational innovation atmosphere (Vrakking, 1990). In addition, the innovative organizational culture that seeks to respond to the changing environment plays a positive role in leading to continuous innovation activities (Azeem et al., 2021) and plays a crucial role in the long-term technical capabilities of companies (Valdez-Juárez & Castillo-Vergara, 2021). From this perspective, it promotes members' innovative behavior, appropriate organizational culture, and atmosphere must be formed (Bendak et al., 2020). Innovative organizational culture that responds to the changing environment leads positively to continuous innovation activities. It plays a key role in the long-term technological capabilities of companies.

2.1.4 Moderating Effect of Performance Evaluation System

Regarding performance evaluation, both theoretically (Gupta et al., 2008; Mumford, 2000) and empirically (Mark & Akhtar, 2003; Papulová et al., 2021) report that performance evaluation has a positive function in organizational innovation. Organizations evaluate and control members in several ways to see if they have achieved their given performance properly. One such method is performance evaluation based on short-term performance and performance evaluation based on long-term performance (Dai et al., 2020; Joghee & Alzoubi, 2022). Innovation in an organization takes considerable time and resources to achieve its results (Mumford, 2000). Therefore, a performance evaluation system that values long-term performance is needed rather than operating a performance evaluation system based on short-term profits.

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From a long-term perspective, the organization's performance evaluation system positively affects the organization's innovation activities and performance. A study by Mumford (2000) argues that a performance evaluation system focused only on short-term performance deteriorates organizational innovation or creative performance. The long-term performance evaluation based on the creativity of members of the organization, not the short-term, can promote the creative performance of members (Didonet et al., 2020; Majid et al., 2021). The performance evaluation system that promotes the creative performance of members of the organization improves the creative problem-solving ability of members of the organization, through which it promotes the acquisition and utilization of external resources, acting as a significant factor in innovation performance (Mark & Akhtar, 2003). In addition, it was found that internal resources such as strategies and culture of a company are more positively linked to corporate performance in companies that are making good use of the long-term performance evaluation system (Huang & Huang, 2020; Salim et al., 2019; Shahzad et al., 2021). These preceding studies suggest that the long-term performance evaluation system can positively moderate the relationship between internal and external factors and technological innovation.

2.2 Research Model

As mentioned above, Figure 1 shows the relationship between internal capabilities and technological innovation, and the moderating effect of the performance evaluation system.

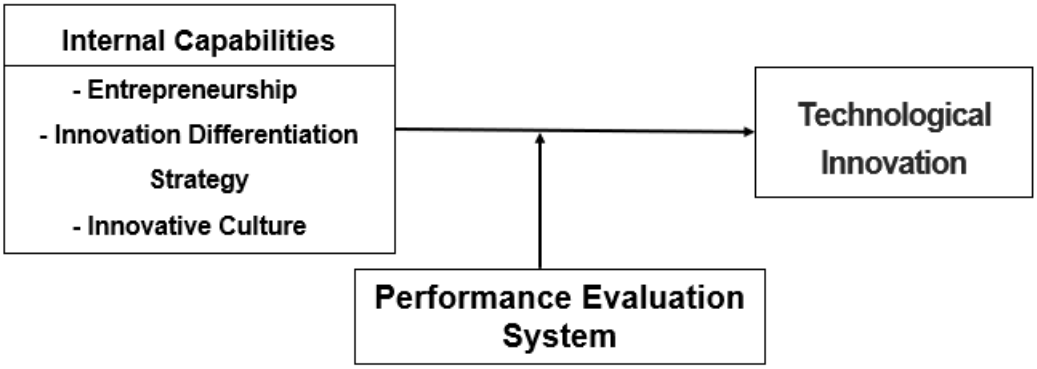

Figure 1. Research Model

H1. Entrepreneurship positively affects technological innovation.
H2. Innovation differentiation strategy positively affects technological innovation.
H3. Organizational culture positively affects technological innovation.
H4. Performance evaluation system moderates the relationship between entrepreneurship and technological innovation.
H5. Performance evaluation system moderates the relationship between innovation differentiation strategy and technological innovation.
H6. Performance evaluation system moderates the relationship between innovative culture and technological innovation.

3. EMPIRICAL RESEARCH

3.1 Measurement of Variables

3.1.1 Entrepreneurship

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Entrepreneurship is viewed as a manager's risk sensitivity and ability to cope with environmental uncertainty and measured by four questions (a five-point scale) used by Covin & Slevin (1989) and Covin (1991) (CEO is very active in innovating management, technology, products, etc., CEO actively takes risks, CEO emphasizes active response to environmental change, CEO actively responds to environmental uncertainty).

3.1.2 Innovation Differentiation Strategy

The strategy sees it as an innovation differentiation strategy. It uses five questions (a five-point scale) created by referring to the questionnaire presented by Miller (1988) to measure (new product development, R&D, market development, aggressive strategy, and innovation orientation).

3.1.3 Innovative Culture

Innovative culture sees the degree of adaptation to change and the active additional degree and uses the four questions suggested by Denison and Mishra (1995) to measure them (Our company often undergoes organizational changes based on customer demands, and our company is an organization that changes quickly in response to the environment. Our employees influence the company's decision-making. In our company, cooperation, and cooperation between departments are actively conducted).

3.1.4 Performance Evaluation System

The organization's performance evaluation system uses three questions asking whether member evaluation is linked to long-term performance (Performance from a long-term perspective has an important influence on my performance evaluation; it is difficult to receive a good performance evaluation if performance from a long-term perspective is poor, and performance from a long-term perspective account for a large portion of the overall performance evaluation).

3.1.5 Technological Innovation

Technological innovation is the introduction of new products to meet consumer wants and increase a company's profitability and competitiveness (Zahra et al., 2000). It is measured by the number of new product introductions in the last three years.

3.1.6 Control Variables

Firm size, firm age, and R&D are introduced as control variables. Firm size (Cosh & Hughes, 2000) and firm age (Stock et al., 2002) that can affect technological innovation are controlled. The scale was measured by 'the total number of employees,' the natural logarithm was taken and used for analysis, and the age was measured by 'the number of years elapsed from the year of establishment.'

According to the research findings that R&D has a significant impact on innovation (Lin & Chen, 2005; Shefer & Frenkel, 2005), R&D was introduced as a control variable, and the measurement was 'the ratio of R&D investment to sales over the past three years' (Hall & Bagchi-Sen, 2002).

3.2 Data Characteristics, Factor Analysis, and Reliability

3.2.1 Data Characteristics

To test the hypotheses presented in this study, a survey was conducted on small and medium-sized manufacturing companies in Daegu. As a result, a total of 230 data were collected, and 172 companies were used for the final analysis, excluding companies

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whose responses were unfaithful or judged to be unreliable and companies that were not suitable for the sample of this study (Companies with less than three years of age, fewer than five employees, or more than 299).

In this survey, questionnaires were sent and collected through direct visits, mail, faxes, and e-mails. In order to secure the reliability of the data, the survey response was made possible at the highest management level or higher than the middle manager level.

3.2.2 Factor Analysis and Reliability

In this study, the construct validity of these data was reviewed by rotating the varimax of 4 questions for measuring entrepreneurship, five questions for measuring innovation differentiation strategy, four questions for measuring innovation-oriented organizational culture, and three questions for measuring performance evaluation system. As a result, four factors were found. In addition, Cronbach's α to examine the reliability of the data was found to be reliable, including entrepreneurship .868, innovation differentiation strategy .866, innovation-oriented organizational culture .917, and performance evaluation system .919. The results of factor analysis and reliability are presented in Table 1.

Table 1. Factor Analysis and Reliability

Variables	Contents	1	2	3	4	Cronbach's Alpha
Entrepreneurship	CEO is very active in innovating management, technology, and products.	.232	.113	**.769**	.294	.868
	CEO is actively taking risks.	.195	.141	**.728**	.171	
	CEO emphasizes active response to environmental changes.	.225	.195	**.813**	.225	
	CEO actively deals with environmental uncertainty.	.255	.109	**.797**	.142	
Innovation Differentiation Strategy	Degree of new product development	**.774**	.030	.116	.076	.866
	Degree of R&D	**.727**	.227	.239	.117	
	Degree of new municipal development	**.748**	.143	.297	.114	
	Degree of aggressive strategies	**.778**	.092	.160	.259	
	Degree of innovation orientation	**.765**	.072	.170	.228	
Innovative Culture	Our company often undergoes organizational changes due to the demands of customers.	.114	**.882**	.175	-.098	.917
	Our company is an organization that changes quickly in response to the environment.	.116	**.874**	.091	.301	
	The employees of our company influence the decision-making of the	.077	**.847**	.184	.300	

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	company.					
	Our company actively cooperates and cooperates between departments.	.162	**.822**	.105	.216	
Perform Evaluation System	Performance from a long-term perspective has an important influence on my performance evaluation.	.237	.310	.273	**.796**	.916
	Performance from a long-term perspective is not good, and receiving a good performance evaluation is difficult.	.230	.263	.332	**.813**	
	Performance from a long-term perspective occupies a large proportion of the overall performance evaluation.	.284	.136	.274	**.796**	
Eigenvalue		7.291	2.259	1.449	1.083	
Proportion of Variance		45.567	14.119	9.054	6.768	
Cumulative Proportion of Variance		45.567	59.687	68.741	75.509	

Technological innovation was significantly and positively related to firm age, size, R&D, entrepreneurship, innovation differentiation strategy, innovative culture, and performance evaluation system. Below Table 2, it shows the correlation analysis.

Table 2. Correlation Analysis

	Mean	SD	1	2	3	4	5	6	7
1. Firm Age	15.308	9.072							
2. Firm Size	53.500	55.905	.192*						
3. R&D	9.051	10.821	-.122	-.138					
4. Entrepreneurship	3.627	.656	.214**	.191*	-.016				
5. Innovation differentiation Strategy	3.538	.611	.125	.103	.135	.537**			
6. Innovative Culture	3.461	.672	.171*	-.108	-.034	.387**	.333**		
7. Performance Evaluation System	3.653	.672	.176*	.094	-.009	.614**	.535**	.505**	
8. Technological Innovation	5.267	6.794	.164*	.141	.188*	.503**	.541**	.191*	.489**

Notes: *p < .05, **p < .01

3.3 Hypotheses Test

This study aims to analyze the moderating effect of the performance evaluation system on entrepreneurship, innovation differentiation strategy, innovative culture, and technological innovation, and the relationship between them under the control of firm size, age, and R&D. Multicollinearity can occur because the interaction term is included in the moderating effect test. Therefore, in this study, mean centralization was used to solve the multicollinearity problem, and the mean centralization increases the accuracy and stability of the estimate by reducing the standard error. Therefore, regression analysis was performed after centralization, and multicollinearity was diagnosed

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through the tolerance limit and variance inflation factor. As a result of the diagnosis, it was found that the tolerance limit (more than 0.1 of the allowable value) and the variance inflation coefficient (less than 10 of the allowable value) were not at the level of suspicion of multicollinearity.

3.3.1 Relationship between Internal Capabilities and Technological Innovation, and Moderating Effect of Performance Evaluation System

As shown in Table 3, the research model was significant in Model 2, which introduced independent variables such as entrepreneurship, innovation differentiation strategies, and innovative culture ($F=17.754$, $p<.01$), and R^2 also increased significantly compared to Model 1 ($\Delta R^2=.285$, $p<.01$). Entrepreneurship and innovation differentiation strategy was found to have a positive significant relationship with technological innovation, but innovative culture did not have a positive significant relationship with technological innovation.

Model 4 introduced the interaction term between entrepreneurship and performance evaluation system, and the research model was significant ($F=18.398$, $p<.01$), and R^2 also increased significantly compared to Model 3 ($\Delta R^2=.056$, $p<.10$). It was also found that the interaction term between entrepreneurship and performance evaluation system showed a positive and significant relationship with technological innovation.

Model 5 introduced the interaction term between the innovation differentiation strategy and the performance evaluation system, and the research model was significant ($F=17.257$, $p<.01$), and R^2 also increased significantly compared to Model 3 ($\Delta R^2=.040$, $p<.01$). It was also found that the interaction term between the innovation differentiation strategy and the performance evaluation system had a positive and significant relationship with technological innovation. Therefore, the performance evaluation system positively controls the relationship between the innovation differentiation strategy and technological innovation.

Model 6 introduced the interaction term between the innovation-oriented organizational culture and the performance evaluation system, and the research model was significant ($F=14.797$, $p<.01$), but R^2 did not increase significantly compared to Model 3 ($\Delta R^2=.002$). Therefore, it was found that the interaction term between the innovative culture and the performance evaluation system did not have a positive significant relationship with technological innovation.

Table 3. Regression Result

	Dependent Variable: Technological Innovation					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Firm Age	.148	.062	.061	.093	1.171	.066
Firm Size	.199**	.093	.080	.073	.945	.076
R&D	.236**	.165**	.169**	.191**	3.164**	.173**
Entrepreneurship		.298**	.216**	-.1007**	3.291**	.213*
Innovation Differentiation Strategy		.353**	.298**	.302**	-2.454*	.292**
Innovative Culture		-.044	-.110	-.131	-1.769	-.344
Performance Evaluation System			.231	-.970**	-2.670**	.044

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EN * PES				2.193**		
IDS * PES					3.466**	
IC * PES						.372
Regression Result	F=6.753** R^2=.108 Adjusted R^2=.092	F=17.754** R^2=.392 Adjusted R^2=.370 Model 1 ΔR^2=.285**	F=16.873** R^2=.419 Adjusted R^2=.394 Model 2 ΔR^2=.026**	F=18.398** R^2=.475 Adjusted R^2=.449 Model 3 ΔR^2=.056**	F=17.257** R^2=.459 Adjusted R^2=.432 Model 3 ΔR^2=.040**	F=14.797** R^2=.421 Adjusted R^2=.392 Model 3 ΔR^2=.002

Notes: *p < .05, **p < .01

4. CONCLUSION

4.1 Summary and Significance of Research Results

Based on the existing empirical research and innovation theory on the determinants of technological innovation, this study presented research models and related hypotheses on the relationship between entrepreneurship, innovation differentiation strategies, innovative culture and technological innovation, and the moderating effect of the performance evaluation system on these relationships. The presented research hypotheses were empirically identified with 172 SMEs in Daegu.

The results are as follows:

First, entrepreneurship and innovation differentiation strategy was found to have a positive relationship with technological innovation. However, in the case of innovative culture, it was found that there was no positive significant relationship with technological innovation.

Second, in the relationship between entrepreneurship, innovation differentiation strategies, and technological innovation, the performance evaluation system was found to play a positive moderating role, but the interaction effect between the innovative culture and the performance evaluation system was insignificant.

These findings provide the following implications:

In the case of SMEs, the influence of the CEO is great, which can significantly impact the successful innovation process. Existing studies (Elenkov et al., 2005; Liñán et al., 2020) have confirmed that the more adventurous and entrepreneurial the CEO's values, the more active the innovation activities and increases innovation performance. In addition, differentiated strategies bring competitive advantages to companies and achieve high performance, thereby having a positive relationship with technological innovation (Beneito, 2003; Galende & De la Fuente, 2003).

The performance evaluation system positively impacts an organization's innovation activities and performance (Mark & Akhtar, 2003) and is an important factor in the company's innovation performance (Mark & Akhtar, 2003). Existing studies have proven that internal resources such as strategies and entrepreneurship that promote innovation are more positively linked to corporate performance in companies that use the long-term performance evaluation system well (Elenkov et al., 2005; Liñán et al., 2020).

On the other hand, it was found that the relationship between innovation-oriented organizational culture and technological innovation did not have a positive significant relationship, and the interaction effect between the innovative culture and the performance evaluation system was insignificant. These findings indicate that SMEs may be passive in systematically building an innovative culture due to a lack of spare

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resources and are more familiar with tangible and practical resource use than using intangible resources such as culture.

4.2 Limitations and Future Research Directions

Despite these implications, this study has the following limitations. Therefore, future studies should be conducted by supplementing these limitations.

First, foreign studies related to technological innovation analyze the differences in innovation processes by industry and the diversity of innovation patterns by industry. It suggests that a technological innovation support system that responds to the industry's unique technological innovation patterns should be sought. Although it is necessary to understand the innovation patterns by industry, this study did not reflect this. As it is judged that innovation patterns will be different due to differences in demand level and environment by industry, future studies should also conduct research through comparative analysis by industry. Second, technological innovation was measured only by new product development and the number of improvements in existing products. It is necessary to measure various innovation results, such as the number of patent applications, new process developments, and improvements in existing processes. In addition, it will be a more accurate and meaningful study if the quantitative measurement of the number of cases and the added value generated from the launch of new products are considered together. Therefore, future studies should be conducted in the direction of overcoming these limitations.

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REFERENCES

[1] Adams, R., Bessant, J., & Phelps, R. (2006). Innovation management measurement: A review: International Journal of Management Reviews, 8(1), 21-47.
[2] AlQershi, N. (2021). Strategic thinking, strategic planning, strategic innovation and the performance of SMEs: The mediating role of human capital. Management Science Letters, 11(3), 1003-1012.
[3] Azeem, M., Ahmed, M., Haider, S., & Sajjad, M. (2021). Expanding competitive advantage through organizational culture, knowledge sharing and organizational innovation. Technology in Society, 66, 101635.
[4] Barker, V. L., & Mueller, G. C. (2002). CEO characteristics and firm R&D spending. Management Science, 48(6), 782-801.
[5] Becheikh, N., Landry, R., & Amara, N. (2006). Lessons from Innovation Empirical Studies in the Manufacturing Sector: A Systematic Review of the Literature from 1993-2003. Technovation, 26, 644-664.
[6] Bendak, S., Shikhli, A. M., & Abdel-Razek, R. H. (2020). How changing organizational culture can enhance innovation: Development of the innovative culture enhancement framework. Cogent Business & Management, 7(1), 1712125.
[7] Beneito, P. (2003). Choosing among alternative technological strategies: An empirical analysis of formal sources of innovation. Research Policy, 32(4), 693-713.

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[8] Blanchard, K. (2020). Innovation and strategy: Does it make a difference! A linear study of micro & SMEs. International Journal of Innovation Studies, 4(4), 105-115.
[9] Büschgens, T., Bausch, A., & Balkin, D. B. (2013). Organizational culture and innovation: A meta-analytic review. Journal of product innovation management, 30(4), 763-781.
[10] Cosh, A. D., Hughes, A., & Weeks, M. (2000). The relationship between training and employment growth in small and medium-sized enterprises. ESRC Centre for Business Research, University of Cambridge.
[11] Covin, J. G. (1991). Entrepreneurial versus conservative firms: A comparison of strategies and performance. Journal of Management Studies, 28(5), 439-462.
[12] Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. Strategic Management Journal, 10(1), 75-87.
[13] Dai, K., Zhang, Y., Wang, D., Li, J., Lu, H., & Yang, X. (2020). High-performance long-term tracking with meta-updater. In Proceedings of the IEEE/CVF conference on computer vision and pattern recognition (pp. 6298-6307).
[14] Debackere, K., Clarysse, B., & Rappa, M. A. (1996). Dismantling the ivory tower: The influence of networks on innovative output in emerging technologies. Technological Forecasting and Social Change, 53(2), 139-154.
[15] Denison, D. R., & Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. Organization science, 6(2), 204-223.
[16] Didonet, S. R., Fearne, A., & Simmons, G. (2020). Determining the presence of a long-term/short-term dilemma for SMEs when adopting strategic orientation to improve performance. International Small Business Journal, 38(2), 90-110.
[17] Eisenhardt, K. M., & Brown, S. L. (1999). Patching. Restitching business portfolios in dynamic markets. Harvard Business Review, 77(3), 71-82.
[18] Elenkov, D. S., Judge, W., & Wright, P. (2005). Strategic Leadership and Executive Innovation Influence: An International Multi-Cluster Comparative Study. Strategic Management Journal, 26(January), 665-682.
[19] Ernst, H. (2002). Success factors of new product development: A review of the empirical literature. International Journal of Management Reviews, 4(1), 1-40.
[20] Galende, J. (2006). Analysis of technological innovation from business economics and management. Technovation, 26(3), 300-311.
[21] Galende, J., & De la Fuente, J. M. (2003). Internal factors determining a firm's innovative behaviour. Research Policy, 32(5), 715-736.
[22] Griffin, A., & Hauser, J. R. (1996). Integrating R&D and marketing: A review and analysis of the literature. Journal of Product Innovation Management, 13(3), 191-215.
[23] Hall, L. A., & Bagchi-Sen, S. (2002). A study of R&D, innovation, and business performance in the Canadian biotechnology industry. Technovation, 22(4), 231-244.
[24] Hanaysha, J. R., Al-Shaikh, M. E., Joghee, S., & Alzoubi, H. M. (2022). Impact of innovation capabilities on business sustainability in small and medium enterprises. FIIB Business Review, 11(1), 67-78.
[25] Hauser, A., Eggers, F., & Güldenberg, S. (2020). Strategic decision-making in SMEs: effectuation, causation, and the absence of strategy. Small Business Economics, 54, 775-790.
[26] Herbig, P., & Dunphy, S. (1998). Culture and innovation. Cross Cultural Management: An International Journal, 5(4), 13-21.

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ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

[27] Hoffman, K., Parejo, M., Bessant, J., & Perren, L. (1998). Small firms, R&D, technology and innovation in the UK: A literature review. Technovation, 18(1), 39-55.
[28] Huang, C. C., & Huang, S. M. (2020). External and internal capabilities and organizational performance: Does intellectual capital matter?. Asia Pacific Management Review, 25(2), 111-120.
[29] Jung, D. I., Chow, C., & Wu, A. (2003). The role of transformational leadership in enhancing organizational innovation: Hypotheses and some preliminary findings. The Leadership Quarterly, 14(4), 525-544.
[30] Lee, C., Lee, K., & Pennings, J. M. (2001). Internal capabilities, external networks, and performance: A study on technology-based ventures. Strategic Management Journal, 22(6/7), 615-540.
[31] Lin, B. W., & Chen, J. S. (2005). Corporate technology portfolios and R&D performance measures: A study of technology intensive firms. R&D Management, 35(2), 157-170.
[32] Liñán, F., Paul, J., & Fayolle, A. (2020). SMEs and entrepreneurship in the era of globalization: advances and theoretical approaches. Small Business Economics, 55, 695-703.
[33] Majid, A., Yasir, M., Yasir, M., & Yousaf, Z. (2021). Network capability and strategic performance in SMEs: The role of strategic flexibility and organizational ambidexterity. Eurasian Business Review, 11, 587-610.
[34] Mark, S. K. M., & Akhtar, S. (2003). Human resource management practices, strategic orientations, and company performance: a correlation study of publicly listed companies. Journal of American Academy of Business, 2(2) 510-525.
[35] McEvily, S. K., Eisenhardt, K. M. M., & Prescott, J. E. (2004). The global acquisition, leverage, and protection of technological competencies. Strategic Management Journal, 25(8/9), 713-722.
[36] Miller, D. (1988). Relating Porter's business strategies to environment and structure: Analysis and performance implications. Academy of management Journal, 31(2), 280-308.
[37] Mumford, M. D. (2000). Managing creative people: strategies and tactics for innovation. Human Resource Management Review, 10(3), 313-351.
[38] Munandar, A., Maulina, E., Sukoco, I., & Purnomo, M. (2021). Analysis of the Entrepreneurship Orientation to Build the Coffee-to-Go Business during the Covid-19 Outbreak. Review of Integrative Business and Economics Research, 10, 108-116.
[39] Nina, S. M. A., Raharja, S. U. J., Tahir, R., & Purnomo, M. (2022). Effect of Knowledge Management Capabilities and Entrepreneurial Orientation Towards Competitive Advantage: A Study on Small Businesses in Banten Province, Indonesia. Review of Integrative Business and Economics Research, 11, 179-192.
[40] Papulová, Z., Gažová, A., Šlenker, M., & Papula, J. (2021). Performance measurement system: Implementation process in smes. Sustainability, 13(9), 4794.
[41] Rađenović, T., Krstić, B., Janjić, I., & Vujatović, M. J. (2023). The effects of R&D performance on the profitability of highly innovative companies. Strategic Management-International Journal of Strategic Management and Decision Support Systems in Strategic Management, 28(3).
[42] Salim, N., Ab Rahman, M. N., & Abd Wahab, D. (2019). A systematic literature review of internal capabilities for enhancing eco-innovation performance of manufacturing firms. Journal of cleaner production, 209, 1445-1460.

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ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

[43] Senge, P., & Carstedt, G. (2001). Innovating Our Way to the Next Industrial Revolution. MIT Sloan Management Review, 42(2), 24-38.
[44] Shahzad, M., Qu, Y., Zafar, A. U., & Appolloni, A. (2021). Does the interaction between the knowledge management process and sustainable development practices boost corporate green innovation?. Business Strategy and the Environment, 30(8), 4206-4222.
[45] Shefer, D., & Frenkel, A. (2005). R&D, firm size, and innovation: An empirical analysis. Technovation, 25(1), 25-32.
[46] Souitaris, V. (2002). Firm-specific competencies determining technological innovation: A survey in Greece. R&D Management, 32(1), 61-77.
[47] Stock, G. N., Greis, N. P., & Fischer, W. A. (2002). Firm size and dynamic technological innovation. Technovation, 22(9), 537-549.
[48] Suchek, N., Fernandes, C. I., Kraus, S., Filser, M., & Sjögrén, H. (2021). Innovation and the circular economy: A systematic literature review. Business Strategy and the Environment, 30(8), 3686-3702.
[49] Thamhain, H. J. (2003). Managing innovative R&D teams. R&d Management, 33(3), 297-311.
[50] Valdez-Juárez, L. E., & Castillo-Vergara, M. (2021). Technological capabilities, open innovation, and eco-innovation: Dynamic capabilities to increase corporate performance of SMEs. Journal of Open Innovation: Technology, Market, and Complexity, 7(1), 8.
[51] van der Panne, G., van Beers, C., & Kleinknecht, A. (2003). Success and Failure of Innovation: A Literature Review. International Journal of Innovation Management, 7(3), 309-338.
[52] Vrakking, W. J. (1990). The innovative organization. Long Range Planning, 23(2), 94-102.
[53] West, M. A. (1990). The social psychology of innovation in groups. In M. A. West & J. L. Farr (Eds.), Innovation and creativity at work: Psychological and organizational strategies (pp. 309–333). John Wiley & Sons.
[54] Zahra, S. A., Neubaum, D. O., & Huse, M. (2000). Entrepreneurship in Midium-Size Companies: Exploring the Effects of Ownership and Governance Systems. Journal of Management, 26(5), 947-976.

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