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A study on the R&D activities of Korean service companies: Focusing on R&D innovation cooperation for corporate innovation

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Abstract

Currently, Korean society is experiencing a period where cutting-edge technologies and information and communication technologies are applied and converged across various sectors of the economy and society. Technological development is accelerating over time, and consequently, competition in all fields is intensifying. Schumpeter states in the theory of economic development that innovation is central to economic growth, fostering overall economic progress, and that entrepreneurship is essential for innovation. It can be said that companies are the primary agents of innovation. As such, corporate innovation activities play a vital role. In an era where markets change rapidly from moment to moment, it is even more crucial to pursue innovation activities that enable steady growth without eliminating companies. Traditionally, innovation has focused on a company's internal R&D activities, but as the costs associated with external information search decrease, companies' search capabilities improve. Fierce competition and increased technological complexity have led companies to seek innovation sources externally. Successful innovation requires internal R&D activities, but it is also important to effectively utilize external knowledge and technology. Collaboration with external organizations allows partners to combine various complementary external resources. In particular, small and medium-sized enterprises (SMEs), which have relatively fewer resources compared to large companies, can reconsider their innovation performance by expanding their resource base through external cooperation, utilizing technologies already developed by partner organizations. Therefore, this study aims to identify R&D innovation cooperation in the context of corporate innovation within Korean service companies, enhance understanding, and provide implications useful for innovation research.

Keywords: Corporate innovation, Korean service companies, R&D activities, R&D innovation cooperation.

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1. Introduction

In order to adapt to the fiercely competitive environment of modern society, companies seek to secure competitiveness through continuous innovation activities. The primary innovation activity of a company can be considered its R&D activities. Many studies have examined the relationship between corporate R&D activities and corporate growth, and this research continues to be relevant today. First of all, many studies indicate that R&D activities have a positive relationship with corporate growth [1]. However, contrary to the results of these studies, there are studies that show that R&D activities do not have a negative or significant influence on actual corporate growth [2]. It can be observed that these studies focused solely on the relationship between R&D activities and corporate growth.

However, with the recent acceleration of technological change, the convergence and complexity of technology are increasing, and market competition is becoming more intense. Companies are pursuing continuous innovation activities to survive and grow in a rapidly changing environment, but the recent trend of technological change is making it difficult for a company to secure competitiveness through independent innovation activities. In a situation where the competitive environment is shifting from competition between existing companies to competition between networks, [3] innovation through cooperation is becoming the most important innovation strategy for companies. In particular, for SMEs that lack sufficient internal resources, innovation through cooperation with entities possessing various capabilities is a crucial strategy, and collaboration between organizations with different capabilities and resources can significantly enhance innovation performance Nieto and Santamaría [4].

Song and Montoya-Weiss [5] emphasize that there may not be a linear relationship between external cooperation and corporate performance, which means that a third variable must be considered. In other words, even companies with the same level of corporate cooperation can achieve better innovation performance.

Horizontal cooperation is gradually strengthening to acquire advanced or complementary technologies from partners outside the supply chain, such as universities, research institutes, and competitors, as technology convergence and complexification become more active recently [6]. Since companies are pursuing various forms of cooperation, the impact on innovation will differ depending on the type of cooperation. Therefore, analysis is necessary. This allows for the presentation of various implications that can guide companies in making decisions or prioritizing issues they may encounter during innovation activities.

2. Theoretical Background

2.1. Understanding Corporate Innovation

A company can conduct business by continuously providing effective and competitive solutions to its customers to satisfy their needs according to the changing environment in the market. In general, the main goal of innovation for a company is to develop new or improved products for increased profitability. Through these innovations, companies find and provide better solutions to solve and improve their problems, and in particular, they contribute to enhancing the quality of products and services, adjusting prices, thereby increasing customer satisfaction and quality of life. Therefore, innovation can disrupt existing markets, revitalize old markets, or create new markets. Consequently, effective innovation management is crucial for a company to offer better products or services to customers rather than remaining with current solutions (products or services) [7].

Innovation is largely classified into four categories according to the degree of impact [8]. The first is breakthrough innovation, which refers to innovation that discovers or creates solutions that did not exist before. The second is disruptive innovation. Disruptive innovation involves making complex products or services that are difficult for many consumers to access simpler and more affordable, thereby making them accessible to a broader audience. It creates new markets and leads to the growth of enterprises and the overall national economy. Companies that have achieved high growth have often grown through these disruptive innovations. The third is continuous innovation. This aims to improve existing products or services to produce higher quality and more expensive offerings, thereby increasing profitability. Although important, it is less helpful for growth because customer expansion is limited as it replaces the existing market. The fourth is efficient innovation, which increases the efficiency of business operations. This can result in reduced employment. For example, large stores such as Walmart are efficient, but employment has decreased as smaller stores have disappeared. Among these types of innovation, it can be said that creative and disruptive innovations are more essential for the growth of companies and the economy.

In general, innovation in a company involves the adoption of new ideas or actions, and it emerges through the use of new technologies, the adoption of new practices, the production of new products, and the provision of new services [9]. In addition, innovation involves the implementation of new or significantly improved products (or goods and services), processes, marketing methods, or organizational methods in business practices, workplace organizations, or foreign relations [10].

In other words, corporate innovation can be described as an investment activity for a company to continuously and competitively provide comprehensive solutions to solve customer problems.

Corporate innovation is a multidimensional concept. Scholars divide the dimensions of corporate innovation into the subject of innovation, the intensity of innovation, and the innovation model. Depending on the subject of innovation, innovation can be categorized as product innovation, technology innovation, service innovation, strategic innovation, process innovation, organizational innovation, and marketing innovation [11].

The importance of corporate innovation is essential today to meet the needs of the market economy and social development amid rapid economic growth and the evolving direction of development in a fiercely competitive environment. Additionally, it serves as a crucial basis for assessing whether a company can survive in a changing market environment and is vital for enhancing the competitiveness of the business sector. In today's economic landscape and intense competitive

environment, corporate innovation is important because it aligns companies with current trends and societal needs. This is because it provides a key foundation for evaluating a company's ability to survive in the market and is a significant factor in realizing a company's social competitiveness.

2.2. Resource Based View and Innovation Cooperation

The term cooperation is a widely used term not only in everyday life but also in various fields. In general, it is an effort made by several actors to achieve a given goal, which refers to the process of coming together to form psychological relationships through interaction among individuals, organizations, and groups [12]. In general, corporate cooperation is described as the process of forming a partnership in which multiple independent companies or corporate networks closely collaborate while sharing resources, information, and risks to achieve mutual goals [13]. Cooperation can reduce uncertainty by detecting rapid changes and sharing expectations for challenges in innovation and implementation [14]. Cooperation between companies has long been implemented in the processes of production, logistics, and sales of products to enhance the efficiency of activities. The importance of corporate cooperation activities has been increasingly emphasized recently because the competitive advantage and sustainability of innovation for companies are also changing due to rapidly evolving technological changes, uncertainty in the global market environment, shortening product life cycles, and the diversity of knowledge sources.

Resource-based view is a theory that sees the source of a company's competitive advantage as based on internal resources, starting with Penrose [15], embodied through Wernerfelt [16], and systematized through [15]. A similar concept is resource dependence theory, which emphasizes the importance of resources and has conceptual similarities; therefore, both theories are used interchangeably. However, while the resource-based view focuses on the search, acquisition, learning, and reinvention of external resources to secure a company's competitive advantage, resource dependence theory emphasizes the power structure's advantage through control of core internal resources and securing competitive advantage by making others dependent on them. Due to these differences, there is a view that an approach from a resource-based view is useful in explaining cooperation or strategic alliances between organizations [16], and this study is also considered to be appropriate from a resource-based view as a study in terms of innovative cooperation.

From a resource-based view, an important factor is the resources and capabilities of a company. Corporate resources are sometimes used as a concept similar to corporate capabilities, and resources are inputs to the production process, and resources themselves are not productive [17]. It is a concept that encompasses not only resources such as capital, labor, and land used in economics, but also intangible resources and organizational capabilities. Resources can be largely divided into tangible and intangible assets, and tangible assets are machinery, process, capital, and intangible assets are important core resources that can secure a competitive advantage, including technological capital, human capital, reputable capital, organizational capital, knowledge, brand, technical know-how, and commercial contact [18].

Corporate ability is the ability to perform activities that can create specific tasks or values, and resources are the source of corporate ability and corporate ability is the source of competitive advantage [17]. In other words, if a company has superior resources compared to other companies, it can be said that the company has excellent capabilities, and it has a competitive advantage because more performance can be generated through these capabilities. However, not all resources create a competitive advantage, and when those resources are discriminatory resources that other companies do not possess, they create a competitive advantage. This is because competitors must not be able to easily imitate or catch up with the resources and capabilities they possess in order for a company to secure and maintain a competitive advantage.

Barney [15] emphasized the importance of organizational resources and presented heterogeneity and immobility as the characteristics of resources that can give a competitive advantage, and explained that rare or unique, inimitable resources bring a competitive advantage to companies. Das and Teng [19] said that from a resource-based view, companies' choice of alliances is to increase the value of companies by acquiring and utilizing valuable resources held by other companies. Hagedoorn et al. [22] stated that since companies cannot have all resources, it is necessary to acquire and utilize external resources through strategic alliances, and this approach promotes cooperation between companies.

In response to today's rapidly changing business environment, innovation is essentially required in order for companies to secure a competitive advantage, survive as they enter new markets, and further sustainable development is possible. The main success factor for almost all successful companies is continuous growth, and technological innovation is the fundamental driving force behind this growth [20]. Innovation can be created within, outside, and at the organizational boundary, and the main function of innovation is to reproduce it into new knowledge by utilizing existing knowledge inside and outside the organization. Schumpeter [11] suggested that innovation involves the launch of new goods or products, the introduction of new production methods, the development of new markets, and the securing of new sources. He argued that the result of these innovation activities is excess profit. In other words, it is said that through innovation, companies earn more profit than the average profit.

Depending on the target, there are various forms of innovation cooperation among companies. Based on the target of cooperation and the relationship between participants, it can be broadly divided into vertical cooperation and horizontal cooperation. Vertical cooperation involves a supplier or customer within the supply chain, which can achieve innovation performance by increasing the usability and efficiency of existing knowledge. Horizontal cooperation includes competitors, universities, and research institutes. Companies can achieve innovation by expanding the scope of new knowledge through horizontal cooperation, Tsai and Wang [21]. Fritsch and Lukas [22] classified partners into customers, suppliers, competitors, and research institutes, and Tether [6] classified partners into vertical relationships within the supply chain (customers, suppliers) and horizontal relationships outside the supply chain (competitors, universities, government-funded research

institutes, etc.). In addition, Lhuillery and Pfister [23] classified them into parent companies, customers, suppliers, competitors, and research institutes.

The types of innovation cooperation are classified according to the external relationships between participants, but they are carried out in detailed forms depending on the degree of mutual dependence, the content of cooperation, and the purpose of cooperation. Innovation cooperation may have different motives depending on the target and can positively affect innovation performance by providing benefits to participants through cooperation. Universities cooperate with various motives, such as securing research funds or utilizing educational resources necessary for research and development. Public research institutes transfer technology or secure creative research resources, and companies secure and utilize scarce resources.

Research on early innovation cooperation focused on the motivation for cooperation [24], the selection of cooperative partners [25], and the success and failure of cooperation, focusing on the fundamental question of whether innovation cooperation is helpful for a company's competitive advantage and innovation [26]. Since then, empirical studies have been conducted on how various factors affect the overall cooperation process, such as environmental factors related to cooperation [27], structural factors such as contractual and relational governance [28], and relational factors. Recently, the research area has expanded and developed through the combination with other research topics, such as entrepreneurship [29].

3. Research Design

Data from the Korean Innovation Survey (service sector), published by the Science and Technology Policy Institute, were used to investigate the current status of R&D innovation cooperation among Korean service companies. The Korea Innovation Survey aims to collect and provide basic data necessary for related research and policy development by understanding the current status and characteristics of innovation performance and activities of companies operating in Korea's service industry [30].

The 18th Korean Innovation Survey, which began with the 'Technology Innovation Survey' in 1996, was conducted in 2023. It was designated as a national approval statistic by the National Statistical Office in 2003, and the name of the survey was changed to the 'Korean Innovation Survey (KIS)' in 2014. Starting with the latest data in 2023, a comparative analysis was performed using the 2021 survey data.

The 2023 survey population includes 10 or more regular workers, encompassing a total of 66,499 companies within the standard industry classification of 'businesses' engaged in normal business activities from 2020 to 2022. The sampling frame is based on the Statistical Business Register (SBR) maintained by the National Statistical Office as of the end of 2021. To ensure the stability of the time series, explicit stratification variables included the two-digit business code and the number of regular workers. Potential stratification variables maintained the business code, regional code, and the number of regular workers in the middle category. Additionally, a truncated stratification extraction method was employed, dividing companies into the total survey layer for those with 500 or more regular workers and the sample survey layer for companies with fewer than 500 employees. For sample allocation, the Neiman allocation method was used, utilizing the variance of the number of regular workers to improve stability by minimizing changes in sample size across cells according to the design. The sample size was determined to be 4,000 companies, considering task instructions, costs, schedules, and statistical errors. After data collection, weights were calculated, including design weights, non-response correction weights, and post-stratification correction weights, in accordance with the stratification extraction design. Parameters were estimated, and the accuracy of the estimates was enhanced by incorporating parameters such as rest/closure and changes in the size of regular workers, collected during the investigation, into the population model [30].

The 2021 survey population consists of a total of 60,111 service companies with 10 or more regular employees that conducted business activities from 2018 to 2020. The sampling frame is the Statistical Business Register (SBR) of the National Statistical Office as of the end of 2019, and the sample design remains the same as in 2023.

4. Analysis of Research Results

As a result of examining actual cooperation activities with other companies or organizations, rather than simply signing contracts, between 2020 and 2022, 8.7% of companies cooperated in R&D activities. Analyzing activities from 2018 to 2020, it was found that 8.0% of companies cooperated in R&D activities. Table 1 shows the current status of innovation cooperation by legal type.

Table 1.
Status of Innovation Cooperation by Legal Type 2018-2022.

(Unit: %)

Sortation		Collaborated on R&D activities.		Collaborated on innovation activities other than R&D.		Cooperated in general activities other than innovation activities.	
Year		2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022
Total		8.0	8.7	1.4	3.6	5.8	10.0
Type of court	Small enterprise	8.8	10.8	1.5	2.9	5.8	10.0
	Medium enterprise	6.3	6.3	1.1	4.5	6.9	11.4
	Middle market enterprise	3.8	5.2	2.3	4.2	0.7	10.1
	Large enterprise	5.4	5.9	0.0	4.8	1.5	5.3

According to a survey of partner organizations that conducted innovation activities between 2020 and 2022, cooperation with external private companies was the highest at 41.2%, followed by internal companies at 29.2%, universities and higher education institutions at 13.9%, private research institutes at 11.5%, and public (government-funded) research institutes at 8.9%. Additionally, a survey of partner organizations that conducted innovation activities between 2018 and 2020 indicated that external private companies were the most involved at 58.7%. Table 2 shows the current status of innovation cooperation by size.

Table 2.
Status of Innovation Cooperation by Size 2018-2022.

(Unit: %)

Sortation		**Internal companies**		**External private companies**		**External public companies**		**Universities and higher education institutions**	
Year		2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022
Total		37.5	29.2	58.7	41.2	27.7	8.0	12.4	13.9
Type of court	Small enterprise	35.5	13.9	61.2	39.5	25.4	7.0	2.4	14.5
	Medium enterprise	41.8	52.4	49.4	44.3	40.6	9.3	58.4	13.7
	Middle market enterprise	60.9	62.0	59.9	36.5	18.3	4.9	28.5	0.0
	Large enterprise	100.0	82.4	0.0	54.6	0.0	33.5	0.0	21.9
Sortation		Private research institutes		Public (government-funded) research institutes		Government ministries		Non-profit organization	
Year		2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022
Total		4.8	11.5	4.8	8.9	17.5	8.4	2.3	2.9
Type of court	Small enterprise	2.4	9.9	4.2	8.8	20.5	8.6	2.4	0.0
	Medium enterprise	14.1	14.7	7.3	8.5	5.0	8.5	2.0	8.5
	Middle market enterprise	18.3	4.2	10.2	10.1	10.2	0.0	0.0	0.0
	Large enterprise	16.8	21.9	0.0	21.9	0.0	21.9	0.0	4.4

By region, cooperation with external universities and higher education institutions (91.7%) and private companies (82.8%) was high in the metropolitan area, and cooperation with external public companies (56.6%) and government ministries (34.6%) was high in the non-metropolitan area. By region, there was a lot of cooperation with the metropolitan area, but cooperation with public research institutes and government ministries was high in the non-metropolitan area. The contents of this are shown in Table 3.

Table 3.
Status of cooperation by partner and region between 2018-2022.

(Unit: %)

Sortation	No cooperation		Cooperation					
			Domestic				Overseas	
			Metropolitan area		Non-metropolitan area			
Year	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022
Internal companies	62.5	70.8	72.7	65.4	36.2	34.1	0.6	1.0
External private companies	41.3	58.8	81.0	76.0	33.8	26.0	8.1	0.0
External public companies	72.3	92.0	80.7	43.4	55.3	56.6	0.3	0.0
Universities and higher education institutions	87.6	86.1	82.4	91.7	43.9	14.2	0.7	0.0
Private research institutes	95.2	88.5	58.0	82.8	40.2	17.2	1.9	0.0
Public (government-funded) research institutes	95.2	91.1	29.8	77.8	75.0	22.2	0.0	0.0
Government ministries	82.5	91.6	55.1	65.4	64.0	34.6	0.0	0.0
Non-profit organization	97.7	97.1	0.0	100.0	100.0	0.0	0.0	0.0

As a result of a survey on the most useful innovation partners in innovation activities from 2020 to 2022, companies responded that external private companies (46.5%) are the most useful partners, followed by internal companies (27.4%). The usefulness of innovation partners in innovation activities from 2018 to 2020 was highest for external private companies at 43.0%. The usefulness of innovation partners is shown in Figure 1.

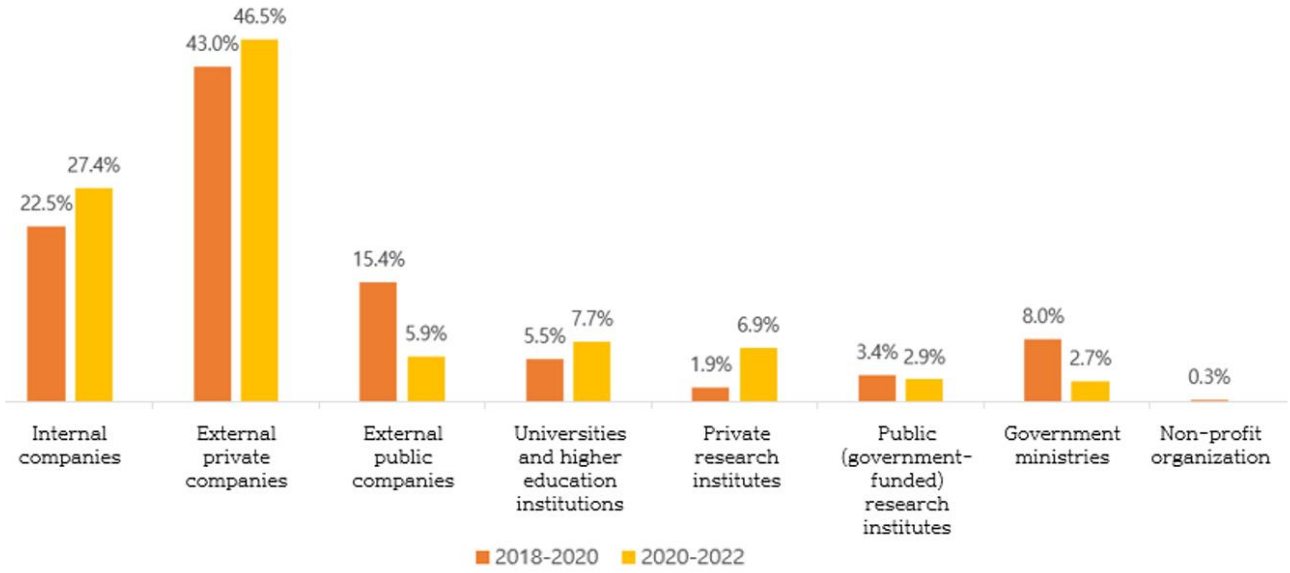

Figure 1.
Usefulness of Innovation Partners in 2018-2022.

As a result of investigating the factors that hindered the successful realization of innovation activities from 2020 to 2022, 60.1% of the respondents said that 'lack of internal funds' hindered innovation activities. As a result of investigating the factors that hindered the successful realization of innovation activities from 2018 to 2020, the lack of internal funds was the highest at 66.4%. Related contents are shown in Table 4.

Table 4.
Factors hindering innovation from 2018-2022 (lack of funds).

(Unit: %)

Sortation		**Lack of internal funds**		**Lack of external funds**		**Difficulty in obtaining government support**		**Excessive cost of innovation**	
Year		2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022
Total		66.4	60.1	46.6	23.8	44.3	23.8	46.6	48.3
Type of court	Small enterprise	68.3	56.3	46.8	19.4	45.2	20.5	46.9	45.4
	Medium enterprise	58.2	69.9	43.4	33.6	39.6	31.6	42.8	55.7
	Middle market enterprise	77.2	65.3	63.5	40.9	60.7	32.3	63.8	53.0
	Large enterprise	81.8	82.0	65.1	55.1	55.2	47.8	71.9	68.5

In terms of corporate competency factors from 2020 to 2022, ‘lack of information on the market’ was the highest at 54.6%, and in terms of corporate competency factors from 2018 to 2020, the lack of excellent manpower was the highest at 57.0%. Related contents are shown in Table 5.

Table 5.
Factors hindering innovation from 2018-2022 (lack of corporate capabilities.

(Unit: %)

Sortation		**Lack of excellent manpower**		**Absence of cooperative partners**		**Difficulty accessing external knowledge**		**Priorities for Innovation**		**Lack of good ideas**		**Lack of information about technology**		**Lack of information on the market**	
Year		2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022
Total		57	54.1	49.2	36.8	50	38.2	50.8	41.2	54.6	44.6	49.1	49.2	55.1	54.6
Type of court	Small enterprise	57.6	51.6	48.7	31.9	49	33.6	50.2	37.1	53.9	38.9	48.2	46	55	51.6
	Medium enterprise	52.3	6.07	47.7	49.1	49.9	50	49.8	51.6	54.6	59.3	49	57.8	53.6	62.6
	Middle market enterprise	76.7	59.1	72.6	48	74.5	48.1	76	42.3	74	50.8	70.7	48.3	70.7	57.4
	Large enterprise	74.5	65.2	72	58.4	71.5	57.3	70.3	72.6	71	76.8	68.8	59.4	69.7	68.4

In terms of market and necessity factors from 2020 to 2022, 'lack of capacity due to excessive market competition' was the biggest obstacle to innovation at 50.4%, and in terms of market demand and necessity factors from 2018 to 2020, 'lack of capacity' was the highest at 61.7%. Related contents are shown in Table 6.

Table 6.
Factors hindering innovation from 2018-2022 (market and lack of need).

(Unit: %)

Sortation		**Uncertainty in market demand**		**Lack of capacity due to excessive market competition.**		**No additional innovation required**		**Lack of innovation demand**		**Low market competition pressure**	
Year		2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022	2018-2020	2020-2022
Total		59.8	45.8	61.7	50.4	52.5	23.6	55.9	43.5	54.4	43.3
Type of court	Small enterprise	59.8	41.9	62.8	48.7	54.6	20.6	57.9	41.4	56.4	42.7
	Medium enterprise	58.3	55.8	57.1	55.1	45.0	31.4	49.0	49.7	47.5	45.7
	Middle market enterprise	71.3	49.1	68.2	49.4	56.3	25.5	55.6	40.4	55.6	38.3
	Large enterprise	74.6	72.3	74.5	61.2	59.7	35.2	62.1	46.5	61.5	42.4

5. Conclusion

In our society today, the development of technology is accelerating, and accordingly, the importance of innovation activities in all fields is being emphasized. In particular, the importance of corporate innovation activities, which can be considered the subject of innovation, has been highlighted in several studies. Additionally, there are studies emphasizing the continuity of innovation activities. Consequently, several scholars have examined the factors affecting the sustainability of corporate innovation activities. However, the research primarily focuses on the influence of corporate activities or internal factors on the sustainability of these activities. This study aims to identify and examine R&D innovation cooperation among the determinants that enable Korean companies to sustain their innovation efforts.

This study utilized data from the Korean Innovation Survey organized by the Science and Technology Policy Institute. First, through theoretical considerations, the understanding of corporate innovation related to R&D activities, the support base perspective, and the concept of innovation cooperation were summarized. Subsequently, the current status of R&D innovation cooperation in Korea's service sector, which is the focus of this study, is summarized. Based on the above, I would like to present the following implications.

First, there are various statistics that can measure the innovation capabilities of domestic companies or industries in terms of national approval statistics, but it is difficult to find statistics that can specifically confirm the innovation cooperation capabilities of each type of court. As a result, it is significant that research has been conducted on R&D innovation cooperation for corporate innovation and that it can be used as basic data for further research in this area. Additionally, this study can contribute to the smooth implementation of various activities, such as decision-making or prioritization of problems that may arise during the process of carrying out innovation cooperation activities.

Second, this study demonstrates that businesses must move away from passively exploring knowledge for successful innovation cooperation and actively utilize a variety of external sources of knowledge. In particular, it is crucial to acquire knowledge that cannot be obtained solely through the company's internal capabilities by engaging in active interaction while seeking various external cooperative partners and actively engaging with those deemed appropriate.

Third, large corporations and mid-sized enterprises can pursue large-scale innovation from a macro perspective, but because small and medium-sized enterprises are difficult to innovate on a large scale in reality, there are fundamental differences in the characteristics of innovation cooperation. Support policies and projects should be planned by reflecting this. In other words, since small and medium-sized enterprises with limited resources make decisions that are directly linked to survival, efforts to select appropriate partners and request cooperation are needed intensively.

Fourth, it will be necessary to accumulate on-site demand and experience and use them to support government policy support regarding the demands of SMEs to continue cooperating with innovation and how to support their innovation cooperation process.

Fifth, it is important to increase the number of cooperative partners, but the efficiency of intensive resource allocation requires selecting a cooperative partner suitable for the company's characteristics. In particular, it is important to be aware that relationships with cooperative partners are likely to lead to success only when mutual trust exists, so that formal cooperation is not always necessary.

Despite these implications, this study has the following limitations and leaves tasks for future research. First, this study utilized data from the Korean Enterprise Innovation Survey organized by the Korea Institute for Science and Technology Policy, but a limitation is that various factors related to innovation cooperation activities were not included in the analysis. To address this, future studies should perform analyses that consider more diverse factors. Additionally, research is needed to compare the commonalities and differences between the service industry and other industries regarding the relationship

between innovation cooperation and management performance, as well as the impact of innovation cooperation activities and technological innovation on management performance.

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