

# The role of External Sources on Innovation Performance: Review from theory to empirical research

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## ABSTRACT

In recent years, firms' innovation activities have been encouraged in many countries, and the topic of innovation performance has been of interest to researchers. Previous studies have confirmed that internal sources have an impact on innovation performance, while external sources have gained increasing popularity and influence on firms' activities. Despite the growing interest in the impact of external sources on innovation performance, most studies have reached conflicting conclusions, with some showing positive effects and others negative effects. Therefore, the question remains as to whether external sources can affect innovation performance. This study aims to clarify the role of external sources on innovation performance by reviewing, analyzing, and synthesizing results from 56 empirical studies conducted worldwide. The findings highlight the theoretical frameworks used in previous studies and the types of external sources, such as external knowledge, R&D, information technology, and spillovers from foreign enterprises, that affect innovation performance. Finally, the study proposes suggestions for future research.

**Key words:** Literature review, External sources, Innovation performance

## INTRODUCTION

Innovation performance plays a crucial role in the growth of firms<sup>1</sup>. In recent years, researchers have shown interest in the topic of innovation performance and confirmed that it is affected by various factors such as innovation activities<sup>1,2</sup>, innovation capacity<sup>3</sup>, knowledge sources<sup>4-6</sup>, lean management<sup>7</sup>, absorptive capacity<sup>8-12</sup>, internal control<sup>13</sup>, organizational ambidexterity<sup>14</sup>, organizational learning ambidexterity<sup>15</sup>, knowledge sharing behavior<sup>16</sup>, and openness<sup>17</sup>. Greco et al.<sup>18</sup> reviewed the relationship between open innovation activities and corporate innovation performance in European countries using data from 61 articles published between 2003-2013. They found that research on the role of external open innovation activities is limited, but that process innovation benefits more from open innovation activities than from internal activities<sup>18</sup>. Raja and Wei<sup>19</sup> conducted a literature review of the relationship between quality practice and innovation performance based on 62 papers. They found a positive relationship between quality practice and corporate innovation performance, but also noted that other factors such as the uncertain business environment, firm size, financial sources, and corporate culture can modify this relationship. Zhao et al.<sup>20</sup> reviewed the impact of open innovation performance and risk management during open innovation activities, using data from 18 ar-

ticles. Muller and Peres<sup>21</sup> explored the impact of social network structure on corporate innovation performance by reviewing 34 papers and found that the social network structure has a positive impact on innovation performance. Salim et al.<sup>22</sup> examined the influence of internal factors on eco-innovation performance through a systematic literature review of 55 articles and found that corporate internal capacity is valuable for management and can enhance innovation performance.

Despite the growing interest in the impact of external sources on innovation performance, previous studies have reached conflicting conclusions, with some showing positive effects and others negative effects. Moreover, the relationship between external sources and innovation performance is U-shaped. Given this significant controversy, a literature review of the relationship between external sources and innovation performance is necessary.

The purpose of this study is threefold: (1) to summarize the research theories used to explain how external sources impacted the innovation performance in previous empirical studies; (2) to examine and classify the types of external sources that affect innovation performance; (3) to suggest areas for future research.

## RESEARCH METHOD

In this study, we reviewed 56 empirical studies from around the world to understand the role of external

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sources on innovation performance. The research used a combination of quantitative and qualitative methods, with 64% of the studies using quantitative research and 8.9% using qualitative research. The articles were published between 2005 and August 2022 and were sourced from prestigious journals such as Elsevier, Emerald, and Taylor & Francis. The studies were conducted in developing and emerging countries, with 36 articles being published in developing countries and 20 in emerging countries. Refer to Table 1 and Figure 1 for details.

## LITERATURE SUMMARY BY THEORETICAL FRAMEWORK

This section presents a compilation of reviewed studies based on the theoretical frameworks used. These theories are grouped as the knowledge-based theory, the resource-based theory, and other theories. Refer to Table 2 for details.

### Resource-based theory

The resource-based theory was proposed by Barney<sup>23</sup>. This theory argues that enterprises are a combination of resources<sup>23,24</sup>. However, this theory emphasizes that not all resources have the potential to bring out the competitive advantage of firms<sup>25</sup>. Penrose<sup>26</sup> is examined as a major contributor to the theoretical background of the resource-based theory<sup>27</sup>. According to the resource-based theory, most studies focus on strategic background, resource presentation, and ability required to reach sustainable competitive advantage and corporate performance<sup>18</sup>. In addition, enterprises with resources that are valuable, rare, inimitable, and non-substitutable can implement value-creating strategies that are not easily replicated by other enterprises<sup>23</sup>. Resources in the context of the resource-based view include human, social, material, organizational, and financial resources<sup>28</sup>. A combination of resources, activities, and routines perform strategies and lead to new action, revenue, and business models for firms. Moreover, invisible resources are factors for successful firms<sup>23,29</sup>. The resource-based theory has been applied in previous empirical studies to investigate the relationship between external sources and innovation performance<sup>5,15,30,31</sup>.

### Knowledge-based theory

Knowledge-based theory was built upon the resource-based theory. According to this theory, enterprises could achieve sustainable competitive advantage compared to their competitors<sup>23</sup>. The

knowledge-based theory gained acceptance among researchers worldwide as a means to study firm behavior. However, this theory was commonly criticized for considering knowledge as a general resource rather than one with special properties<sup>32</sup>. Additionally, the knowledge-based theory of firms considers knowledge as a corporate strategic source<sup>32</sup>.

One of the key contributions made by the knowledge-based theory is the exploration of two sources of knowledge for innovation: internal orientation and external orientation<sup>33</sup>. The knowledge-based theory posits that finding internal and external sources involves different selections. Thus, using internal orientation knowledge of firms does not necessarily prevent them from using external orientation knowledge<sup>34</sup>. Previous studies have highlighted the relationship between knowledge source and innovation performance based on internal and external orientation knowledge<sup>31,33,35,36</sup>.

### Other theories

Several other theoretical frameworks have been utilized to examine the impact of external sources on innovation performance in previous research, including the absorptive capacity theory, the behavioral theory of the firm, knowledge integration theory, the relational view, the theory of organizational learning, and the theory of economic development.

The absorptive capacity theory, proposed by Cohen & Levinthal<sup>37</sup>, define absorptive capacity as the ability of a firm to realize the value of new external information, assimilate it, and apply it to trading targets. This means continuous improvement in the internal knowledge base of a firm, which contributes to the increasing ability of a firm to transfer external information to new products, services, or processes.

The behavioral theory of the firm was proposed by Cyert & March<sup>38</sup>. This theory suggests that enterprises cannot process the amount of external redundant knowledge, which causes a condition of information overload and decreases the ability of enterprises to examine suitable knowledge. Therefore, external sources would be better at solving these problems and improving corporate innovation performance.

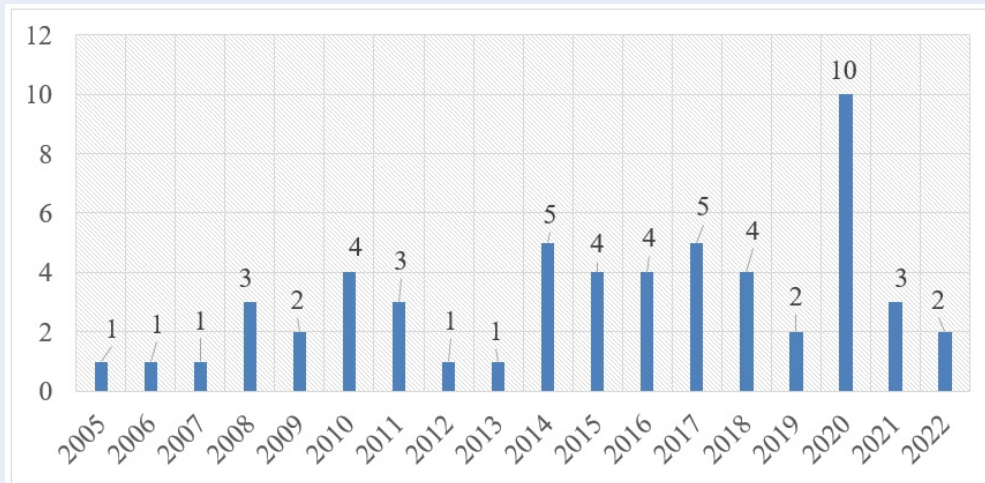
According to the knowledge integration theory, external knowledge integration was defined as an integrated mechanism including the stages of examining, receiving, and using knowledge<sup>39,40</sup>. Integrating external knowledge plays an important role in taking external sources for innovation processes<sup>41</sup>.

The relational view, proposed by Dyer & Singh<sup>42</sup>, provides a framework for the internal determinants

**Table 1: Summary of studies reviewed**

Year	No. Articles	Scope of research		Research Method		
		Developing country	Emerging country	Quantitative research	Qualitative research	Both quantitative research and qualitative research
2005	1	1				1
2006	1	1				1
2007	1	1		1		
2008	3	2	1	1		2
2009	2	1	1	1	1	
2010	4	2	2	3		1
2011	3	2	1	3		
2012	1		1		1	
2013	1	1		1		
2014	5	4	1	4	1	
2015	4	4		2	2	
2016	4	2	2	4		
2017	5	5		2		3
2018	4	3	1	2		2
2019	2	2		2		
2020	10	4	6	8		2
2021	3		3	2		1
2022	2	1	1	2		
Total	56	36	20	38	5	13

Source: Authors' analysis from review results, 2023.



**Figure 1:** Number of published articles during 2005-2022 (Source: Authors' analysis from review results, 2023).

of corporate innovation performance. This theory suggests that important sources of enterprises operate along their frontier and network interaction in these activities<sup>42</sup>. Thus, sticking with the network relationships between staff would influence their behavior, development, and performance<sup>43</sup>.

The theory of organizational learning provide background and content for creating and converting knowledge into innovation<sup>44,45</sup>. Changes in market information collection were used to explain how extending the potential behavior of organizations, including corporate innovation performance<sup>46</sup>.

The theory of economic development, suggested by J. A. Schumpeter<sup>47</sup>, states that corporate innovation plays an important role in changing the environment through events such as introducing new products/services, processes, marketing, or organization. J. Schumpeter<sup>48</sup> argued that the function of innovation is to destroy the obstructions to equilibrium by giving leaders the ability to increase profits.

## LITERATURE SUMMARY BY TYPE OF EXTERNAL SOURCES

This section compiles the reviewed studies by type of external resources used. These external sources are grouped as external knowledge sources, socio-economic sources, and other sources.

### External knowledge sources

External knowledge support enterprises in creating new ideas to add to their knowledge base, which enhances their performance<sup>49</sup>. With constrained financial and human resources for innovation activities, external knowledge could help these enterprises solve these problems<sup>50</sup>. On the other hand, internal knowledge development could be a waste of time, leading to a reduction in competitive advantage for firms<sup>51</sup>. In addition, external knowledge is readily available to enterprises and can be obtained with a minimum cost<sup>52</sup>.

External knowledge is a major source of potential innovation. External knowledge sources are clearly becoming essential for innovative activities by enterprises<sup>53</sup>. External knowledge sources are positively associated with corporate innovation performance<sup>11,17,30,31,35,36,54-80</sup>. The relationship between external sources and corporate innovation performance was an inverted U-shaped relationship<sup>81-86</sup>.

According to market-based information, knowledge is obtained from customers and suppliers, which is a type of external knowledge resource for innovation activities<sup>85</sup>. Duong et al.<sup>86</sup> found that knowledge

usage from customers and suppliers had a positive impact on innovation performance. Similarly, Love & Mansury<sup>87</sup> confirmed that external linkages positively impact innovation performance.

External search depth and breadth are also types of external knowledge sources for corporate innovation performance. With access to a wide knowledge base, enterprises can easily collect new information and potential changes, which improve their ability to discover market opportunities or technology and expand knowledge for innovation activities<sup>53,88</sup>. Therefore, distant enterprises could help them find new market opportunities to join strategic sectors and access new customers<sup>57</sup>. Flor et al.<sup>10</sup> found that the impact of external search breadth and depth on innovation performance can be moderated by potential absorptive capacity. Gölgeci et al.<sup>89</sup> posit that external search depth and breadth have a positive impact on innovation performance.

Table 3 provides a summary of studies using external knowledge as an external source.

### External socio-economic sources

The role of national knowledge resources has been widely discussed in literature reviews relative to national innovation systems<sup>90</sup>. Government and public policies are among types of external sources for innovation activities<sup>91</sup>. Choi & Lim<sup>92</sup> found that external government and public policies positively impact the innovation performance of 212 manufacturing SMEs in Korea. Zeng et al.<sup>93</sup> reported that the linkage with government agencies has an impact on the innovation performance of 137 SMEs in China.

External information technology capabilities are considered external sources for firms. Information technology capabilities support knowledge integration by examining external knowledge, including exploration, finding, storage, and dissemination<sup>39</sup>. Gomes & Kruglianskas<sup>94</sup> reported that technological information has a positive impact on innovation performance. Frishammar & Åke Hörte<sup>95</sup> found that the management of external information has a positive effect on corporate innovation performance. S. Wu et al.<sup>96</sup> studied the effect of information technology capability on open innovation performance. S. M. Wu & Ding<sup>97</sup> found that external information technology capability positively affects the open innovation performance of 232 SMEs.

Spillovers from foreign direct investment were also considered external sources. The viewpoint of spillovers suggests that local enterprises could benefit from foreign direct investment experiences to improve their innovation activities<sup>98,99</sup>. Jiang et al.<sup>100</sup>

**Table 2: Summary of studies following the theoretical framework**

Theoretical framework		Author(s)
Resource-based theory		Barney <sup>23</sup>
Knowledge-based theory		Grant <sup>32</sup>
Other theories	The absorptive capacity theory	Cohen & Levinthal <sup>37</sup>
	The behavioral theory of the firm	Cyert & March <sup>38</sup>
	Knowledge integration theory	Kraaijenbrink et al. <sup>39</sup>
	The relational view	Dyer & Singh <sup>42</sup>
	Theory of organizational learning	Argyris & Schön <sup>44</sup> , Sinkula et al. <sup>45</sup>
Theory of economic development		J. A. Schumpeter <sup>46</sup>

Source: Review results, 2023.

**Table 3: Summary of studies using external knowledge as an external source.**

Type of external knowledge	Studies using external knowledge as an external source	External sources affect corporate innovation performance
External knowledge	Alvarez & Iske <sup>35</sup> , Arant et al. <sup>77</sup> , Batterink <sup>78</sup> , Beck & Schenker-Wicki <sup>79</sup> , Berchicci et al. <sup>80</sup> , Broekel & Boschma <sup>54</sup> , Cabrilo et al. <sup>55</sup> , Chen et al. <sup>56</sup> , Chiang & Hung <sup>57</sup> , Crescenzi & Gagliardi <sup>58</sup> , Farrukh et al. <sup>59</sup> , Ferraris et al. <sup>60</sup> , Frenz & Ietto-Gillies <sup>61</sup> , Gimenez-Fernandez et al. <sup>62</sup> , Gu et al. <sup>36</sup> , Hameed et al. <sup>30</sup> , Hwang & Lee <sup>63</sup> , Jordan & O’Leary <sup>64</sup> , Kang & Kang <sup>65</sup> , Kashosi et al. <sup>11</sup> , Kesidou & Snijders <sup>66</sup> , Medase & Abdul-Basit <sup>67</sup> , O’Connor et al. <sup>68</sup> , Ritala et al. <sup>69</sup> , Sofka & Grimpe <sup>70</sup> , Svetina & Prodan <sup>31</sup> , Torres de Oliveira et al. <sup>71</sup> , Trantopoulos et al. <sup>72</sup> , Vahter et al. <sup>73</sup> , Van Beers & Zand <sup>74</sup> , Wang et al. <sup>17</sup> , Wubben et al. <sup>75</sup> , Zouaghi et al. <sup>76</sup>	Positive
	Berchicci <sup>81</sup> , Laursen & Salter <sup>83</sup> , Ye et al. <sup>84</sup>	an inverted U-shape
Knowledge usage from customers and suppliers	Duong et al. <sup>86</sup> , Love & Mansury <sup>87</sup>	Positive
External search depth and breadth	Flor et al. <sup>10</sup> , Gölgeci et al. <sup>89</sup>	Positive

Source: Review results, 2023.

**Table 4: Summary of studies using external socio-economic as an external source**

Type of external socio-economic	Studies using external knowledge as an external source	External sources affect corporate innovation performance
Government and public policies	Choi & Lim <sup>92</sup> , Zeng et al. <sup>93</sup>	Positive
External information technology capabilities	Gomes & Kruglianskas <sup>94</sup> , Frishammar & Åke Hörte <sup>95</sup> , S. Wu et al. <sup>96</sup> , S. M. Wu & Ding <sup>97</sup>	Positive
Spillovers from foreign direct investment	Jiang et al. <sup>100</sup>	Positive

Source: Review results, 2023.

showed that spillovers from foreign direct investment and external R&D had a positive impact on innovation performance. Refer to Table 4 for details.

### Other external sources

In addition to external knowledge and external socio-economic sources, several other external sources can determine corporate innovation performance, as discussed in some of the reviewed studies.

External R&D activities are an important external source for corporate innovation performance<sup>101</sup>. Innovation performance can emerge from external knowledge sources, such as R&D activities, due to reduced cost and time<sup>102</sup>. Muñoz-Bullón et al.<sup>103</sup> found that external R&D activities have a positive impact on innovation performance. Gkypali et al.<sup>104</sup> found that a diverse range of external collaborations negatively impacts innovation performance through its effect on internal R&D. Inauen & Schenker-Wicki<sup>105</sup> investigated the impact of an outside-in approach to R&D management on innovation performance.

The benefits of using external network utilization for the corporate innovation process can be clearly understood in the context of the learning organization<sup>106</sup>. Thus, external network utilization is also considered a type of external source for corporate innovation performance. Keil et al.<sup>107</sup> found that external business development activities positively impact innovation performance of the 110 largest companies listed on US stock exchanges. Baker et al.<sup>106</sup> reported on the role of external network utilization on innovation performance in 1978 US enterprises.

Another external source related to studies is the level of openness<sup>15</sup>. The level of openness can clearly reflect the awareness distance for innovation activities<sup>108</sup>. Openness plays a crucial role in the combination of available knowledge and new knowledge<sup>109</sup>. Refer to Table 5 for a summary of other external resources.

## CONCLUSIONS AND DISCUSSIONS

This study aims to review the literature on the relationship between external sources and innovation performance. The findings show that previous studies have utilized theoretical frameworks such as the knowledge-based theory, the resource-based theory, and other theories. Moreover, the results classify the types of external sources are grouped as external knowledge sources, socio-economic sources, and other sources.

Previous research has generally found that external sources have a positive impact on corporate innovation performance. This is due to a few reasons. Firstly, external sources can reduce the cost of searching for innovative activities<sup>52</sup>. For example, external knowledge is easily accessible, helping companies quickly understand how to solve problems<sup>50</sup>. As a result, the external knowledge improves their competitiveness and innovation performance<sup>51</sup>. Secondly, external sources can increase a company's potential for growth. For instance, small enterprises may not have enough internal sources to perform R&D activities, so external R&D activities can help improve their services or products<sup>102</sup>. Finally, external sources can have a strong impact on a firm's innovation performance through spillover effects<sup>100</sup>. For example, an increase in foreign direct investment and foreign enterprises can bring new technologies and processes into the domestic market, providing local firms with more opportunities to learn and innovate.

On the other hand, diversity in external collaborations can negatively impact corporate innovation performance through its effects on internal R&D<sup>104</sup>. This is due to three major reasons. Firstly, excessive dependence on external sources can increase costs and reduce profit and innovation performance. Secondly, relying on external sources can lead to communication and control risks. For instance, the use of external sales programs can expose a company's customer database to competitors. Lastly, diverting resources towards external sources can reduce internal innovation activities and demotivate employees, leading to negative long-term impacts on corporate innovation performance<sup>104</sup>.

Previous research argues that external sources can have both positive and negative impacts on corporate innovation performance, indicating a non-linear relationship between external sources and innovation performance. This is consistent with the findings of Berchicci<sup>81</sup>, Laursen & Salter<sup>83</sup>, Ye et al.<sup>84</sup>, who found a U-shaped relationship between external knowledge and corporate innovation performance, with optimal use of external sources leading to improved innovation performance.

Understanding these types of external sources is crucial in determining innovation performance in different contexts. The results of this study can be useful for managers when making decisions. The authors suggest that future research should focus on different types of external sources such as external information technology capability, spillover from foreign businesses, or a combination of them.

**Table 5: Summary of other external sources used as an external source**

Other external sources	Studies using external knowledge as an external source	External sources affect corporate innovation performance
External R&D activities	Muñoz-Bullón et al. <sup>103</sup> , Inauen & Schenker-Wicki <sup>105</sup>	Positive
	Gkypali et al. <sup>104</sup>	Negative
External network utilization	Keil et al. <sup>107</sup> , Baker et al. <sup>106</sup>	Positive
Level of openness	Dahlander & Gann <sup>108</sup> , Nooteboom et al. <sup>109</sup>	Positive

Source: Review results, 2023.

This study clearly examined the role of external sources on corporate innovation performance through a systematic literature review of 56 articles. But also there are three major limitations to this study. Firstly, the number of articles reviewed is relatively low (less than 70 articles), although other literature reviews on the same topic have also used a similar number of articles. Secondly, the study does not clarify different findings in various economic conditions and cultures. Finally, the role of moderating variables on corporate innovation performance is not addressed in this study.

### DIRECTIONS FOR RESEARCH FUTURE

In terms of theory, previous researchers have applied various theoretical frameworks to explain the impact of external sources on corporate innovation performance. Existing literature on the role of external innovation sources primarily views them as a supplement to corporate internal knowledge<sup>83,110</sup>. However, studies that combine theories to investigate the support provided by external sources for internal sources and their impact on innovation performance are scarce. Thus, future studies can analyze this relationship and provide new interpretations of the theory.

In terms of research methods, future studies should employ a combination of quantitative and qualitative research to better understand the role of specific external sources on firms' innovation performance in different cultural contexts.

In the context of emerging countries, the information technology capability level is rapidly growing and affecting the business environment. Furthermore, firms' external information technology capability helps to reduce costs and support sales and technology. Previous empirical research has shown that information technology capability plays an important

role in business growth, but studies exploring the relationship between information technology capability and corporate innovation performance are limited. Thus, future studies should aim to clarify the impact of external information technology capability on firms' innovation performance in emerging countries, such as Vietnam, where the Internet is widely used.

In terms of research subjects, previous empirical studies have focused on either SMEs or large enterprises. Hence, future studies should examine the influence of external sources on corporate innovation performance differently for small and large enterprises.

### LIST OF ABBREVIATIONS

R&D: Research and Development  
SMEs: Small and Medium Enterprises

### CONFLICT OF INTEREST

The authors hereby declare that there is no conflict of interest in the publication of this article.

### AUTHORS CONTRIBUTION

All authors contributed equally to the manuscript.

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# Vai trò của nguồn bên ngoài đối với thành quả đổi mới: Đánh giá từ lý thuyết đến nghiên cứu thực nghiệm

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## TÓM TẮT

Trong những năm gần đây, hoạt động đổi mới của doanh nghiệp được khuyến khích ở nhiều quốc gia và chủ đề về thành quả đổi mới đã được nhiều nhà nghiên cứu quan tâm. Các nghiên cứu trước đây đã xác nhận rằng các nguồn nội bộ ảnh hưởng đến thành quả đổi mới, trong khi các nguồn bên ngoài ngày càng phổ biến và ảnh hưởng đến các hoạt động của doanh nghiệp. Mặc dù ngày càng có nhiều mối quan tâm về tác động của các nguồn bên ngoài đối với thành quả đổi mới, nhưng hầu hết các nghiên cứu đưa ra những kết luận trái ngược nhau, trong đó một số cho thấy tác động cùng chiều và những nghiên cứu khác cho thấy tác động ngược chiều. Do đó, câu hỏi đặt ra là liệu các nguồn bên ngoài có thể tác động đến thành quả đổi mới hay không. Nghiên cứu này nhằm mục đích làm rõ vai trò của các nguồn bên ngoài đối với thành quả đổi mới bằng cách xem xét, phân tích và tổng hợp kết quả từ 56 nghiên cứu thực nghiệm trên toàn thế giới. Các phát hiện nêu bật các khung lý thuyết được sử dụng trong các nghiên cứu trước đây và các loại nguồn bên ngoài, chẳng hạn như kiến thức bên ngoài, R&D, công nghệ thông tin và tác động lan tỏa từ các doanh nghiệp nước ngoài, có ảnh hưởng đến thành quả đổi mới. Cuối cùng, nghiên cứu đề xuất một số gợi ý cho các nghiên cứu trong tương lai.

**Từ khóa:** Tổng quan tài liệu, nguồn bên ngoài, thành quả đổi mới

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