

5-2018

Research on Relationship between Knowledge Diffusion Rate and Enterprise Knowledge Search Breadth

Liu Junwen

Guangxi University, 1525557475@qq.com

Wei Tie

Guangxi University, weitie@gxu.edu.cn

Han Zeming

Guangxi University, 395265136@qq.com

Follow this and additional works at: <http://aisel.aisnet.org/confirm2018>

Recommended Citation

Junwen, Liu; Tie, Wei; and Zeming, Han, "Research on Relationship between Knowledge Diffusion Rate and Enterprise Knowledge Search Breadth" (2018). *CONF-IRM 2018 Proceedings*. 23.

<http://aisel.aisnet.org/confirm2018/23>

This material is brought to you by the International Conference on Information Resources Management (CONF-IRM) at AIS Electronic Library (AISEL). It has been accepted for inclusion in CONF-IRM 2018 Proceedings by an authorized administrator of AIS Electronic Library (AISEL). For more information, please contact elibrary@aisnet.org.

RESEARCH ON RELATIONSHIP BETWEEN KNOWLEDGE DIFFUSION RATE AND ENTERPRISE KNOWLEDGE SEARCH BREADTH

Liu Junwen
Guangxi University
1525557475@qq.com

Han Zeming
Guangxi University
395265136@qq.com

Wei Tie
Guangxi University
weitie@gxu.edu.cn

Abstract:

From the perspective of patent, this paper constructs a theoretical model between knowledge diffusion rate and enterprise knowledge search breadth, and probes into the relationship between them. At the same time, this paper explores the adjustment functions of these variables including the technical difficulties and the market expectation. Through the analysis of the patent data, we came to the follow conclusions: the diffusion rate of knowledge has a positive effect on the breadth of enterprise knowledge search. The difficulty of technology and the degree of decentralization of innovation sources positively modulate this promotion effect. The market expects this role to be negatively regulated.

Key words:

knowledge diffusion rate, knowledge search breadth, the degree of diversification of innovation source

1 INTRODUCTION

Knowledge search refers to the process of finding new technologies and knowledge beyond the boundaries of organizations and technologies (L Rosenkopf, A Nerkar, 2001). With the rise of open innovation, more and more businesses choose to use knowledge search to seek ideas outside the enterprise or outside the enterprise rather than internal research (Lei et al, 2011). At present, researchers mostly study the impact of knowledge search on the innovation performance of enterprises from two aspects of knowledge search width and knowledge search depth (K Laursen, A Salter, 2006; Yang, 2014; Ruan et al, 2015).

Some scholars also studied the antecedents of knowledge search. According to Wu et al. (2008), understanding that organizational resources, external knowledge richness,

search experience and knowledge search are positively related(Wu et al,2008).Shalini Rogbeer et al. (2014) conducted an empirical study of biotechnology industry data.The study found that international diversity and knowledge search width are positively U-shaped relationship, technological diversity has no significant effect on the width of knowledge search, and cooperation diversity negatively affects knowledge search width(Shalini Rogbeer et al,2014).Liang focused on the antecedents analysis of knowledge search in biopharmaceutical enterprises.The study found that the absorption of redundant resources plays a positive role in promoting the degree of remote knowledge search, and technology accumulation will positively regulate the role of redundant resources absorbed in remote knowledge search. technology exclusive negative adjustment has absorbed redundant resources The role of remote knowledge search(Liang,2015).

However, most of these researches on antecedents are about the construction of affiliate networks, the influence of the network relations among alliance partners on the strength of knowledge search, or the knowledge search strategy of enterprises in a particular industry(Wu et al,2008;Shalini Rogbeer et al,2014).Rarely do we pay attention to the relationship between knowledge diffusion and breadth of knowledge search. The updating and iterative process of knowledge make the knowledge overflow and gradually spread to the outside world. With the passage of time, will knowledge diffusion rate affect the width of knowledge search? This paper will proceed from this point of view, study the diffusion rate of knowledge on the width of knowledge search function of enterprises, while studying enterprise technical difficulty and corporate market expectation the impact of this relationship.

2 Theory and Hypotheses

2.1 The rate of knowledge diffusion on the width of knowledge search function

Knowledge diffusion is the link between enterprises in innovation and cooperation,it provide a method for enterprises to integrate innovative resources (Liu et al,2015).Knowledge diffusion rate is an important way to measure knowledge diffusion.Enterprises in the process of searching for external source of innovation always expect to search for more valuable patents to the company, and the cost of knowledge search in knowledge search should be less than the value of knowledge search for the enterprise in this case.According to the theory of diffusion of potential energy, knowledge diffusion can be understood as the process of knowledge spillover from other providers to other individuals(Ba et al 2016).The higher the speed of knowledge search, the greater the potential energy of knowledge spillover, the lower the cost of knowledge search, so enterprises can search for more valuable knowledge with less cost.Therefore, enterprises in order to search for as much as more valuable knowledge should increase the knowledge search width (with more high knowledge provider docking).

Based on this, we put forward hypothesis:

H1: The rate of knowledge diffusion can promote the width of knowledge search.

2.2 Enterprise technical difficulty of the regulatory role

Technical difficulty refers to the difficulty of the technical characteristics encountered by enterprises in these problems. Too much difficulty about technology will make the enterprise get more knowledge from the outside of the enterprise, so that the enterprise needs to seek knowledge from outside and then integrate the knowledge (J Lowe, P Taylor, 2010). When the main business of a company involves much more difficult technology, because of the high technology complexity and the uncertainty of technology, the knowledge points designed are extensive. Enterprises should increase the breadth of knowledge search and integrate and utilize the knowledge.

Based on this, we put forward hypothesis:

H2: Technical difficulty positively regulates the knowledge diffusion rate to promote the width of enterprise knowledge search.

2.3 Market expectations of the regulatory role

The market is expected to represent the enterprise's expectation of the future market development, the market environment and the vitality of the enterprise, indicating the degree of recognition of the enterprise to the market situation. According to the different expectations of the market, the strategy of knowledge search will have different effects. There are different views on the relationship between market expectations and knowledge search in the academic field. One view is that market expectations have a positive impact on the breadth of knowledge search. For example, Laursen and Salter firms with high market expectation will encourage enterprises to innovate due to the future market prospect, so as to increase the degree of knowledge search (K Laursen., A Salter, 2006). On the contrary, Wu (2008) argues that enterprise knowledge search strategy adjustment according to market expectations. When the market is expected to better, the enterprise market will clearly understand a specific knowledge, which will repeat the search for this type of knowledge (Wu et al, 2008). On the basis of previous studies, we believe that when market expectations are better, the sensitivity and interest of enterprises to external knowledge diffusion are reduced, and the positive effect of knowledge diffusion on knowledge search width is suppressed.

Based on this, we put forward hypothesis:

H3: the market expectation is negative to regulate enterprise knowledge search width to promote knowledge diffusion rate.

2.4 Model Building

Based on the above hypotheses, this paper constructs the theoretical model shown in Figure 1 below.

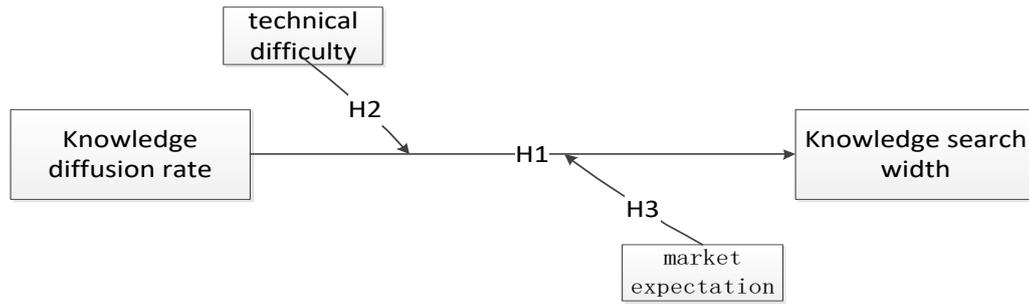


Figure 1 Theoretical model

3 Research Design

3.1 Data Source

The data in this paper is mainly derived from the patent data in China's SOOPAT database. Only the patent data of China's related companies from July 2016 to June 2017 are selected for the time selection. In the selection of enterprises, selected innovative companies, including communications equipment manufacturing, construction, service, bio-pharmaceutical, and automobile manufacturing industries, have different scales to conduct research.

In addition, some of our indicators are statistically calculated based on the 2016 China Statistical Yearbook. In the statistical calculation, we reject the data of less than 10 pieces of the patent monthly application, which avoids the interference of the data too small on the result.

3.2 Variable Definition

(1) Dependent Variable

Knowledge search width: This variable is based on the number of IPC large groups involved in a patent application for a month on SOOPAT, and then logarithm of the value (Alan.L.Poter et al,2012)

(2) Independent Variables

Knowledge diffusion rate: $V_n = A_n / A_{(n-1)} - 1$

In this formula, A_n indicates the total number of patents disclosed on the patent website up to time n.

A_{n-1} indicates the total number of patents published on the patent website as of time n-1.

(3) Adjust The Variable

Technical Difficulty: We define the technical difficulty of high-tech companies to 1; the technical difficulty of non-high-tech companies to 0.

Market expectation: We calculate the growth rate of corporate profits in all companies

in the past three years. The average annual growth rate of enterprises in the last three years is higher than the industry average. The market expects the market to be in good condition. The market expects a value of 1; The value is 0.

(4) Control Variables

We take the factors such as enterprise property right, enterprise age, R & D intensity and business status as control variables, because these factors may have an impact on enterprise knowledge search intensity from previous studies(Wu et al,2008).At the time of quantification, when the enterprise is a state-owned enterprise, the enterprise property value is 1, and in other cases, the value is 0.; the enterprise age is determined according to the natural logarithm of the enterprise from the year of establishment to the year 2017; the research and development intensity takes the research and development investment as the sales amount ratio; business status is measured according to the logarithm of the company's annual business income in 2016(Wu et al,2015;Luo,2011).

4 Hypothesis Testing And Analysis

Table 1 shows the average value, standard deviation and correlation coefficients of the variables.It also shows the results of multivariate regression analysis of enterprise knowledge search width.Model 1 is a multiple regression model that controls the search width of firm knowledge.Model 2 is a multiple regression model that increases knowledge search width of the knowledge diffusion rate based on model 1.Models 3 and 5 are the regression models after adding corresponding adjustment variables on the basis of model 2.Models 4 and 6 are regression models that contain control variables, independent variables, manipulated variables, and interaction terms.

	total	Average	Standard deviation	Model1	Model 2	Model 3	Model 4	Model 5	Model 6
Control Variables									
Enterprise Property Rights	150	0.71	0.46	-0.419*	-0.417*	-0.277	-0.282	-0.633**	-0.638**
Business Age	150	3.23	0.55	0.330*	0.329*	0.542**	0.544**	0.356**	0.361**
R & D Intensity	150	0.40	0.44	0.656**	0.661**	0.423 ⁺	0.421*	0.221	0.216
Business Conditions	150	7.77	1.28	0.564**	0.565**	0.576**	0.579**	0.537**	0.537**
Argument									
Knowledge Diffusion Rate	150	1.49	0.35		0.106**	0.111**	0.165*	0.135**	-0.049
Moderator									
Technical Difficulty	150	0.71	0.46			0.746**	0.150		
Market Expectation	150	0.60	0.49					0.895**	0.416
Interactive Item									
Technical Difficulty * Knowledge Diffusion Rate								0.399*	

several angles including characteristics of this technology, the scale and market of enterprises, enterprises in different confirmed the characteristics of the case, the relationship between knowledge diffusion rate and knowledge search width are different.

5.2 Management Inspiration

The paper provides the direction for the enterprise to search for knowledge and find the source of innovation. First, the search strategy should be based on the company's own conditions. According to the company's technicality, companies with greater technical difficulty need to increase the breadth of knowledge search.;Second, the strategy of knowledge search should be a dynamic process that requires constant adjustment. Enterprises should analyze the current market knowledge diffusion rate, and adjust the width of knowledge search according to the rate of knowledge diffusion; Third, enterprises should, based on their own business conditions, conduct business search for knowledge in the main innovations of main products when market prospects are good in recent years. In this case, the width of knowledge search should be reduced; and in recent years, unstable or declining operating conditions, the market outlook is not good, you need to expand the knowledge search width, to seek innovation, combined with the search for innovative research and development of more competitive products to market.

5.3 The Limitations Of Future Research

Our research still has some limitations. In our research, the indicators used in measuring knowledge search and knowledge diffusion are too single, and only the relationship between knowledge search width and knowledge diffusion rate is studied. Further research can study the relationship between knowledge search depth and knowledge diffusion rate. In addition, our research is to use the patented data for empirical analysis, the next step can also use additional data for further hypothesis testing to verify the stability of the results.

Acknowledgement

Project supported by National Natural Science Foundation of China (No.71562001).

References

- L. Rosenkopf, A Nerkar (2001).Beyond local research: boundary-spanning, exploration, and impact in the optical disk industry[J].Strategic Management Journal,22(4):287-306.
- Lei,Z. Z&Lei, Y.S(2011).Review of the progress of foreign knowledge search theory research [J]. Library and Information Service.
- K Laursen, A Salter(2006). Open for innovation: The role of openness in explaining innovation performance among UK manufacturing firms[J]. Strategic Management Journal,27(2):131-150.
- Yang,Y.W(2014),Network Embeddedness, Knowledge Search and Innovation Performance [D]. Guangzhou: South China University of Technology.

- Wu,X.B, Peng,X.M and Ding,S.Q(2008),Factors influencing the search strategy of external knowledge sources in Chinese enterprises [J]. Science of Science, 26 (2): 364-372.
- Rogbeer S, Almahendra R, Ambos B(2014). Open-Innovation Effectiveness: When does the Macro Design of Alliance Portfolios Matter?[J]. Journal of International Management, 20(4):464-477.
- Liu,G.W & Yang,Z.Y(2015),Research on the Impact of Regional Industry-Academia Cooperation Innovation Network Structure on Knowledge Spread - Based on the Patent Data of Electronic Information from 2000 to 2013 in Guangxi [J] .Science & Technology Progress and Policy,32 (23): 36-42.
- Ba,Z.C,Li,G and Zhu,S.W(2016),Research on Knowledge Diffusion Mechanism of Scientific Research Cooperation Network [J]. Chinese Library Science, 42 (5): 68-84.
- Lowe J, Taylor P.(2010) R&D and technology purchase through licence agreements: complementary strategies and complementary assets[J]. R & D Management, 28(4):263-278.
- Wu,H. & Chen,J(2015).Enterprise External Knowledge Search and Innovation Performance: A New Theoretical Framework [J]. Science of Science and Management of Science and Technology, 36 (4): 143-151.
- Luo,F(2011)..Study on Influencing Factors of External Knowledge Search Strategy [D] .Hangzhou: Zhejiang University.
- Alan L. Porter, Scott W. Cunningham(2012),Technology Mining and Patent Analysis [M]. Qinghua University Press.
- Yue,Z.H,Xu,H.Y&Fang,S(2015),Research on Knowledge Diffusion Modeling of Scientific Research Cooperation Network Based on Individual Behavior[J].Journal of Information,2015,34(08):819-832.