



*Studies in Science of Science*  
ISSN 1003-2053, CN 11-1805/G3

---

DOI 10.16192/j.cnki.1003-2053.20230913.001

2023-06-29

2023-09-15

[J/OL]

<https://doi.org/10.16192/j.cnki.1003-2053.20230913.001>









[1]

[2]

[3-8]

[5-7, 9-11]

[5-7, 9]

[10, 11]

[12]

[13-15]

[16]

[17, 18]

[19]

[20,21]

[22]

[23]

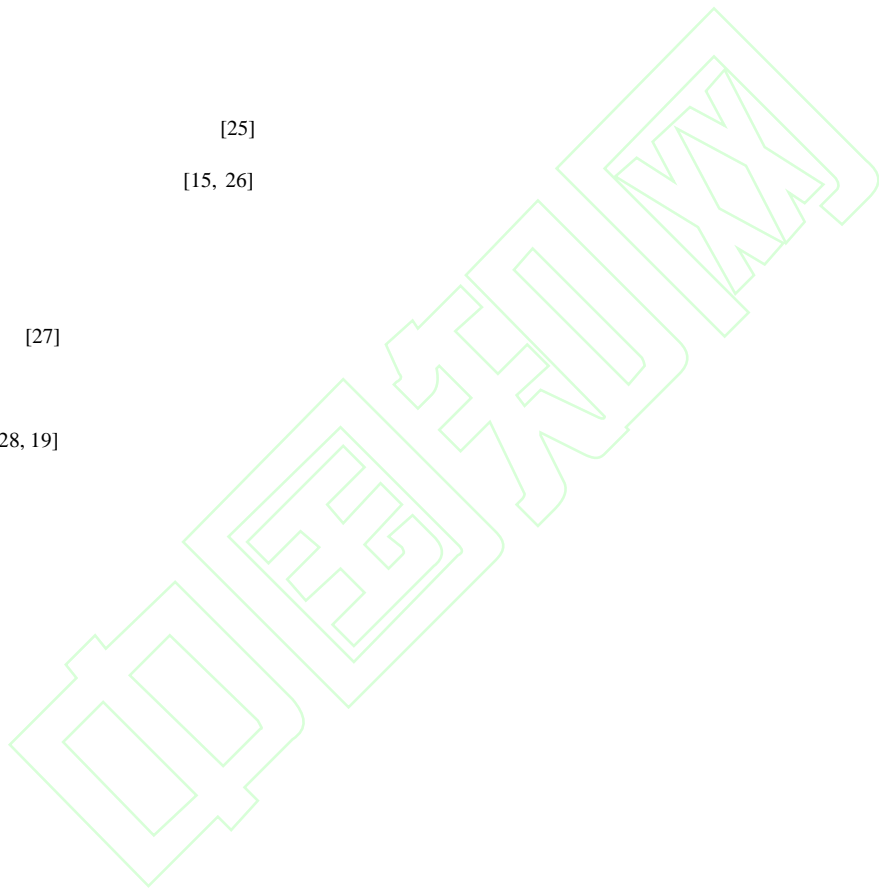
[24]

[25]

[15, 26]

[27]

[28, 19]



---

---

$$d_i^{in} = \sum_{j \neq i} x_{j,i}(e_{j,i} \in Ed)$$

$$s_i^{in} = \sum_{j \neq i} w_{j,i}(e_{j,i} \in Ed)$$

$$d_i^{out} = \sum_{j \neq i} x_{i,j}(e_{i,j} \in Ed)$$

$$s_i^{out} = \sum_{j \neq i} w_{i,j}(e_{i,j} \in Ed)$$

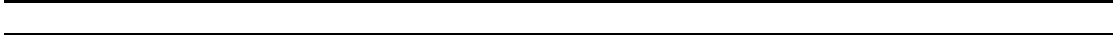
$$b_i = \sum_{j, g \neq i} \frac{n_{j,g}(i)}{n_{j,g}}, n_{j,g}$$

$$\begin{matrix} j & g & n_{j,g}(i) \\ j & g & i \end{matrix}$$

---

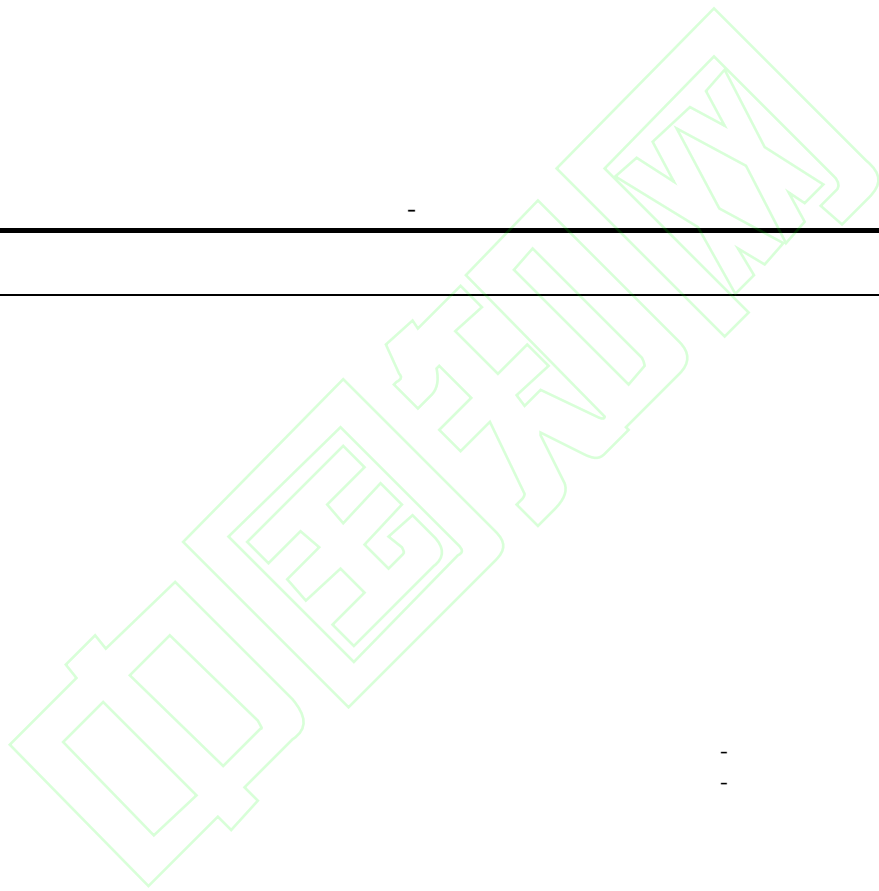
中国知网





中国知网







---

---

-	-
-	-

---

中国知网

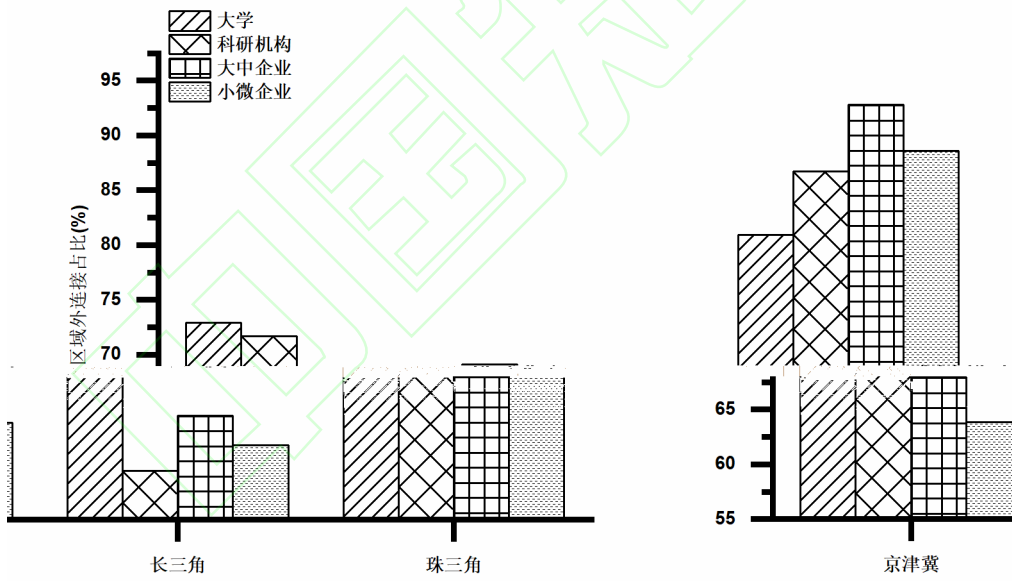
---

---

中国知网

---





-

-



[3-8]

[16]

[7]





- [1] Doloreux D. What we should know about regional systems of innovation[J]. *Technology in Society*. 2002, 24(3): 243-263.
- [2] Boschma R A, ter Wal A L J. Knowledge networks and innovative performance in an industrial district: The case of a footwear district in the south of Italy[J]. *Industry and Innovation*. 2007, 14(2): 177-199.
- [3] Tsouri M, Pegoretti G. Structure and resilience of local knowledge networks: The case of the ICT network in Trentino[J]. *Industry and Innovation*. 2021, 28(7): 860-879.
- [4] Kauffeld-Monz M, Fritsch M. Who are the knowledge brokers in regional systems of innovation? A multi-actor network analysis[J]. *Regional Studies*. 2013, 47(5): 669-685.
- [5] . [J]. . 2023, 41(2): 348-355. Wen K, Liu Y, Pan T, et al. The role of public research institutes in national innovation system[J]. *Studies in Science of Science*. 2023, 41(2): 348-355.
- [6] . [J]. . 2019, 40(7): 106-118. Dai Y, Wang S H. A comparative study of the area of innovation network gatekeeper: Taking the field of telecommunications as an example[J]. *Science Research Management*. 2019, 40(7): 106-118.
- [7] . [J]. . 2021, 33(5): 149-160. Xie Z T, Kong F C, Xie N. Spatio-temporal A social network analysis based on cooperatively authorized patents[J]. *R&D Management*. 2021, 33(5): 149-160.
- [8] . [J]. . 2022, 43(4): 75-94. He X J, Wu S S, Wu Y Y, et al. Identification of structural hole spanners and its role evolution in patent transfer networks: An empirical study on the China Greater Bay Area[J]. *Science of Science and Management of S.&T*. 2022, 43(4): 75-94.
- [9] Zhao Y, Li D, Han M, et al. Characteristics of research collaboration in biotechnology in China: Evidence from publications indexed in the SCIE[J]. *Scientometrics*. 2016, 107(3): 1373-1387.
- [10] . [J]. ( ). 2016, 27(5): 109-116. Chen Q, Liu X. On the evolutionary path of the research of university innovation cooperation in Shanghai An empirical research based on paper data[J]. *Tongji University Journal Social Science Section*. 2016, 27(5): 109-116.
- [11] . [J]. . 2021, 42(1): 57-66. Wang L Y, Wu Y, Zhu Z Q, et al. A research on the influence mechanism of patent cooperation networks on innovation performance of technology-based SMEs[J]. *Science Research Management*. 2021, 42(1): 57-66.
- [12] . [J]. . 2021, 42(11): 77-95. He X J, Wu S S, Cai J R, et al. A comparative study on the structural evolution of patent transfer network among subjects in the China and the U.S. Bay Area[J]. *Science of Science and Management of S.&T*. 2021, 42(11): 77-95.

- [13] . [J]. . 2013, 34(6): 3-7.
- Chen J, Zhao X T, Liang L. Science-based Innovation[J]. Science of Science and Management of S.&T. 2013, 34(6): 3-7.
- [14] Ke Q. An analysis of the evolution of science-technology linkage in biomedicine[J]. Journal of Informetrics. 2020, 14(4): 101074.
- [15] Wang G, Guan J. Measuring science-technology interactions using patent citations and author-inventor links: An exploration analysis from Chinese nanotechnology[J]. Journal of Nanoparticle Research. 2011, 13(12): 6245-6262.
- [16] Balland P, Boschma R. Do scientific capabilities in specific domains matter for technological diversification in European regions?[J]. Research Policy. 2022, 51(10): 104594.
- [17] Ahmed N, Wahed M, Thompson N C. The growing influence of industry in AI research[J]. Science. 2023, 379(6635): 884-886.
- [18] Youtie J, Ward R, Shapira P, et al. Corporate engagement with nanotechnology through research publications[J]. Journal of Nanoparticle Research. 2021, 23(4): 85.
- science[J]. Organization Science. 2018, 29(5): 818-836.
- [20] Bonaccorsi A. Addressing the disenchantment: Universities and regional development in peripheral regions[J]. Journal of Economic Policy Reform. 2017, 20(4): 293-320.
- [21] . [J]. . 2022, 57(12): 124-142. Zhang J, Bai K R. Basic research in Chinese universities and enterprise innovation[J]. Economic Research Journal. 2022, 57(12): 124-142.
- [22] Yang W, Yu X, Wang D, et al. Spatio-temporal evolution of technology flows in China: Patent licensing networks 2000–2017[J]. The Journal of Technology Transfer. 2021, 46(5): 1674-1703.
- [23] Narin F, Hamilton K S, Olivastro D. The increasing linkage between U.S. technology and public science[J]. Research Policy. 1997, 26(3): 317-330.
- [24] Lemley M A, Sampat B. Examiner characteristics and patent office outcomes[J]. The Review of Economics and Statistics. 2012, 94(3): 817-827.
- [25] . NTB [J]. . 2012, 32(12): 108-119. Zhang X J, Yu B. A NTB Index[J]. Journal of Finance and Economics. 2012, 32(12): 108-119.
- [26] Guan J, He Y. Patent-bibliometric analysis on the Chinese science-technology linkages[J]. Scientometrics. 2007, 72(3): 403-425.
- [27] Sinha A, Shen Z, Song Y, et al. An overview of Microsoft academic service (MAS) and applications[C]// Proceedings of the 24th International Conference on World Wide Web. New York: ACM Press, 2015: 243-246.
- [28] Marx M, Fuegi A. Reliance on science: Worldwide front page patent citations to scientific articles[J]. Strategic Management Journal. 2020, 41(9): 1572-1594.
- [29] Marx M, Fuegi A. Reliance on science by inventors: Hybrid extraction of in-text patent-to-article citations[J]. Journal of Economics & Management Strategy. 2022, 31(2): 369-392.