

Keungoui KIM

School of Applied Artificial Intelligence
Handong Global University
Pohang, South Korea
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EMPLOYMENT

Handong Global University, Korea

School of Applied Artificial Intelligence 2021.09.01 ~
Assistant Professor (Tenure-track)

University College Dublin, Ireland

Spatial Dynamics Lab 2020.03.16 ~
Post-doc Researcher 2021.08.31

University Paris-Saclay (former University Paris-Sud), France

RITM (Réseaux Innovation Territories Monodialibation) 2019.02.18 ~
Post-doc Researcher 2020.03.13

Asian Research Network, Korea

Associate Research Fellow (Part-time) 2015.04.01 ~
2016.02.29

Science and Technology Policy Institute, Korea

Office of Global Policy 2014.07.01 ~
Associate Research Fellow (Part-time) 2015.03.31

Hyundai Motors Company, Korea

Research and Development Center 2012.07.16 ~
Engineering Researcher 2014.02.28

EDUCATION

Seoul National University, Seoul, Korea

Technology of Management, Economics, and Policy Program 2019.02.26
Ph.D. in Economics (2016.03.01)
Dissertation Title: “Research on firm-level diversification framework with
respect to measurements and activities: Focused on the empirical case of
pharmaceutical industry”

Seoul National University , Seoul, Korea	2016.02.26
Technology of Management, Economics, and Policy Program	(2014.03.01)
M.Sc. in Economics	
Dissertation Title: “A Study on Technology Standardization Method using Network Analysis: Focused on Wireless Communication Technology Layer of Internet of things”	
Handong Global University , Pohang, Korea	2012
B.Sc. in Mechanical Engineering	
B.Sc. in Electric Engineering	

RESEARCH INTERESTS

- *Topics*: Science-Technology Convergence, Smart Specialization, Regional Innovation, Socio-technology System Transition, Knowledge Spillover, Public Policy (Real-estate, IT governance, Health, Crime), Digital Technologies, Entrepreneurship, Industry Network
- *Methodologies*: Econometric Analysis, Text Mining & Natural Language Processing, Machine Learning, Network Analysis, Spatial Regression, Structural Equation Modelling, Meta Frontier Analysis, Index development, Policy (program) evaluation, Computational Simulation

TEACHING INTERESTS

- Subject courses: (1) AI & Social Change, (2) Computational Social Science, (3) Socio-technical System Transition, (4) Science, Technology, and Policy, (5) Strategic Management of Intellectual Property Right, (6) Regional Innovation, (7) Economics of Technology Innovation, (8) Applied Econometrics, (9) Knowledge Management, (10) International Development and STI policy
- Method courses: (1) Data Science (R, SQL, Python), (2) Advanced Statistics, (3) Python, R, HTML Programming, (4) Text Mining & Natural Language Processing, (5) AI Project Management, (6) Data Visualization, (7) Machine Learning, (8) Network analysis and Social Change

LANGUAGE

Korean (Mother-tongue)

English

Fluent in speaking, listening, writing, and working

Bahasa Indonesia

Intermediate level of speaking and listening
(10 years of living in 1995-2005).

INTERNATIONAL PUBLICATIONS (SSCI)¹

1. Shin, H., Kogler, D., **Kim, K.** * 2023. The Relevance of Scientific Knowledge Externalities for Technological Change and Resulting Innovation Citation Impact Across European Metropolitan Areas. *Review of Regional Research*
2. Lee, C., Na, C., **Kim, K.***. 2023. The effect of watching OTT late at night on sleep. *Sleep and Biological Rhythms* [SCIE, JCR Q3, IF:1.390].
3. **Kim, K.**, Lee, J., Lee, C. 2023. Which innovation type is better for productivity efficiency? Comparison between product, process, organisational and marketing innovations using stochastic frontier and meta-frontier analysis. *Technology Analysis and Strategic Management* [SSCI, JCR Q3, IF: 2.975] 2023/01. 35(1): 59-72 (<https://doi.org/10.1080/09537325.2021.1965979>)
4. Nonnis, A., Bounfour, A., **Kim, K.** 2023. Knowledge diffusion with consideration of complementarity between intangibles and productivity: Empirical evidence from European cases. *Research Policy* [SSCI, JCR Q1, IF: 9.473] 2023/01. 52(1): 104611 (<https://doi.org/10.1016/j.respol.2022.104611>)
5. **Kim, K.**, Nonnis, A., Özyaygen, A., Kogler, D. 2022. Green-tech knowledge capacity/diversity and entrepreneurship in German regional economies. *International Entrepreneurship and Management Journal* [SSCI, JCR Q1, IF: 6.704] 2022/10. (<https://doi.org/10.1007/s11365-022-00808-3>)
6. Shin, H., **Kim, K.**, Kogler, D. 2022. Scientific Collaboration, Research Funding, and Novelty in Scientific Knowledge². *Plos One* [SCIE, JCR Q2, IF: 3.24] 2022/07. 17(7) (<https://doi.org/10.1371/journal.pone.0271678>)
7. Lee, C., Shin, H., **Kim, K.**, Kogler, D. 2022. The effects of regional capacity in knowledge recombination on productivity gains. *Technological Forecasting and Social Change* [SSCI, JCR Q1, IF: 9.01] 2022/07. 180 July: 121669 (<https://doi.org/10.1016/j.techfore.2022.121669>)
8. **Kim, K.**, Kogler, D., Lee, C., Kang, T. 2022. Changes in the knowledge effect on local labor market in the midst of regime transition: Evidence from France over 1986-2015. *Applied Spatial Analysis and Policy* [SSCI, JCR Q2, IF: 1.59] 2022/05. (<https://doi.org/10.1007/s12061-022-09444-4>)
9. Kang, T., Maliphol, S., Kogler, D., **Kim, K.*** 2022. Regional knowledge capabilities, entrepreneurial activity, and productivity growth: Evidence from Italian NUTS-3 regions. *International Regional Science Review* [SSCI, JCR Q3, IF:2.477] 2022/05. 45(3): 293-320 (<https://doi.org/10.1177/01600176211034134>)
10. Lee, J., Park, K., **Kim, K.*** 2022. Transition failure strengthening regime stability in socio-technical systems: A case study of shared mobility market in South Korea. *Telematics and Informatics* [SSCI, JCR Q1, IF: 6.182] 2022/05. 70(May): 101814 (<https://doi.org/10.1016/j.tele.2022.101814>)
11. Kogler, D., Davies, R., Lee, C., **Kim, K.*** 2022. Regional Knowledge Spaces: The Interplay of Entry-Relatedness and Entry-Potential for Technological Change and Growth. *Journal of Technology Transfer* [SSCI, JCR Q2. 5.783, IF: 6.320] 2022/03. (<https://doi.org/10.1007/s10961-022-09924-2>).
12. **Kim, K.**, Lee, J., Kim, E. & Hwang, J. 2022. The related and unrelated product diversification strategy and open innovation: Comparison between biopharmaceutical and pharmaceutical industries. *Journal of Product Innovation*

¹ Research specifics in ORCID: <https://orcid.org/0000-0002-0839-8813> / *(Corresponding)

² Posted in LSE blog: <https://blogs.lse.ac.uk/impactofsocialsciences/2022/11/01/two-minds-better-than-one-does-research-funding-and-support-for-collaboration-lead-to-more-innovative-research/>

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- Management* [SSCI, JCR Q1, IF 6.987] 2022/02.
(<https://doi.org/10.1111/jpim.12620>).
13. Lee, J., **Kim, K.***, Kim, J., Hwang, J. 2022. The relationship between shared mobility and regulation in South Korea: A system dynamics approach from the socio-technical transitions perspective. *Technovation* [SSCI, JCR Q1, IF: 6.606] 2022/01. 109: 102327 (<https://doi.org/10.1016/j.technovation.2021.102327>)
 14. Lee, J., **Kim, K.***, Park, G., Cha, N. 2021. The role of online news and social media in preventive action in times of infodemic from a social capital perspective: The case of the COVID-19 pandemic in South Korea. *Telematics and Informatics* [SSCI, JCR Q1, IF: 6.182] 2021/11. 64 (11): 101691
(<https://doi.org/10.1016/j.tele.2021.101691>)
 15. Jung, S., **Kim, K.**, Lee, C. 2021. The Nature of ICT in Technology Convergence: A Knowledge-based Network Analysis. *Plos One* [SCIE, JCR Q2, IF: 3.24] 2021/07. 16 (7): 1-20 (<https://doi.org/10.1371/journal.pone.0254424>)
 16. **Kim, K.**, Jung, S., Hwang, J., Kim, E. 2021. The optimal diversification strategy in pharmaceutical industry: balance-centered or hetero-centered? *Science, Technology and Society* [SSCI, JCR Q4, IF: 1.173] 2021/05. 26 (2): 1-24
(<https://doi.org/10.1177/09717218211005616>)
 17. **Kim, K.**, Bounfour, A., Nonnis, A., Özaygen, A. 2021. Measuring ICT externalities and their contribution to productivity: A bilateral trade based approach. *Telecommunications Policy* [SSCI, JCR Q2, IF: 3.036]. 2021/03. 45 (2): 102085
(<http://doi.org/10.1016/j.telpol.2020.102085>).
 18. **Kim, K.**, Jung, S. & Hwang, J. 2019. Technology Convergence Capability and Firm Innovation in the Manufacturing Sector: An Approach based on Patent Network Analysis. *R&D Management* [SSCI, JCR Q2, IF: 4.272]. 2019/09. 49(4): 595-606
(<https://doi.org/10.1111/radm.12350>).
 19. Lee, J., **Kim, K.**, Shin, H., Hwang, J. 2018. Acceptance Factors of Appropriate Technology: Case of Water Purification Systems in Binh Dinh, Vietnam. *Sustainability* [SSCI, JCR Q2, IF: 3.245]. 2018/07. 10(7): 1-20
(<http://doi.org/10.3390/su10072255>)
 20. **Kim, K.**, Jung, S., Hwang, J., Hong, A. 2018. A dynamic framework for analyzing technology standardization using network analysis and game theory. 2018/05. *Technology Analysis and Strategic Management* [SSCI, JCR Q3, IF: 2.975]. 30(5): 540-555 (<http://dx.doi.org/10.1080/09537325.2017.1340639>).
 21. Lee, C., Jung, S., **Kim, K.***. 2017. Effect of a Policy Intervention on Handset Subsidies on the Intention to Change Handsets and Households' expenses in Mobile Telecommunications. *Telematics and Informatics* [SSCI, JCR Q1, IF: 6.182]. 2017/12. 34(8): 1524-1531 (<https://doi.org/10.1016/j.tele.2017.06.017>).

INTERNATIONAL PUBLICATIONS (SCOPUS)

1. Kogler, D. & **Kim, K.** 2021. Following the paper trail : the UK scientific and technological knowledge space and its reliance on international knowledge spillovers. *Regional Studies, Regional Science* [SCOPUS]. 2021/12/17. 8 (1): 447-459. (<https://doi.org/10.1080/21681376.2021.2009907>)
2. Nonnis, A., Bounfour, A., Ozaygen, A., **Kim, K.**, Beliaeva, T. 2021. The combined contribution of intangible capital and global value chain participation to productivity. *International Journal of Intellectual Property Management* [SCOPUS]. 2021/02/19. 11 (1) (<http://doi.org/10.1504/IJIPM.2020.10032445>)

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3. **Kim, K.**, Jung, S., Kim, E., Hwang, J. 2019. Which technology diversification index should be selected?: Insights for diversification perspectives. *Cogent Business & Management* [SCOPUS]. 2019/07. 6 (1): 1-18
(<https://doi.org/10.1080/23311975.2019.1643519>)

DOMESTIC PUBLICATIONS

1. **Kim, K.**, Lee, J., Lee, C. 2021. Exploratory Analysis of Knowledge Structure and Evolutionary Trajectory in Korean Artificial Intelligence for Effective Technology Policy (효율적인 기술 정책 제안을 위한 한국 인공지능 지식 구조와 진화 궤적의 탐색적 분석). *Innovation Studies*, 16(3): 139-172.
2. Park, C., Kim, D., Yoon, J., **Kim, K.**, Lee, J., & Hwang, J. 2018. A Study on Cooperation Model for Promoting Overseas Volunteering Program Based on Appropriate Technology Orienting University Students Participation: Focused on Institute for Global Social Responsibility in SNU (대학생 참여 중심의 적정기술 활동 활성화를 위한 산학단 협력모델 연구:서울대학교 글로벌사회공헌단 사례를 중심으로). *Journal of Appropriate Technology*, 4(1): 1-8.
3. Shin, H., Kim, J., Lee, J., **Kim, K.**, & Hwang, J. 2016. A Convergence Innovation System Approach for Sustainable Appropriate Technology: Identifying the innovation factors (지속가능한 적정기술을 위한 혁신 시스템: 혁신 요소의 탐색). *Journal of Appropriate Technology*, 2(1): 68-75.
4. **Kim, K.**, & Jung, S. 2017. A Study on Apartment Transaction Price Index Using Cluster Analysis: Focused on the case of Seoul (군집 분석을 활용한 아파트 실거래가격지수 연구: 서울시 사례를 중심으로). *Journal of Real Estate Analysis*, 3(1): 35-58 (<https://doi.org/10.30902/jrea.2017.3.1.35>).
5. **Kim, K.**, & Kim, Y. 2015. A Study on Forecasting Model for Apartment Housing Price Index Reflecting Model Uncertainty: Focused on BMS, BMA (모델의 불확실성을 반영한 아파트가격지수 예측 모형 연구: BMS, BMA 를 중심으로). *Journal of Real Estate Analysis*, 1(1): 27-52 (<https://doi.org/10.30902/jrea.2015.1.1e.27>).
6. **Kim, K.**, Jung, S., & Hwang, J. 2015. A Study on Technology Standardization Method Using Network Analysis: Focused on Wireless Communication Technology Layer of Internet of Things (네트워크 분석을 이용한 기술 표준화 방법론 연구: 사물인터넷 무선 통신 기술 계층을 중심으로). *Journal of Technology Innovation* [KCI]. 25 (3): 43-65 (<http://dx.doi.org/10.14383/SIME.2015.23.3.43>).

BOOK

- (Book Chapter) Ahmed Bounfour, **Keungoui Kim**, Tran Ngoc Phung, 2022, "Digital Platform Modelling: Delineating the Foundations of Their Business Models," In book of Platforms and Artificial Intelligence, The Next Generation of Competences.
(https://doi.org/10.1007/978-3-030-90192-9_1)
- Jeong Hyop Lee, Sira Maliphol, **Keungoui Kim**, 2015, "STI Strategies and Action Planning in ASEAN," Science and Technology Policy Institute (STEPI) Policy Report.

(Book Chapter) Korea Standard Association, 2015, “Next Standards 2016”: Insight 04. The Value and Future of Technology Standard (written by **Keungoui Kim**, Sungdo Jung, and Junseok Hwang).

INTERNATIONAL CONFERENCE PARTICIPATION

Borja, S., **Kim, K.**, Yoon, H. Hwang, J. 2022. Mechanisms that Influence IT Governance Effectiveness: Empirical Analysis in Private and Public Sector in Colombia. PICMET 2022 at Portland, USA.

Wanzenböck, I., Rocchetta, S., Kogler, D., **Kim, K.** 2022. Explaining the emergence of new regional technological specialisations: the role of organisations’ network structure. DRUID 2022. DRUID. June 14th.

Lee, J., **Kim, K.**, Kogler, D. 2022. Regional cooperation between Hong Kong and Shenzhen for synergies and complementarities: Focused on the scientific and technological knowledge space. DRUID 2022. DRUID. June 14th.

Kim, K., Kogler, D., Zabetta, M. 2021. Knowledge Specialization and Novel Innovations: The Role of Regional Brokerage and Collaboration Intensity. DRUID 2021. DRUID. October 19th.

Kim, K., Shin, H., Kogler, D. 2021. Relatedness and science change in region: The evolution of science space in EU regions. DRUID 2021. DRUID. October 19th.

Shin, H., **Kim, K.**, Kogler, D. 2021. Science Collaboration, Research Funding, and Novelty in Scientific Knowledge. DRUID 2021. DRUID. October 20th.

Kim, K., Kogler, D., Zabetta, M. 2021. New Cooperation and Novel Innovations: The Role of Regional Brokerage and Collaboration Intensity. 4th International Conference on Cluster Research. Rethinking Clusters. September 23rd.

Wanzenböck, I., Rochetta, S., Kogler, D., **Kim, K.** 2021. Actors, networks and regional technological change. A network portfolio approach to explain the emergence of new technological specializations. 4th International Conference on Cluster Research. Rethinking Clusters. September 23rd.

Kim, K., Kogler, D., Maliphol, S. 2021. What are the key topics in the future interdisciplinary science?: Combination of network analysis and topic modelling method based on LDA mallet model. Research Policy 50th Anniversary Conference. Research Policy. September 10th.

Kim, K., Shin, H., Koger, D. 2021. Relatedness and science change in region: The evolution of science space in EU regions. Research Policy 50th Anniversary Conference. Research Policy. September 10th.

Kim, K., Shin, H., Koger, D. 2021. Relatedness and science change in region: The evolution of science space in EU regions. Regions in Recovery. Regional Studies Association. (https://www.youtube.com/watch?v=VLo698aT_Lg)

Shin, H., **Kim, K.**, Koger, D. 2021. Moderating role of funding for science collaboration and novelty. Regions in Recovery. Regional Studies Association. (https://www.youtube.com/watch?v=VLo698aT_Lg)

Kim, K., Lee, C., Kogler, D. 2020. A new dimension of regional knowledge space: entry relatedness and entry potential. 5th edition of Summer School on Data & Algorithms for ST&I studies at Leuven, Belgium.

Kim, K., Bounfour, A., Özaygen, A., Nonnis, A., Beliaeva, T. 2019. The contribution of ICT to productivity focusing on intangibles and interior/exterior ICT externalities. The World Conference on Intellectual Capital for Communities at Paris, France. European Chair on Intellectual Capital. July 11th.

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- Nonnis, A., Özyaygen, A., Bounfour, A., **Kim, K.**, Beliaeva, T. 2019. Analyzing the productivity contribution of intangible assets and participation in global value chains. The World Conference on Intellectual Capital for Communities at Paris, France. European Chair on Intellectual Capital. July 11th.
- Borja, S., **Kim, K.**, Yoon, H. Hwang, J. 2018. IT Governance Effectiveness and Its Influence on Innovation Product and Process. PICMET 2018 at Hawaii, USA.
- Hong, A., **Kim, K.**, Jung, S. & Kim, K. 2018. The effect of the patent convergence on global competitiveness index for cross country analysis. The Asia-Pacific Productivity Conference (APPC) 2018 “Productivity, Innovation, and Sustainable Economic Growth with Changing Technological Paradigm” at Seoul, South Korea.

DOMESTIC CONFERENCE PARTICIPATION

- Lee, J., Park, K., **Kim, K.*** Haunted by the ghost: Strengthen the regime stability by niche failure. 2021. 정보통신정책학회 2021 년 정기학술대회. 2021/11/19.
- Lee, J., Lee, J., Kim, K., Park, K. What happens after niche failed becoming regime? An agent-based model of socio-technical transitions. 2022. 미디어경영학회 2022 년 정기학술대회. 2022/5/13.

RESEARCH GRANT PARTICIPATION

- WeGO (World e-Governments Organization of Cities and Local Governments) Open Data Project. Open Data: An Introductory, Practical Guide for Solutions. Participation as a *Researcher*. 2014.07.01 ~ 2014.12.31. ³
- Communications Policy Research Center (CPRC). Internet of Things Policy Project. Participation as a *Researcher*. 2016.04.01 ~ 2017.03.31.
- National Research Foundation of Korea (NRF). Common Research Project: “Theory Building of Appropriate Technology and Sharing Economy Application for Social Problem Resolution”. Participation as a *Researcher*. 2016.11.01 ~ 2018.12.31.
- Sun Dae In Economic Research Institute. “Real-estate price index development project” Participation as *Data Analyst*. 2016.09 ~ 2017.02. ⁴
- Graduate School of Health Science Business Convergence, College of Medicine, Chungbuk National University. Pharmaceutical data preprocessing and integration project. Participation as *Data Analyst*. 2017.09 ~ 2018.02.
- GLOBALINTO (H2020 project). European Research Commission. Participation as Post-doc Researcher. 2019.02 ~ 2020.03.
- Northern Powerhouse Research and Innovation. Cambridge Econometrics. Participation as a Post-doctoral Researcher & Data Analyst. 2020.03 ~ 06.
- SciTech Space (SFI Science Policy Research Programme). Science Foundation Ireland. Participation as a Post-doctoral Researcher. 2020.03 ~ 2021.08.
- Big Data Innovation Sharing University Project (빅데이터 혁신공유대학 사업). Organization committee. 2021.09 ~ .
- LINC 3.0 TFT. 2022.01 ~ 2022.03. (Project accepted)

³ Research outcome, <http://we-gov.org/portfolio/open-data-an-introductory-practical-guide-for-solutions/>

⁴ Research outcome, Kim, K. & Jung, S. 2017. A Study on Apartment Transaction Price Index Using Cluster Analysis: Focused on the case of Seoul. *Journal of Real Estate Analysis*, 3(1): 35-58.
<https://doi.org/10.30902/jrea.2017.3.1.35>

LINC 3.0 재직자교육센터장. 2022.07. ~

한동대학교 빅데이터 혁신공유대학사업 운영위원. 2021.09. ~

빅데이터 혁신공유대학사업 성과평가관리위원회 운영위원. 2022.07 ~

2023 소프트웨어중심대학사업 준비 TFT 2023.02 ~

AWARDS & HONORS

2015. Best Paper Award. Real Estate Policy and Market Analysis Papers Competition.
Korea Appraisal Board.⁵

2015. Best Paper Award. The 5th International Symposia Green, Smart, Development and
Vision 2015.

2013. Excellence Award. 2013 Idea Festival. Hyundai Motors R&D Center. “A vehicle for
dwarfism, GLOVE”.

TEACHING EXPERIENCE

Handong Global University, Pohang, South Korea

Introduction to Software. 2023-Spring

Big Data Capstone Design. 2023-Spring

Text Mining. 2022-Autumn

Data Science. 2022-Spring / 2022-Summer (“Big Data Camp 2022”)

Introduction to Big Data. 2021-Winter (“Big Data Camp 2021”)
2022-Spring / 2023-Spring

Python Programming. 2021-Autumn

App Programming. 2021-Autumn / 2022-Autumn

University College Dublin, Dublin, Ireland

Regional Innovation. 2021-Spring

Institut Mines-Télécom Business School (IMT BS), Evry, France

Strategic Management of Intellectual Property Right. 2020-Spring

POSCO, Pohang, Korea

Bahasa Indonesia lecture. 2012.03~06

INVITED LECTURE

“Applied Engineering Statistics” at Kyung Hee University. 2017-October.

“NLP & Data Science” at Hyundai Motors Group. 2023-August.

“Smart AI Utilization (스마트한 인공지능 활용법)” at Pohang City Hall. 2023-May.

“Social Science in AI Era (인공지능시대 속의 사회과학)” at Uiduk University. 2023-May.

⁵ Kim, K., & Kim, Y. 2015. A Study on Forecasting Model for Apartment Housing Price Index Reflecting Model Uncertainty: Focused on BMS, BMA. *Journal of Real Estate Analysis*, 1(1), 27–52.

“ChatGPT and Future Education” at Jakarta International University. 2023-June.
“Invited Lecture on Vision” at Youngdong High School. 2023-June.
(planned) Big Data Analysis Introduction using Python at Co-Week Academy. 2023-July.
(planned) ChatGPT Competition at Hyundai Motors Group. 2023-July.
(planned) ChatGPT Application in Motors Industry at Hyundai Motors Group. 2023-September

SOFTWARE / PROGRAMMING SKILLS

Fluent usage at big data handling, econometric analysis and data visualization using R

Languages: R, Python, SQL

Statistics & Econometric analysis: R, STATA, MATLAB, SPSS, AMOS, Eviews

Network analysis: R, Gephi / Database: SAS, PostgreSQL, MySQL, Neo4j

Web-crawling: R, Python / Text analysis (Natural Language Processing): R, Python

Visualization: R, R Shiny⁶

Intermediate level of engineering modeling and simulation using CATIA V5

Additional software skills: MS-office literacy, Adobe Audition

ACADEMIC SERVICE

Ad-hoc Reviewer in

Technological Forecasting and Social Change, Journal of Intercultural Communication Research, Journal of Technology Transfer, Regional Studies, Scientometrics, Technology Analysis and Strategic Management, International Regional Science Review, Policy Sciences, Industry: Organization & Management, R&D Management, Telematics and Informatics, Information Technology and Management, Plos One, Journal of Intellectual Capital, Cogent Business & Management

⁶ R Shiny applications: https://awekim.shinyapps.io/WoS_REG_shiny_R/,
https://awekim.shinyapps.io/WoS_shiny/, https://awekim.shinyapps.io/SS_shiny_R/,
https://awekim.shinyapps.io/Manuf_shiny_R/