IP Literature Watch

December 2022

This newsletter contains an overview of recent publications concerning intellectual property issues. The abstracts included below are as written by the author(s) and are unedited.

IP & Antitrust

Does Competition Spur Innovation in North Africa? Evidence from a Panel ARDL Approach

Walid Gani (Tunisian Competition Council)
Working Paper
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4278690

The launch of the African Continental Free Trade Area at the beginning of 2021 provides new opportunities for North African countries to boost their economies. To conquer this vast market, innovation has become an ineluctable need. Although competition policy may serve as a salient lever for enhancing innovation, it is still not well harnessed by North African economies, even though they have one of the oldest competition law regimes on the African continent. For this purpose, this paper attempts to explore the relationship between competition and innovation in four North African countries from 1995 to 2019. The second generation of panel unit root and cointegration tests have been used in our study. Based on the estimations of the panel autoregressive distributed lag model, our findings show that competition positively impacts innovation in the long run. Further, our empirical results demonstrate that innovation is positively impacted by economic growth and financial development and negatively impacted by human capital and trade openness in the long run. The causality analysis reveals a unidirectional causal relationship running from competition to innovation.

Unfair Competition: United Kingdom

Dev Saif Gangjee (Faculty of Law, University of Oxford)
Martin Senftleben (ed) 2022, Status Report on Protection Against Unfair Competition in WIPO Member States (WIPO/STRAD/INF/8 PROV.)
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4279831

This contribution to an international survey of unfair competition laws provides an overview of the laws relating to unfair competition in the United Kingdom (UK). As opposed to a single source, the UK has unfair competition laws - in plural - which is permitted by the Paris Convention. A range of statutory actions and torts or equitable wrongs are surveyed, with an emphasis on passing off, malicious or injurious falsehood and the breach of confidence.

IP & Licensing

AI for Patent Essentiality Review

Katie Atkinson (University of Liverpool)
Danushka Bollegala (University of Liverpool)
Working Paper
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4277799

In the process of developing novel standards for Information and Communication Technologies (ICT), an important step is to determine whether a patent held by a company is, or might be, required to practice the concepts covered in a given ICT specification. The patents that claim inventions that are necessary to practice a particular ICT standard are called Standard Essential Patents (SEPs) [Baron and Pohlman, 2021]. Existing approaches for automatically detecting SEPs for a given specification rely on textual similarity measures such as Latent Semantic Analysis (LSA) [Landauer and Dumais, 1997, Deerwester et al., 1990]. In this report, we first give an overview of the task of manually detecting SEPs as conducted by patent lawyers and subject matter experts, in section 2. Next, we will discuss the associated challenges from the view point of the state-of-the-art (SoTA) in Artificial Intelligence (AI), in section 3. We provide a general overview of how AI has been applied to the domain of Law in section 4, including specifically the applications of AI in Patent Law. We discuss existing tools that purport to facilitate patents that are essential for a given ICT specification in section 5. We summarize in section 6 SoTA developments in the Machine Learning (ML) and Natural Language Processing (NLP) communities that can potentially address the challenges discussed in section 3. Finally, we conclude this report in section 7 by providing a set of recommendations from a technological perspective and we list requirements that must be satisfied by future solutions to the SEP detection problem such that more accurate and explainable tools can be developed.

Essentiality Checks Might Foster SEP Licensing, But Do Not Stop Over-Declarations from Inflating Patent Counts and Making Them Unreliable Measures

Keith Mallinson (WiseHarbor)
Working Paper
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4278639

Essentiality checks could help implementers determine with whom they need patent licenses. If clutches of selected patents are independently and reliably checked to establish that prospective licensors each have at least one patent that would likely be found essential by a court, these results might be used by several or many prospective licensees to determine with whom they need to be licensed for standards such as 5G.

However, essentiality checking does a poor job in adjusting for over-declaration in patent counts and will encourage even more spurious declarations. This paper focuses on the wider use of essentiality checks and sampling in patent counting. With too many patents to check them all properly, it is hoped that thorough checking of random samples of declared patents will - by extrapolation - also enable accurate SEP counts to be derived. Essentiality checks do not fix and can only moderate exaggerations in patent counts due to over-declaration. For example, false positive essentiality determinations will exceed correct positive essentiality determinations where true essentiality rates are less than 10% unless at least 90% of determinations are correct. Inadequate checking could imbue many with a false sense of security about precision while encouraging even more over-declaration by others which would further misleadingly inflate their measured patent counts and essentiality rates.

Even ignoring residual bias after improved but imperfect checking, sample sizes of thousands of patents would be required to provide even only modest levels of precision in essential patent counts (e.g. a ± 15% margin of error on the estimated patent count at the 95% confidence level) on patent portfolios and entire landscapes where essentiality rates are low (e.g. 10%) due to over-declarations.

This paper is a follow-on to my September 2021 paper entitled Essentiality Rate Inflation and Random Variability in SEP Counts with Sampling and Essentiality Checking for Top-Down FRAND Royalty Rate Setting: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3933944

Effects of incorporating public innovation intermediaries on technology transfer performance: evidence from patent licensing of Japan's *Kohsetsushi*

Nobuya Fukugawa (Tohoku University)
Heliyon
https://www.sciencedirect.com/science/article/pii/S2405844022024276

The incorporation of public organizations is meant to improve their efficiency and contribution to national and local economies. In Japan, incorporation has been implemented at the national and local levels since the late 1990s. This process alters the incentive system comprising intellectual property (IP) ownership, managerial freedom, and rent sharing, which promotes IP commercialization. This study assesses the economic consequences of the incentive system reform, taking the example of a public innovation intermediary, Kohsetsushi. Unlike the incorporation of national universities, the incorporation of Kohsetsushi is at the discretion of local governments. Therefore, there should be a comparative advantage for both incorporated and unincorporated Kohsetsushi. A dataset representative of both types of Kohsetsushi was established to estimate the average treatment effects on the treated (ATT), identify the type of selection into incorporation, and discuss the economic consequences of endogenous selection by local governments. The counterfactual analysis of licensing income revealed a negative ATT of incorporation and negative selection into not choosing incorporation. Incorporated Kohsetsushi would have had higher licensing income had they not been incorporated. The evidence does not support comparative advantage. The unintended consequence might have been caused by the lack of harmonization between the incentive and evaluation systems.

Non-Fungible Tokens as a Framework for Sustainable Innovation in Pharmaceutical R&D: A Smart Contract-Based Platform for Data Sharing and Rightsholder Protection

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Niclas Nilsson (Lund University)
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Kacper Szkalej (Lund University – Faculty of Law; Stockholm University - Faculty of Law)
Working Paper
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4298070

Research and Development (R&D) in the pharmaceutical sector traditionally occurred in closed, siloed institutional settings. This approach was a function of a rights-oriented intellectual property model which framed access and reuse of data (data sharing) as a threat to rightsholders. However, a closed model of explorative collaboration is less suited to today's more complex scientific ecosystem, where external engagement and dynamic partnering with multiple actors and diverse information sources has become

essential. As such, devising alternative approaches is vital in ensuring that opportunities for scientific advances are not lost or innovation stifled.

This article introduces a hybrid contractual framework that combines the benefits of the automated functionality of smart contracts and non-fungible tokens (NFTs) embedded in a blockchain with more traditional rights-based licensing schemes. The presented framework is based on the outcome of an experimental pilot platform that enabled participants to store, find and reuse data following FAIR data principles. The platform documents real-world physical assets in the drug discovery of chemical molecules in an immutable digital ledger.

More generally, smart contracts and NFTs point us towards an open and global collaborative platform for exploiting and advancing drug research assets. The resulting platform creates mechanisms for resolving issues regarding standardization, interoperability, and disclosure. As such, it overcomes many of the practical hurdles currently obstructing collaboration in pharmaceutical R&D, as well as providing a framework to address the central conflict in drug discovery, namely the demand for greater data sharing and the protection of rightsholder interests.

IP & Litigation

Universities involvement in patent litigation: an analysis of the characteristics of US litigated patents

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Laura Ciucci (Social Sciences, Gran Sasso Science Institute; University of Corsica)
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Scientometrics
https://link.springer.com/article/10.1007/s11192-022-04500-9

Some recent patent infringement litigations initiated by universities have resulted in multi-million dollar damages and have attracted public attention and stimulated research especially among law scholars. In this paper, we build a brand new database that include patents filed by universities at the United States and Trademark Office (USPTO), their characteristics and, eventually, the information about whether they have been used in infringements lawsuits by universities in the years 1990–2019. Our study is articulated in two parts. First, we show that, although it is still a quite rare phenomenon, patent litigation involving universities has been significantly growing in the last 2 decades. Second, we study the characteristics of university patents that have been litigated vis-à-vis non-litigated university patents. In this respect, we find that public universities and non-US universities are less inclined to litigate their patents compared to private and US universities. In addition, we also find that patent quality is an important determinant in the decision of university litigation. This result holds for patents in the Electrical Engineering sector, which is traditionally prone to opportunistic litigation, and no matter what type of university involved (public vs private, or US vs non-US).

IP & Innovation

The determinants of parallel invention: Measuring the role of information sharing and personal interaction between inventors

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Rudi Bekkers (Eindhoven University of Technology (TUE))
Hitotsubashi University IIR Working paper WP#22-06
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4270955

Historical accounts describe numerous cases of parallel invention. Nowadays, with over half a million inventions yearly that apply for patent protection at the USPTO alone, it is likely that there are a lot of parallel inventions among these. Yet, the mechanisms behind creating similar knowledge remain unstudied. From both a theoretical and practical perspective, it is an interesting question to what degree parallel inventions take place truly independent of each other, or whether they are the result of the exchange of knowledge and ideas between inventors. In our empirical study, we use the unique setting of technical standardization, where it is possible to systematically observe knowledge sharing as well as knowledge exchanges between inventors in detail. This study presents two novel analyses, one focusing on the determinants of similar inventions (using an AI-based approach) and one on the determinants of identical inventions (exploiting data from the patent granting procedure). In both analyses, we find positive and significant effects for knowledge sharing as well as for inventor interaction as determinants. The latter effect is the strongest: if meet in person and discuss their ideas, the likelihood of similar inventions increases up to a factor of approximately five, to up to 2.3 percentage points. Empirically confirming the theoretical work of Amabile (1983, 1988) on knowledge creation at the individual level and that of Nonaka (1994, 2006) on knowledge creation at the organizational level, we reflect on the implications of our findings for companies wishing to increase their inventive efforts.

Great Recession Babies: How Are Startups Shaped by Macro Conditions at Birth?

Daniel Bias (Owen Graduate School of Management at Vanderbilt University)
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Working Paper
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4298934

We combine novel micro data with quasi-random timing of patent decisions over the business cycle to estimate the effects of the Great Recession on innovative startups. After purging ubiquitous selection biases and sorting effects, we find that recession startups experience better long-term outcomes in terms of employment and sales growth (both driven by lower mortality) and future inventiveness. While funding conditions cannot explain differences in outcomes, a labor market channel can: recession startups are better able to retain their founding inventors and build productive R&D teams around them. Contrary to popular belief, recessions do not spawn superstar firms.

The Impact of Patent Applications on Technological Innovation in European Countries

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Alberto Costantiello (Lum University Giuseppe Degennaro)
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Working Paper
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4275264

We investigate the innovational determinants of "Patent Applications" in Europe. We use data from the European Innovation Scoreboard-EIS of the European Commission for 36 countries in the period 2010-

2019. We use Panel Data with Fixed Effects, Panel Data with Random Effects, Pooled OLS, WLS and Dynamic Panel. We found that the variables that have a deeper positive association with "Patent Applications" are "Human Resources" and "Intellectual Assets", while the variables that show a more intense negative relation with Patent Applications are "Employment Share in Manufacturing" and "Total Entrepreneurial Activity". A cluster analysis with the k-Means algorithm optimized with the Silhouette Coefficient has been realized. The results show the presence of two clusters. A network analysis with the distance of Manhattan has been performed and we find three different complex network structures. Finally, a comparison is made among eight machine learning algorithms for the prediction of the future value of the "Patent Applications". We found that PNN-Probabilistic Neural Network is the best performing algorithm. Using PNN the results show that the mean future value of "Patent Applications" in the estimated countries is expected to decrease of -0.1%.

The Effects of Innovative and Digital Dimensions on the Business Dynamism in Italy: An Empirical Study

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Working Paper
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4287358

During the last years, the attention of scholars and policy makers on the effects of innovation and digitalization in the economy has constantly increased. The paper analyses this setting by investigating the causal relationship between the business dynamism of Italian companies in terms of churn rate that indicates how frequently new firms are created and existing enterprises close down (reflecting the Italy's capacity of "creative destruction"). The level of digitalization and innovation have been measured using the territorial broadband penetration, as proxy of digitalization and patent applications of Information Technology (IT) to European Patent Office (EPO), as proxy of innovation. The study has been performed by examining a ten-year period from 2010-2019. The main finding suggests that, on average, current and past territorial penetration of the broadband has incentivized the creation of Italian enterprises, balancing the losses derived from the local business breakdowns. Also, IT patents play a key role to create and/or innovate the business value, by increasing productivity that affects the territorial growth. However, results suggest that the effects of IT patents on the churn rate of enterprises located in the Centre-North and South of Italy are dissimilar. In fact, while current and past territorial development of broadband exercise similar meaningful effects over businesses' churn rate in the northern and southern territories, IT patents' applications have significant influence over the churn rate of enterprises located in the Centre-North only, evidencing disparities in the scenario of the business dynamism of the country.

IP Law & Policy

The Replication Crisis and IP Law: A Novel Policy Tool For Open Science

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Arizona State Law Journal, Forthcoming
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4274712

In recent years, the scientific community has faced a considerable problem — the replication crisis. Replication is the process of verifying scientific findings by repeating a published study. It is considered a cornerstone of the scientific enterprise, contributing to the credibility of research findings. Over the past two decades, however, replication has become increasingly difficult; in fact, in some disciplines the

non-replicability rate is over 50%. A major factor accounting for this is diminished access to research materials required for replication (replication materials). This problem is particularly acute in computational studies, where the code, software documentation, datasets, and other information are often not shared.

In this Article, we address the replication crisis from the perspective of intellectual property (IP) law. Our goal is twofold: first, to investigate the extent to which IP law plays a part in impeding access to replication materials; and second, to explore potential solutions that could minimize this detrimental effect. One branch of IP law that has been identified by scholars as having a potential adverse effect on the ability to conduct replication studies is copyright law. This Article, however, shows that the impact of copyright law is likely minor, whereas other IP regimes — patent and trade secret law — have a greater impact in this domain. We find that a major reason for scientists to avoid sharing replication materials is the fear that doing so will compromise their ability to secure patent and trade secret protection.

As a solution, this Article proposes the Conditional-Access-Agreement (CAA) — a novel policy tool that establishes a private and controlled channel of communication between authors and replicators. Authors would be able to provide access to replication materials on demand, through this channel, for the exclusive purpose of conducting replication studies. The CAA mechanism provides a win-win solution: facilitating access to replication materials without jeopardizing scientists' chances of obtaining IP protection.

AI&IP: Theory to Policy and Back Again Policy and Research Recommendations at the Intersection of Artificial Intelligence and Intellectual Property

Peter Georg Picht (University of Zurich – Institute of Law)
Florent Thouvenin (University of Zurich – Institute of Law)
Working Paper
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4278819

The interaction between artificial intelligence (AI) and intellectual property rights (IPRs) is one of the key areas of development in intellectual property law. After much, albeit selective, debate, it seems to gain increasing practical relevance through intense AI-related market activity, an initial set of case law on the matters, and policy initiatives by international organizations (e.g. WIPO, EPO) and lawmakers. Against this background, Zurich University's Center for Intellectual Property and Competition Law (CIPCO) is conducting, together with the Swiss Intellectual Property Institute (IPI), a research and policy project that explores the future of intellectual property law in an AI context. This paper briefly describes the AI/IP Research Project and presents an initial set of policy recommendations for the development of IP law with a view to AI. The recommendations address topics such as AI-inventorship in patent law; AI-authorship in copyright law; the need for sui generis rights protecting innovative AI output; rules for the allocation of AI-related IPRs; IP protection carve-outs in order to facilitate AI system development, training, and testing; the use of AI tools by IP offices; suitable software protection and data usage regimes.

Copyright Law

AI Restoration Brings 'Dying' Masterpieces Back to Life, But Tricks Copyright?

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https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4285979

Recently, artificial intelligence (AI) has shed light on the restoration of fragmentary masterpieces. It is said that AI-restored content can reproduce the missing part in fragmentary works, reveal authors' initial intention, and give the younger generation a chance to appreciate the essence of cultural heritage. AI restoration leads to a discussion on whether copyright law should apply to AI-restored works. The existing literature about the nexus between the restoration of works and copyright is scarce, and none is related to AI-restored works. Therefore, this paper focuses on investigating the potential copyright issues regarding AI-restored works and exploring how the traditional copyright regime fails to solve those issues. Besides, this paper suggests recalibrating the copyright regime to enhance the authenticity of AI-restored output. Lastly, this cutting-edge article provides theoretical evidence for IP scholars interested in AI-related issues and advocates future research on the relation between AI models and copyright law.

Research on the Dilemma and Improvement of the Copyright Fair Use Doctrine Related to Machine Learning in China

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Paul Kossof (DAC Management LLC)
Yan Dong (Shanghai University of International Business and Economics)
https://repository.law.uic.edu/ripl/vol22/iss1/1/

While artificial intelligence has brought convenience to human life, it has also profoundly affected copyright law. Mechanical learning in the past did not infringe the exclusive rights of the copyright owner, and fair use doctrine could be applied to ensure the development of technology. As machine learning is the core technology of artificial intelligence, if the fair use doctrine is applied then it will infringe the exclusive rights of copyright owners. Based on the working principle of machine learning technology, this paper discusses the copyright infringement risk of machine learning technology. Furthermore, this paper analyzes the challenge of machine learning technology to the basic principle of copyright fair use doctrine and the challenge of machine learning technology to "transformative use" doctrine from the perspective of rule application. To resolve the conflict between the exclusive rights of the copyright owner and the development of artificial intelligence technology, a legal license can be applied to artificial intelligence technology companies as a solution.

Copyright and Digital Fashion Designers: The Democratization of Authorship?

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https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4301895

'Digital fashion' has been widely recognized by the fashion media and increasingly embraced by companies and institutions. This article gives a multidisciplinary perspective on copyright protection of digital fashion designs. It places particular focus on the concepts of 'authorship' and 'originality'.

Authorship conventions of the traditional, physical fashion industry differ significantly from those of copyright law. In fashion, generally authorship is hierarchic and includes many 'gatekeepers'. However, in digital fashion specifically, authorship is more democratic and resembles its legal definition. This democratizes the authorship practices of fashion, bringing the concept of 'author' in fashion closer to the legal meaning of authorship. Moreover, certain practices of digital fashion designers suggest that it might be easier for digital fashion to comply with EU copyright law.

The digital leap that the fashion industry is taking deserves to be recognized from an IP law perspective. The diverging meanings of authorship between law and fashion must be inspected to avoid various legal risks related to the ownership of fashion designs.

Effects of Cultural Content Piracy and Enforcement on Inbound Contents Tourism

Koji Domon (Waseda University)
Working Paper
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4280470

A growing middle-income class in developing and emerging countries has creating new demand for travels to foreign countries. In spite of a new coronavirus, this phenomenon will not stop in the long run. Selection of specific destinations is apparently influenced by an interest in foreign cultures. People see information daily about foreign cultures through the Internet, and they often purchase related content and goods, like music CDs, books, game software and so on. However, they purchase not only originals but also fakes in developing countries where, under lax enforcement of intellectual property rights (IPRs), consumers accept copied goods as second-tier substitutes. This paper considers the effects of Japanese cultural content and related goods, including fakes, on inbound tourism demand. I first theoretically prove a discrepancy between IPR holders and the tourism industry in perceived desirable enforcement and then indicate that it disappears if the secondary market of cultural content and goods is relatively large. Otherwise, IPR and tourism incentives conflict with each other regarding levels of enforcement. Second, I consider a scheme to compensate for tourism-caused damage from IPR infringement when optimal enforcement levels differ.

IP & Trade

Three Megatrends in the International Intellectual Property Regime

Peter K. Yu (Texas A&M University School of Law)
Cardozo Arts & Entertainment Law Journal, Vol. 41, 2023, Forthcoming
Texas A&M University School of Law Legal Studies Research Paper No. 22-64
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4295524

Since the establishment of the Paris and Berne Conventions, the international intellectual property regime has encountered two world wars, struggled with several global pandemics, welcomed many new nations and interacted with a wide variety of technologies and innovative practices. Although this regime progressed only slowly for the larger part of its first century, it saw major transformation in the past four decades, including the adoption of the WTO TRIPS Agreement.

Written in commemoration of the centennial of the American Branch of the International Law Association, this Article identifies three megatrends that help illuminate the magnitude and ramifications of this transformation: (1) the rise of emerging countries; (2) the increased complexity of the international intellectual property regime; and (3) spatial transformation brought about by new technology. Focusing on the myriad impacts changing actors, institutions and technologies have brought to the international

intellectual property regime, this Article discusses each megatrend in turn and explains its significance for the ongoing and future development of the international intellectual property regime.

Other Topics

Changing the Perception of Time: Railroads, Access to Knowledge and Innovation in Nineteenth Century France

Georgios Tsiachtsiras (University of Bristol; University of Bath – School of Management)

Working Paper

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4297205

This paper exploits an episode of French history to study the relationship between the roll-out of railroads and the rise of the innovation activity. I take advantage of the exogenous variation in railway access arising from a straight-line time variant instrument to document that access to rail network increases the regional innovation activity, as it is proxied by the number of patents in the historical database of the National Institute of Industrial Property of France. I employ an access to knowledge index as an underlying mechanism behind the main results to show that, by reducing least-cost distances between cantons, railways intensified the influence exerted by neighboring concentrations of inventors, thereby triggering the spread of patenting. Next, I study the role of a global city, such as Paris, on the diffusion of new technologies. To do that, I have first to use a machine learning algorithm for text analysis and to assign a technology to the patent applications without a technological class. Finally, I introduce a back of the envelope exercise based on canals and roads to show that in the absence of railroads the invention rate of the French cantons would have been, on average, 24.14% lower.

Key Performance Indicators for Utility Model Systems

Jussi Heikkilä (University of Jyväskylä – School of Business and Economics; Lappeenranta-Lahti University of Technology)

Working Paper

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4309677

We suggest key performance indicators (KPIs) that provide a systematic framework to analyze the functioning of utility model (UM) systems. The KPIs are based on a literature review and a content analysis of the webpages of IP offices in countries offering UM protection in 2021. Generally, the IP offices highlight UMs to be shorter, simpler, faster, and shorter protection methods compared to patents but there are differences how these features are highlighted. The differences between UMs and patents lead to multidimensional sorting as economic agents choose within the IP menu which determine the observed differences in characteristics and outcomes of patents and UMs. National differences call for separate context dependent KPIs for UM systems.

New Technologies and Stock Returns

Jinyoung Kim (Boston College)

Working Paper

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4299577

Investments in emerging technologies, such as quantum computing, are risky. This paper examines whether investing in companies with high exposure to new technologies leads to potentially high returns. I collect all U.S. patent publications publicized between 1976 and 2021 and their first-and second-hop neighbor patents in their citation network. I use textual information and the information on the citation network to detect tech clusters experiencing high growth of new patents. A size-adjusted value-weighted

portfolio is created by buying firms with high exposure to new technology and selling firms with low exposure (new-minus-old factor, NMO). The portfolio generates 7.4% annual returns and 5.7% to 14.7% annualized alphas depending on different factor models. In the Fama and MacBeth (1973) regressions of monthly excess returns, the exposure to new technology has a positive, statistically significant loading. I further show that the results are driven by risk-return trade-off.

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