# STANDARDS ESSENTIAL UTILITY MODELS*

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**ABSTRACT:** More than one hundred countries, including major economies such as China, Japan, Germany, and Brazil, offer a form of innovation protection known as the utility model (UM). Unlike patents, UMs are generally not examined substantively, have shorter terms, and vary in their enforceability in litigation. Yet UMs, like patents, are increasingly being declared as "essential" to global industry standards, licensed together with standards essential patents (SEPs), and now even enforced in litigation. This study finds that nearly 1,000 standards essential utility models (SEUMs) have been declared essential to broadly adopted industry standards. And though far less than other SEPs, SEUMs have been subject to litigation in China and Germany, and there appears to be no structural barrier to their litigation in other jurisdictions. These findings raise questions concerning the legal requirement to disclose and license SEUMs, the value of SEUMs for purposes of calculating FRAND royalty rates for individual firm portfolios and for determining top-down aggregated royalty rates for standards, as well as larger questions concerning the use of UMs to protect complex technological inventions that are also covered by patents.

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Over the past two decades, some of the world's largest technology companies—Apple, Microsoft, Samsung, Sony, Huawei, Qualcomm, and many others—have been engaged in high-stakes litigation over patents covering the

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pervasive interoperability standards that form the backbone of the global technology infrastructure. Standards like Wi-Fi, 5G, Bluetooth and IPv6 have been developed by groups of competitors collaborating within international standards development organizations (SDOs) that require participants to make patents covering these standards broadly available to the manufacturers of standardized products on terms that are "fair, reasonable, and nondiscriminatory" (FRAND). The meaning of FRAND, and the amounts that manufacturers must pay to operate under tens of thousands of these standards-essential patents (SEPs), have been the subject of litigation conducted in multiple jurisdictions around the world.

This Article sheds light on an underappreciated feature of the SEP landscape: the existence of non-patent intellectual property rights that are being treated, for all practical purposes, like SEPs, but which are not themselves patents. Unlike the United States, which has a single patent system for the protection of all innovations meeting a minimum threshold of inventiveness, more than one hundred countries worldwide, including major economies such as China, Japan, Korea, and Germany,[1] offer a lesser form of innovation protection known variously as utility models, technical designs, petty patents, innovation patents, short-term patents, registration patents, and the like.[2] For the sake of convenience, we refer to all such forms of sub-patent innovation protection as "utility models" or simply "UMs."

While national rules regarding the scope, availability and issuance of UMs vary from country to country,[3] most UM regimes offer protection for tangible products. Many, but not all, jurisdictions exclude processes, biological materials, and computer software from the scope of protection.[4] The duration of UM protection ranges from five to fifteen years, with most countries offering ten years of protection.[5] In most countries, UM applications are not formally examined and must simply disclose the product in question.[6]

Given the lack of examination, obtaining UMs is generally viewed as faster and cheaper than obtaining patents.[7] This combination of speed and cost, in theory, makes UMs potentially attractive to small and medium enterprises (SMEs)

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1. *WIPO IP Statistics Data Center*, WORLD INTELL. PROP. ORG., https://www3.wipo.int/ipstats/index.htm?tab=utility (Dec. 2023) (choose "Key Indicators"; then choose "Utility model-Applications for the top 10 offices") [hereinafter *WIPO IP Statistics*].

2. *See* Uma Suthersanen, *Utility Models: Do They Really Serve National Innovation Strategies?*, *in* THE INNOVATION SOCIETY AND INTELLECTUAL PROPERTY 2, 4 (Josef Drexl & Anselm Kamperman Sanders eds., 2019) [hereinafter Suthersanen (2019)] (discussing nomenclature).

3. *See* Daniel R. Cahoy & Lynda J. Oswald, *Is Legal Harmonization Always Better? The Counter-Case of Utility Models*, 58 AM. BUS. L.J. 525, 535 (2021) (noting the lack of harmonization of utility model regimes around the world).

4. *See* Dan Prud'homme, Creating a "Model" Utility Model Patent System: A Comparative Analysis of the Utility Model Patent Systems in Europe and China 23–28 (IP Key Project Working Paper Series, 2014), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2541900.

5. *See* JOHN RICHARDS, UTILITY MODEL PROTECTION THROUGHOUT THE WORLD 6–7 tbl.1 (2010), https://ipo.org/wp-content/uploads/2013/03/Utility_Model_protection.pdf [https://perma.cc/W3CW-2EK2].

6. *See* Prud'homme, *supra* note 4, at 58.

7. *Id.* at 17 chart 2 (comparing official costs of utility models versus patents in China and various European countries), 48–49.

that cannot afford full patent protection.[8] Similar considerations have also been raised as advantageous to innovators in low-income countries.[9] As one commentator observed of Germany's UM system, which dates to 1891, UMs were originally intended to benefit small businesses and innovators who lacked the resources to seek full patent protection:

> A utility model patent is a 'little patent,' or the 'patent of the small business man.' Its value lies in the rapid protection of short-lived innovations. It is intended to promote the development or further development of articles of use, articles of mass consumption, for which it has always had special significance . . . .[10]

Despite their long history and widespread adoption, UMs remain, as Professor Mark Janis observed more than two decades ago, "a backwater of intellectual property."[11] Compared to the large body of scholarly literature in other areas of intellectual property law, particularly that concerning patents, there is scant literature concerning UMs, and only a handful of empirical studies that focus on them.[12]

This paper, for the first time, empirically investigates the declaration of UMs as essential to widely deployed technical interoperability standards (standards-essential utility models or SEUMs) and analyzes the impact of SEUMs on the FRAND licensing commitments of their owners.[13] The remainder of this paper proceeds as follows: Part I provides a brief overview of UM systems around the world. Part II summarizes SDO requirements regarding the disclosure and licensing of patents. Part III briefly summarizes the empirical literature concerning UMs, then presents the results of our study, comparing SEUM filing, declaration, and litigation rates to those of UMs and SEPs more broadly. Part IV discusses the implications of these findings for SDOs, policy makers, and private firms. We conclude with recommendations for policy and future research.

## I. UTILITY MODEL SYSTEMS AROUND THE WORLD

### A. Adoption of Utility Model Protection

The concept of the utility model was first introduced in Great Britain via an 1843 Act that allowed applicants to register the shape and configuration of use-

8. *See id.* at 10–11; UMA SUTHERSANEN, UTILITY MODELS AND INNOVATION IN DEVELOPING COUNTRIES 7–8 (2006) [hereinafter SUTHERSANEN (2006)].

9. *See* Prud'homme, *supra* note 4, at 10–11; SUTHERSANEN (2006), *supra* note 8, at 7–8.

10. H. Naumann, *Utility Model Patent Protection*, 40 J. PAT. OFF. SOC'Y 800, 802–03 (1958).

11. Mark D. Janis, *Second Tier Patent Protection*, 40 HARV. INT'L L.J. 151, 152 (1999). For recent collections of citations to the academic literature on utility models, see Cahoy & Oswald, *supra* note 3, at 528 n.10 and Suthersanen (2019), *supra* note 2, at 3 n.3.

12. The existing empirical literature on utility models is discussed in Part III.A, *infra*.

13. The only prior published literature focusing on SEUMs of which we are aware is Florian Mueller's blog post describing a 2018 German lawsuit involving SEUMs. Florian Mueller, *When Defending Against Standard-Essential Patents, Beware of Standard-Essential Utility Models*, FOSS PATENTS (Dec. 7, 2018, 06:55 AM), http://www.fosspatents.com/2018/12/when-defending-against-standard. html [https://perma.cc/XA3Y-8QGW].

ful articles of manufacture—a complement to an 1842 Act protecting ornamental product designs.[14] Given a range of perceived conflicts with the patent system and little use by practitioners, the U.K. statute was formally revoked in 1919.[15]

Germany, in contrast, embraced the concept of UMs during the late nineteenth century as a necessary form of legal protection for "small inventions"—useful improvements of products such as clothing, hand tools, and housewares.[16] UMs, in the German framework, fit somewhere between existing protections for fashion designs, which were purely aesthetic, and patents, which required a higher showing of novelty. In 1891, the German legislature enacted its first statute protecting the utility model or *Gebrauchsmuster*.[17]

Japan and Poland followed shortly after Germany by enacting UM protections during the early twentieth century.[18] Other jurisdictions across Europe, Asia, and Latin America implemented UM systems throughout the century. Jurisdictions around the world continue to experiment with UM protection, and proposals for UM systems have been periodically made in the United States,[19] the European Union,[20] India,[21] and other countries.

At the same time, some countries that once had UM systems have discontinued them owing to perceived conflicts with the general patent system or their failure to achieve desired goals. Thus, the Netherlands, which adopted a "short term patent" system in 1995, eliminated that system in 2008.[22] Belgium abolished its "small patent" system in 2009.[23] And Australia, which adopted an "innovation patent" system akin to UMs in 2001, formally discontinued that system in 2021 after significant policy debate.[24] Though major industrial jurisdictions including Germany, France, Italy, Japan, and Korea still offer UM protection, UMs today are used most heavily in China, where more than 97.5% of the approximately three million worldwide UM applications were filed in 2021.[25]

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14. Lionel Bently & Brad Sherman, *The United Kingdom's Forgotten Utility Model: The Utility Designs Act 1843*, 1 INTELL. PROP. Q. 265, 268 (1997).

15. *Id.* at 277.

16. Naumann, *supra* note 10, at 801.

17. *Id.*; *see also* Kelsey Martin Mott, *The Concept of Small Patent in European Legal Systems and Equivalent Protection under United States Law*, 49 VA. L. REV. 232, 234–46 (1963) (history of German utility model laws).

18. *See* Mott, *supra* note 17, at 246 (citing STEPHEN P. LADAS, THE INTERNATIONAL PROTECTION OF INDUSTRIAL PROPERTY 458–63 (1930)).

19. Janis, *supra* note 11, at 154.

20. *See infra* notes 33–40 and accompanying text.

21. *See* Raju Narayana Swamy, Utility Models as A Second-Tier Patent System: Is It Worth Implementing in India? (May 12, 2022) (unpublished manuscript), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4091118.

22. *See* Prud'homme, *supra* note 4, at 11 & n.22.

23. *Id.* at 11–12.

24. Matthew Rimmer, *Reinventing the Wheel: The Rise and Fall of the Australian Innovation Patent*, *in* SUB-PATENT INNOVATION RIGHTS: UTILITY PATENTS, PETTY PATENTS AND INNOVATION PATENTS AROUND THE WORLD (Jorge L. Contreras ed., forthcoming 2024) [hereinafter SUB-PATENT INNOVATION RIGHTS].

25. *WIPO IP Statistics*, *supra* note 1 (choose "Key indicators"; then choose "Total applications") (2,852,219 Chinese utility model applications versus worldwide total of 2,924,420 utility model applications).

## B. Utility Models in International Agreements

UMs are expressly contemplated alongside patents by the Paris Convention for the Protection of Industrial Property, which added language concerning UMs in 1911.[26] Yet the Paris Convention does not explicitly delineate the scope of UM protection, which is left largely to the discretion of signatory states. The principal effect of the Paris Convention is to require that signatories grant national treatment to applicants for these rights, meaning that they may not discriminate between domestic and foreign applicants or among applicants from different countries.[27] The result of this lack of formal treaty guidance is a diverse set of UM rules that lack significant harmonization.[28]

Unlike the Paris Convention, the 1994 World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) does not cover UMs.[29] According to one leading commentator, this omission was intentional.[30] But while UMs are not expressly authorized under the TRIPS Agreement, they are not prohibited by it either. Accordingly, as observed by Uma Suthersanen, WTO members "are free to formulate or reject UM protection as they see fit," provided that they comply with national treatment obligations under the Paris Convention, which are incorporated in the TRIPS Agreement.[31]

In the 1990s, observers in the European Union began to note that the different sets of UM laws in E.U. member states could have a negative impact on the integration of the European single market, the free flow of goods within Europe, and a reduction of competition among European companies.[32] In 1995, the European Commission published a Green Paper on the possibility of harmo-

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26. Paris Convention for the Protection of Industrial Property, art. 1, ¶ 2, July 14, 1967, 21 U.S.T. 1583, 828 U.N.T.S. 305 ("The protection of industrial property has as its object patents, utility models, industrial designs, trademarks, service marks, trade names, indications of source or appellations of origin, and the repression of unfair competition."); *see* Cahoy & Oswald, *supra* note 3, at 534 n.34.

27. *See* Henning Grosse Ruse-Khan, The International Legal Framework for the Protection of Utility Models, Paper Prepared for the WIPO Regional Seminar on the Legislative, Economic and Policy Aspects of the Utility Model System, Kuala Lumpur, Malaysia (Sept. 3–4, 2012), https://www.wipo.int/edocs/mdocs/aspac/en/wipo_ip_kul_12/wipo_ip_kul_12_ref_t3c.pdf.

28. *See* Cahoy & Oswald, *supra* note 3, at 527 ("[T]here appears to be no harmonization effort for this right or even general concern about its seemingly random availability or lack of treaty coverage.").

29. Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299 [hereinafter TRIPS Agreement].

30. DANIEL GERVAIS, THE TRIPS AGREEMENT: DRAFTING HISTORY AND ANALYSIS 337–38 (3rd ed. 2008) (explaining that the TRIPS Agreement was intended to cover only standard patents and not utility models).

31. Suthersanen (2019), *supra* note 2, at 6. Utility models have also been recognized in certain bilateral and multilateral trade and investment agreements. *See id*. at 6–7; Grosse Ruse-Khan, *supra* note 27, at 5–6.

32. *See* Patrick Ravillard, *The Proposal for a EU Directive on Utility Models*, 4 INT'L INTELL. PROP. L. & POL'Y 36-1, 36-1 to 36-4 (2000).

nizing European UM law,[33] and in 1997 issued a proposed Directive on the protection of UM.[34] The proposal was updated in 1999, but work on the proposal was suspended in 2000 owing to disagreements among member states,[35] notably the United Kingdom.[36] The proposed directive was formally withdrawn in 2006 as the Commission focused its attention on the development of a unitary patent system.[37] Yet in 2013, one year after regulations on the unitary patent were enacted in the European Union,[38] the Commission again turned its attention to UMs, commissioning a study of the economic impact of UMs on European markets.[39] The study was published in 2015,[40] yet we are not aware of any further movement toward the harmonization of European UM laws as a result. UMs are not included in the recent European legislation concerning the Unified Patent and Unified Patent Court (UPC),[41] and several countries that participate in the UPC system also maintain national UM systems.

Despite their absence from these substantive international agreements, UMs are covered by the World Intellectual Property Organization (WIPO) procedural Patent Cooperation Treaty, thus facilitating filing in multiple jurisdictions.[42]

## C. Characteristics of Utility Model Protection

While UM protection varies from country to country, UM protection systems share some key characteristics. This Section highlights some of the similarities and differences of UM protection around the world.

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33. *Green Paper on the Protection of Utility Models in the Single Market*, COM (95) 370 final (July 19, 1995). For a detailed description of E.U. efforts toward harmonization of UM systems, see Martin Stierle, *Utility Models and The European Union: A Need for Harmonisation*?, *in* SUB-PATENT INNOVATION RIGHTS, *supra* note 24.

34. *Proposal for a European Parliament and Council Directive Approximating the Legal Arrangements for the Protection of Inventions by Utility Model*, COM (97) 691 final (Dec. 12, 1997).

35. *Utility Models*, EUR. COMM'N, https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/patent-protection-eu/utility-models_en [https://perma.cc/KN86-G3Z5] [hereinafter *EC Utility Models*].

36. Alfred Radauer et al., *The Myth of the 'Small Patent for the Small Inventor'—Strategic Motives to Use Second-Tier Patent Systems (Utility Models) in Selected European Countries*, 14 J. INTELL. PROP. L. & PRAC. 771, 773 (2019).

37. *EC Utility Models*, *supra* note 35; Radauer et al., *supra* note 36, at 773.

38. Regulation 1257/2012, of the European Parliament and of the Council of 17 December 2012 Implementing Enhanced Cooperation in the Area of the Creation of Unitary Patent Protection, 2012 O.J. (L 361) 1 (EU); Council Regulation 1260/2012 of 17 December 2012, Implementing Enhanced Cooperation in the Area of the Creation of Unitary Patent Protection with Regard to the Applicable Translation Arrangements, 2012 O.J. (L 361) 89 (EU).

39. *EC Utility Models*, *supra* note 35.

40. Alfred Radauer et al., Eur. Comm'n Directorate-Gen. for Internal Mkt., Indus., Entrepreneurship & SMEs, *Study on the Economic Impact of the Utility Model Legislation in Selected Member States—Final Report* (Apr. 2015) [hereinafter *EC 2015 Study*].

41. *See* LUKE MCDONAGH, EUROPEAN PATENT LITIGATION IN THE SHADOW OF THE UNIFIED PATENT COURT 119 (2016).

42. Patent Cooperation Treaty Done at Washington on June 19, 1970, as amended.

### 1. *Eligible Subject Matter*

It is a common perception that UMs are intended to cover relatively simple product design features or "'minor' improvements" that do not rise to the level of inventiveness of patents.[43] For example, the original German UM system was directed toward physical products (i.e., those that possessed "spatial form" (*Raumform*)).[44] Thus, as recently as 2021, UMs in Germany were granted for inventions such as neck pillows (DE202021001064U1), Christmas tree stands (DE202021000981U1), drinking straws (DE202021103855U1), and a novel "mobile dog waste collection aid" (DE202021003254U1). However, the German spatial form requirement was eliminated in 1990.[45] Germany now permits UM protection for chemical and electrical designs, in addition to mechanical designs, resulting in what Mark Janis refers to as "a scope of eligible subject matter essentially congruent to that of the regular patent regime."[46] Thus, recent German UMs include a "communication control chip" (DE202021106098U1), a "circularly polarized cylindrical two-port MIMO dielectric resonator antenna device for 5G applications" (DE202021105303U1), and a "payment system with the option of transaction-specific rights control" (DE202021000532U1)—inventions that could easily be envisioned as the subjects of ordinary patent protection. This convergence of UM and patent coverage appears in several jurisdictions, such that many UMs today are virtually indistinguishable from patents, at least at a textual level.[47] Yet other jurisdictions continue to limit the subject matter for which UMs may be obtained, often excluding methods and processes, chemical compositions, and software.[48]

### 2. *Examination*

One key difference between UMs and patents is in the process and substance of their examination. Patents are typically examined by a governmental office that has technical expertise and applies strict criteria for patentability to claimed inventions. UMs, on the other hand, are often granted on a registration basis, in which they are granted without substantive examination, or in which an examination assesses only novelty but not nonobviousness.[49] These differ-

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43. *See* Radauer et al., *supra* note 36, at 772 (citing *Protecting Innovations by Utility Models*, WORLD INTELL. PROP. ORG. (2018), https://www.wipo.int/sme/en/ip_business/utility_models/utility_models.htm); *see also id.* at 771 ("[O]ne of the oldest, means to address the patent cost barrier for SMEs, is the creation of a second-tier patent system by means of introducing a utility model (UM), ie a second layer of IP rights akin to patents, but with less stringent patentability criteria.").

44. *See* Janis, *supra* note 11, at 164.

45. *See id.*

46. *See id.*

47. *See* Jussi Heikkilä & Michael Verba, *The Role of Utility Models in Patent Filing Strategies: Evidence from European Countries*, 116 SCIENTOMETRICS 689, 697 (2018) ("[T]here exists a subset of UM filings linked to inventions that are important enough to pass the threshold for patent protection.").

48. *See* AUSTRALIAN GOVT. PRODUCTIVITY COMM'N, INTELLECTUAL PROPERTY ARRANGEMENTS—PRODUCTIVITY COMMISSION REPORT NO. 78, at 243 tbl.8.2 (2016) (comparing scope of protection in various countries) [hereinafter AUSTRALIAN PRODUCTIVITY COMM'N REPORT].

49. *See id.* (comparing jurisdictions); Radauer et al., *supra* note 36, at 777–78.

ences result in the issuance of UMs in a manner that is generally faster and less expensive than patents.[50] Thus, while average prosecution times (the period from filing through issuance) for patents range from two to four years,[51] UMs are often issued in a matter of months.[52] However, the reduced examination given to most UMs makes their validity less certain than patents and does not confer on UMs the presumption of validity that is given to patents in many jurisdictions.[53]

### 3. *Validity Challenges*

UMs can be subject to validity challenges in either administrative or judicial proceedings. Administrative cancelation proceedings are typically brought before the governmental office issuing the UM.[54] In some countries, such challenges may not be brought until the UM is issued (i.e., pre-grant challenges are not available).[55] In court, the validity of a UM may often be challenged as a defense when the UM is enforced against an alleged infringer.[56]

### 4. *Enforcement*

The ability of holders to enforce UMs varies around the world. In a few jurisdictions, UMs may not be enforced in litigation; rather, the holder must seek a substantive examination or convert the UM to a patent before it can be enforced.[57] But in most jurisdictions, UMs may be enforced directly once they are issued.[58]

Some jurisdictions that permit the direct enforcement of UMs impose precursor requirements to enforcement. Japan, for example, requires that the holder

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50. *See* Radauer et al., *supra* note 36, at 771–72; *EC 2015 Study*, *supra* note 40, at 3 ("The highest benefit for users of the UM system is, practically across all countries, speed.").

51. *See, e.g.*, James Singer, *How Long Does U.S. Patent and Trademark Prosecution Take? (2022 Edition)*, JD SUPRA (Dec. 30, 2022), https://www.jdsupra.com/legalnews/how-long-does-u-s-patent-and-trademark-8285966/ [https://perma.cc/N6CN-B7AS] (average U.S. patent pendency in 2022 was 25.7 months).

52. *See* AUSTRALIAN PRODUCTIVITY COMM'N REPORT, *supra* note 48, at 242, tbl.8.1 (reporting average one-month processing time for Australian innovation patent and six months to several years for standard patents); Stefan Bianchin, *Utility Model—The Underestimated Property Right*, INTELL. ASSET MGT. (Oct. 26, 2021), https://www.iam-media.com/global-guide/innovation-invention-yearbook/2022/article/utility-model-the-underestimated-property-right [https://perma.cc/QVK4-6A6H]; Yifan Mao & Tiffany Thomas, *Utility Models: Economical, Efficient, and Enforceable Patent Protection*, JD SUPRA (June 23, 2022), https://www.jdsupra.com/legalnews/utility-models-economical-efficient-and-4367830/ [https://perma.cc/FX6Z-XY87]; *EC 2015 Study*, *supra* note 40, at 148.

53. *EC 2015 Study*, *supra* note 40, at 24 (Belgium), 136 (China), 148.

54. *See Utility Models*, WORLD INTELL. PROP. ORG., https://www.wipo.int/patents/en/topics/utility_models.html [https://perma.cc/R67U-8MRR] [hereinafter *WIPO Utility Models*] (choose "How can utility models be challenged by third parties?" from dropdown); Cahoy & Oswald, *supra* note 3, at 536–37.

55. *See, e.g.*, AUSTRALIAN PRODUCTIVITY COMM'N REPORT, *supra* note 48, at 242 tbl.8.1.

56. *See* Cahoy & Oswald, *supra* note 3, at 536–37.

57. *See, e.g.*, AUSTRALIAN GOV'T ADVISORY COUNCIL ON INTELL. PROP., REVIEW OF THE INNOVATION PATENT SYSTEM—FINAL REPORT 8 (2015) (owner of Australian innovation patent can enforce rights only after substantive examination and certification).

58. *See EC 2015 Study*, *supra* note 40, at 32, 51–52, 63.

of a UM obtain a technical opinion from the Japanese Patent Office regarding the compliance of the enforced UM with the requisite statutory requirements,[59] and France requires that the holder of a UM obtain and provide a search report to the accused infringer.[60]

Even with such requirements, UMs are frequently litigated in some jurisdictions. One Dutch researcher found in 2003 that Dutch "registration patents"—largely equivalent to UMs—were litigated 2.7 times more than ordinary patents.[61]

As with patents, remedies for infringement of UMs may include monetary damages and injunctive relief to prevent an infringer from continuing its infringement.[62] The enforcement of UMs has led to significant awards in some cases. For example, in one 2016 case, the owner of a UM claiming a "toe support pad" was awarded monetary damages of approximately US$1.2 million.[63] And in a Chinese case that was heard by the Supreme People's Court, the successful enforcer of a UM claiming the design of a selfie stick obtained a damages award of RMB 1 million, followed by the filing of a "massive number of lawsuits" against other manufacturers of this popular consumer product.[64]

In some jurisdictions, UMs have been used to tactical advantage in litigation.[65] For example, in Germany a UM may be "branched off" or filed on the basis of a pending patent application.[66] As a result, some applicants file UMs strategically to obtain quick protection for inventions that are making their way through the slower patent system. UMs can then be enforced against alleged infringers before the issuance of the corresponding patents, often resulting in the entry of an injunction barring the infringer from continuing to make or sell infringing products.[67] Protection can then be extended for an additional ten years once the corresponding patent issues. Moreover, as explained by one commen-

59. Masabumi Suzuki, *Utility Models in Japan*, *in* SUB-PATENT INNOVATION RIGHTS, *supra* note 24; Mao & Thomas, *supra* note 52.

60. Thibault Gisclard, *Utility Models in France*, *in* SUB-PATENT INNOVATION RIGHTS, *supra* note 24; Mao & Thomas, *supra* note 52.

61. Dick Van Engelen, *Beware the Wolf: Questions About the Dutch Registration Patent System*, PAT. WORLD, Dec. 2003–Jan. 2004, at 26, 28. *But see supra* note 22, and accompanying text (discussing abolition of Dutch UM system).

62. *See, e.g.*, *Enforcing Utility Model Rights*, GER. PAT. & TRADEMARK OFF., https://www.dpma.de/english/services/sme/enforcing_ip_rights/enforcing_utility_model_rights/index.html [https://perma.cc/82XV-KZ9D].

63. Suzuki, *supra* note 59; Mao & Thomas, *supra* note 52.

64. Yu Yang, *China's Utility Model Patent Legal System—Past, Present, and Future*, *in* SUB-PATENT INNOVATION RIGHTS, *supra* note 24; Mao & Thomas, *supra* note 52.

65. *See, e.g.*, Stefan Bianchin, *Utility Model—The Underestimated Property Right*, INTELL. ASSET MGT. (Oct. 26, 2021), https://www.iam-media.com/global-guide/innovation-invention-yearbook/2022/article/utility-model-the-underestimated-property-right [https://perma.cc/2KLG-XY4C] ("One of the main advantages of a German utility model is the various tactical options in its enforcement in infringement proceedings, which make it a highly flexible tool in the IP portfolio.").

66. *See* Peter Georg Picht & Marian Weber, *Utility Models in Germany and Switzerland*, *in* SUB-PATENT INNOVATION RIGHTS, *supra* note 24; *EC 2015 Study*, *supra* note 40, at 154.

67. *Id.* at 32–34.

tator, the scope of UM claims in Germany may be "tailored" to an infringer's products even after an infringement lawsuit has been filed.[68] That is,

> the owner has the opportunity to file new claims during the infringement proceedings and to adapt or even shift the scope of protection in view of the infringer's defence. The owner of the German utility model can thereby make very specific limitations, which are generally considered to be too restrictive in the framework of patent examination proceedings without the knowledge that the product may be at risk of later attack.
>
> Moreover, these tailored claims are only binding between the parties, as no limitation declaration is required vis-à-vis the public. In other words, the German utility model owner could assert other correspondingly tailored claims against another infringer using the entire disclosure of the utility model.[69]

Given the potential for tactical litigation use of UMs, some commentators have questioned the usefulness of UM systems. The Australian government, for example, noted that Australia's version of UMs, "innovation patents," were frequently "used strategically, either to target alleged infringers of standard patents or to increase uncertainty over the scope of rights for competitors."[70] In fact, the "high level of uncertainty" associated with UM protection has been cited as a tactical *advantage* for UM holders seeking to enforce their rights in litigation.[71]

## D. The Incentive Value of Utility Models

As noted at the beginning of this Article, UM systems were introduced in many jurisdictions to stimulate local innovation and industry via a low-cost pathway to intellectual property protection for modest or incremental designs not rising to the level of patentable invention.[72] There is significant debate whether UM systems around the world have achieved these goals.[73] As observed in a 2015 report commissioned by the European Commission,

> in catching up economies, particularly in Japan and also in Korea. . . . [i]t has been shown that UMs facilitated the development of local industry, by incentivising small improvements on existing state-of-the-art technologies from de-

68. Biancin, *supra* note 65.

69. *Id*.

70. AUSTRALIAN PRODUCTIVITY COMM'N REPORT, *supra* note 48, at 239, 255.

71. Biancin, *supra* note 65 ("As long as the protectability of the utility model has not been officially examined, it is often difficult for third parties to assess the extent to which the utility model is or could be legally valid without considerable analysis effort of their own. In practice, it has been shown that this hidden effect of a German utility model often leads to a significant competitive advantage for the owner.").

72. *See supra* notes 8–10 and accompanying text.

73. For an early skeptical view, see J.H. Reichman, *Of Green Tulips and Legal Kudzu: Repacking Rights in Subpatentable Innovation*, 53 VAND. L. REV. 1743, 1797 (2000) ("[P]roperty-based rules do not and cannot work in this environment. They return to the first comer too little or too much, they impede follow-on developments, ignore the significant contributions of the public domain, balkanize the knowledge base, and increase transaction costs.").

> veloped countries. However, once the economies matured, the UM lost much of its supportive function for this inward international technology transfer.[74]

Thus, Australia, in assessing its own UM-like system, determined that the system had outlived its usefulness and elected in 2021 to discontinue it entirely.[75] This debate continues in other jurisdictions that continue to recognize UMs. The findings of this study may cast further doubt on the innovation-promoting value of UMs among SMEs.

## II. STANDARDS ESSENTIAL PATENTS AND UTILITY MODELS

### A. FRAND Licensing Commitments

Technical interoperability standards such as Wi-Fi, 5G, and Bluetooth are communication protocols that enable products made by different manufacturers to communicate with little user intervention. Today, most of these standards are developed by firms that collaborate within SDOs.[76] Given the technical nature of their contributions, firms that participate in SDOs, particularly in the telecommunications and computing industries, can accumulate hundreds or thousands of patents covering key interoperability standards.[77]

To address concerns about the leverage that holders of such patents could exert on implementers of a standard after it has been widely adopted (so-called patent "hold-up"),[78] many SDOs have adopted policies requiring their participants to disclose patents that are believed to be "essential"[79] to the implementation of the SDO's standards in a product (standards-essential patents or SEPs) to other participants in the SDO before approval of the standard.[80] This obligation is intended to allow the SDO to work around or avoid any patent that could unduly impair the broad adoption of the standard.[81] SDO participants that fail to disclose SEPs when so required by an SDO's policies can be found to have

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74. *EC 2015 Study*, *supra* note 40, at 1–2; *see also* Suthersanen (2019), *supra* note 2, at 24 ("[W]hen the national economy and its industries reach higher levels of technological capacity, as in Japan and certainly Australia, it does appear that the disadvantages outweigh the perceived advantages.").

75. Rimmer, *supra* note 24.

76. *See generally* Justus Baron et al., Eur. Comm'n Joint Rsch. Ctr., *Making the Rules: The Governance of Standard Development Organizations and their Policies on Intellectual Property Rights* (Nikolaus Thumm ed., 2019) (providing a comprehensive analysis of the governance of standard development organizations).

77. Justus Baron & Tim Pohlmann, *Mapping Standards to Patents Using Declarations of Declared Standard-Essential Patents and Systems of Technological Classification*, 27 J. ECON. & MGMT. STRATEGY 504, 521 tbl.7 (2018).

78. *See generally* U.S. DEP'T. OF JUST. & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 42 (2007) ("Many SSOs have developed policies to mitigate hold up.") [hereinafter DOJ-FTC 2007 REPORT].

79. *See infra* Section II.B.

80. NAT'L RSCH. COUNCIL, PATENT CHALLENGES FOR STANDARD-SETTING IN THE GLOBAL ECONOMY 71–72 (Keith Maskus & Stephen A. Merrill eds., 2013).

81. *See id.* at 73.

breached the SDO's policy or to have engaged in deceptive or anticompetitive conduct.[82]

In addition, most SDOs also require their participants to license SEPs that they hold to the manufacturers of standardized products on terms that are either royalty-free or that bear no greater than FRAND royalties.[83] This obligation is intended to assure manufacturers that they will be able to incorporate widely adopted standards into their products without the threat of being prohibited from selling standardized products by the holders of SEPs.[84]

## B. Essentiality

An SEP holder's obligation to grant licenses to manufacturers of standardized products generally applies only to patents that are "essential" to the implementation of the standard.[85] That is, a product implementing the standard will necessarily infringe the claims of the patent.[86]

Holding an SEP is thus a double-edged sword in SDOs with a FRAND licensing commitment. On one hand, the owner must forego the right to use the SEP to exclude others from the market for standardized products by licensing the SEP to all implementers of the standard on FRAND terms.[87] But in return, the SEP holder is assured that all implementers of the standard will pay it a FRAND royalty.[88]

Despite the importance of essentiality to the value of patents covering standardized products, the essentiality of a particular patent to a particular standard is usually determined unilaterally by the patent holder without external verification.[89] Yet this decision is often made with incomplete information at a time when the patent in question may still be in prosecution and the standard is not yet finalized.[90] As such, the declaration of a patent as an SEP often constitutes

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82. *See* DOJ-FTC 2007 REPORT, *supra* note 78, at 43–45.

83. *See* Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889 (2002).

84. *See* DOJ-FTC 2007 REPORT, *supra* note 78, at 46–47.

85. Jorge L. Contreras, *Essentiality and Standards-Essential Patents*, *in* CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW: COMPETITION, ANTITRUST, AND PATENTS 209, 209 (Jorge L. Contreras ed., 2017) [hereinafter Contreras, *Essentiality*].

86. There are a few different variations of the "essentiality" definition, including some that are based on the "technical" essentiality of the patent in question (whether any product implementing the standard will infringe as a technical matter) versus "commercial" essentiality (whether any commercially viable product will infringe). *See id.* at 217–19.

87. This obligation applies only to SEP holders that participated in the development of the relevant standard and are thus bound by the licensing policies of the relevant SDO. *See* Jorge L. Contreras, *When a Stranger Calls: Standards Outsiders and Unencumbered Patents*, 12 J. COMP. L. & ECON. 507, 512 (2016) (discussing phenomenon of standards "outsiders"—SEP holders who are not bound by SDO policies).

88. The situation is different with respect to standards subject to a royalty-free or RF licensing commitment. There, SDO participants generally prioritize the sale of standardized products over seeking to earn royalties from their SEPs. *See* Jorge L. Contreras, *A Tale of Two Layers: Patents, Standardization and the Internet*, 93 DENVER L. REV. 855, 862 (2016).

89. Contreras, *Essentiality, supra* note 85, at 222.

90. *Id.* at 223.

a best guess by the SEP holder about the likely essentiality of an issued patent to a published standard.

Not surprisingly, given the potential royalty revenue that may be earned from SEPs, and the potential liability that can arise under the antitrust and competition laws from the *failure* to disclose SEPs in compliance with an SDO's policies, SDO participants have often erred on the side of over-declaration of SEPs.[91] For this reason, the essentiality of declared SEPs to particular standards is frequently challenged in litigation, with the result that some patents asserted against products implementing standards for which they were declared essential are found to be neither essential to the standard nor infringed by the product implementing the standard.[92]

## C. Injunctive Relief and SEPs

One remedy available to a patent holder upon proving infringement is a court-ordered injunction preventing an infringer from continuing to produce or sell infringing products.[93] The availability of injunctions when SEPs are infringed has been the subject of considerable debate over the past two decades, as the general availability of the injunction remedy can be seen to conflict with the SEP holder's commitment to grant licenses to all implementers of the standards covered by the SEPs.[94] As a result, the availability of injunctive relief when SEPs are infringed by an unlicensed implementer varies by country, and may depend on applicable competition law as well as a determination whether the infringing implementer is "willing" to accept a license on FRAND terms.[95]

## D. Utility Models as Standards Essential

In addition to patents, some SDO policies require SDO participants to disclose UMs as potentially essential to implement their standards. This requirement is made explicit, for example, in the *Guidelines for Implementation of the Common Patent Policy* of the International Telecommunications Union (ITU), International Organization for Standardization (ISO), and International Electrotechnical Committee (IEC), which defines a "patent" as including "those claims contained in and identified by patents, utility models and other similar statutory

91. *See id.* at 224–25 (collecting statistics showing actual rates of essentiality of some standards ranging from 28% to slightly over 50%).

92. *See* Mark A. Lemley & Timothy Simcoe, *How Essential Are Standard-Essential Patents?*, 104 CORNELL L. REV. 607, 608 (2019) ("SEPs . . . are significantly less likely to be infringed [than a matched set of litigated non-SEPs]. SEPs, then, don't seem to be all that essential, at least when they make it to court.")

93. *See* Norman V. Siebrasse et al., *Injunctive Relief*, *in* PATENT REMEDIES AND COMPLEX PRODUCTS: TOWARD A GLOBAL CONSENSUS 115 (C. Bradford Biddle et al. eds., 2019).

94. *See* Justus Baron et al., Eur. Comm'n Directorate-Gen. for Internal Mkt., Indus., Entrepreneurship & SMEs, *Empirical Assessment of Potential Challenges in SEP Licensing*, at 82–84 (2023) [hereinafter *EC 2023 SEP Report*]; Jorge L. Contreras et al., *The Effect of FRAND Commitments on Patent Remedies*, *in* PATENT REMEDIES AND COMPLEX PRODUCTS: TOWARD A GLOBAL CONSENSUS 160, 171–90 (C. Bradford Biddle et al. eds., 2019).

95. *See* Contreras et al., *supra* note 94.

rights based on inventions (including applications for any of these)."[96] Other prominent SDOs, including the European Telecommunications Standards Institute (ETSI), the Internet Engineering Task Force (IETF), and the HDMI Forum, also expressly require the disclosure or licensing of UMs that are believed to be essential to a standard.[97]

While the policies of some SDOs expressly mention UMs, the policies of other SDOs, including the Advanced Television Systems Committee (ATSC)[98] and Joint Electron Device Engineering Council (JEDEC),[99] do not, and instead apply their disclosure and licensing requirements only to "patents." At these SDOs, it is not clear what effect the disclosure of a UM under the SDO's disclosure or licensing policies would have, and whether the FRAND or other licensing commitments of the SDO apply to UMs. Conversely, it is not clear whether an SDO participant's failure to disclose a UM would constitute a violation of such an SDO's disclosure policy or deceptive conduct that is otherwise actionable. The implications of this definitional gap are considered more fully in Section IV.B, below.

And while commentators have casually observed that UMs have infrequently been disclosed as essential to technical standards,[100] there has not, until this study, been an empirical assessment of the rate at which UMs are declared to be essential to industry standards. With the caveat that, just as with patents, a declaration to an SDO that a UM is believed to be essential to the implementation of a particular standard is not an assurance that the UM will ultimately be found to be essential, this Article refers to such declared UMs as standards-essential utility models or SEUMs.

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96. INT'L TELECOMMUNICATIONS UNION ET AL., GUIDELINES FOR IMPLEMENTATION OF THE COMMON PATENT POLICY FOR ITU-T/ITU-R/ISO/IEC 2 (2018), https://www.itu.int/dms_pub/itu-t/oth/04/04/T04040000010005PDFE.pdf [https://web.archive.org/web/20220216105452/https://www.itu.int/dms_pub/itu-t/oth/04/04/T04040000010005PDFE.pdf].

97. *See* RUDI BEKKERS & ANDREW UPDEGROVE, IPR POLICIES AND PRACTICES OF A REPRESENTATIVE GROUP OF STANDARDS-SETTING ORGANIZATIONS WORLDWIDE 54 (2013) (noting utility model requirements of major SDOs); *see also* GUIDE TO PATENT POLICIES OF STANDARDS-DEVELOPMENT ORGANIZATIONS 18 (Jorge L. Contreras et al. eds., 2d ed. 2022) [hereinafter GUIDE TO PATENT POLICIES] (noting the "catch all" term that includes utility models in SDO disclosure policies).

98. ADVANCED TELEVISION SYSTEMS COMMITTEE, INC., PATENT POLICY—DOCUMENT B/04 § 11.b (2007) ("'Essential Claim' means claims of all patents issued, and patent applications filed, under the laws of any country that are necessarily infringed by implementing the normative portion of a Specification Document.") (emphasis omitted).

99. JEDEC SOLID STATE TECH. ASS'N, JEDEC MANUAL OF ORGANIZATION AND PROCEDURE § 8.2.1 (2022) (defining "Patent" as "All classes or types of patents other than design patents (including, without limitation, originals, divisions, continuations, continuations-in-part, extensions or reissues), and applications for these classes or types of patents throughout the world.").

100. *See, e.g.*, BEKKERS & UPDEGROVE, *supra* note 97, at 54.

## III. DATA CONCERNING STANDARDS ESSENTIAL UTILITY MODELS

### A. Empirical Literature Concerning Utility Models

Over the years, a small amount of empirical literature concerning utility models has emerged. In 2006, Uma Suthersanen[101] analyzed empirical data on UM filings in Germany, Japan, Korea, China, Malaysia, and Taiwan, and Suthersanen and her colleagues' 2008 work[102] collects contributions including empirical data on UM filings in Singapore, Australia, Japan, Korea, China, various ASEAN nations, and Mexico. Both of these foundational works seek to assess the effectiveness of UM systems as promoters of local innovation, particularly in emerging economies. Relatedly, Jussi Heikkilä's 2023 work develops a set of key performance indicators (KPIs) for UM systems based on a literature review and the public statements of governmental issuing offices.[103]

UMs have also been the subject of a handful of more recent studies focusing on business strategy and innovation theory. Yee Kyoung Kim and coauthors' 2011 work[104] analyzes Korean UM filings to assess their contribution to firm performance. Siwei Cao and coauthors' 2014 work[105] compares firms' filing behavior for inventions protected in both the United States and China. Heikkilä and Annika Lorenz's 2018 study[106] observes the strategic utilization of UMs by German firms, while Heikkilä and Michael Verba's 2018 work[107] explores the structures and characteristics of European patent families that include UMs. Daniel Cahoy and Lynda Oswald's 2021 work uses U.S. patent priority data to assess the degree to which firms elect to pursue patent versus UM protection for similar innovations.[108] Finally, Huiyan Zhang's 2022 work[109] investigates the frequency with which UMs are litigated in China and the characteristics that make both patents and UMs more likely to be litigated.

While Section III.C of this Article presents additional empirical data regarding UM filings and litigation worldwide, the purpose of this Article is not to analyze UM systems generally. Rather, the empirical data on UM systems

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101. SUTHERSANEN (2006), *supra* note 8.

102. INNOVATION WITHOUT PATENTS: HARNESSING THE CREATIVE SPIRIT IN A DIVERSE WORLD (Uma Suthersanen et al. eds., 2007).

103. Jussi T.S. Heikkilä, *Key Performance Indicators for Utility Model Systems*, WORLD PAT. INFO., Sept. 2023, art. no. 102222, at 1.

104. Yee Kyoung Kim et al., *Appropriate Intellectual Property Protection and Economic Growth in Countries at Different Levels of Development*, 41 RSCH. POL'Y 358 (2011).

105. Siwei Cao et al., Speed vs. Length of Patent Protection Evidence from Innovations Patented in U.S and China (2014) (unpublished working paper), https://are.berkeley.edu/sites/default/files/job-candidates/pdfs/SiweiCao_WP101214.pdf.

106. Jussi Heikkilä & Annika Lorenz, *Need for Speed? Exploring the Relative Importance of Patents and Utility Models Among German Firms*, 27 ECON. INNOVATION & NEW TECH. 80 (2018).

107. Heikkilä & Verba, *supra* note 47.

108. *See* Cahoy & Oswald, *supra* note 3.

109. Huiyan Zhang, Characteristics of Litigated Patents in Weak Intellectual Property Rights Regimes: Evidence from China (2022) (unpublished manuscript), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4196569.

presented in Section III.C are intended to provide background for the more detailed discussion and analysis of SEUMs in Section III.D.

## B. Methodology

This study used data on UM filings around the world provided by the World Intellectual Property Organization (WIPO)[110] as well as the IPlytics platform (now a part of LexisNexis).[111] As an official United Nations organization, WIPO makes available filing data from the patent offices of its 193 member states.[112] The IPlytics database includes patent and UM filing data from over 67 national and regional patent offices.[113] IPlytics also contains SEP declarations made at 35 different SDOs and 11 patent pools, including disambiguated information regarding SEP declarants, as well as information (sourced from Darts-ip[114]) concerning SEPs that have been litigated.[115] These databases were queried between March and May 2023. Separately, detailed information regarding litigated SEUMs was sourced from Darts-ip.

## C. Findings—Utility Models

In Section III.C, descriptive statistics are presented regarding all UM filings, applicants, and litigation. Section III.D, below, then turns to SEUMs.

### 1. *Utility Model Filings by Country*

From 1990 to 2021, inclusive, approximately 23 million applications for UMs were filed across 194 jurisdictions, with approximately 17.7 million filed between 2012 and 2021, inclusive (see Appendix A, Supplemental Data Table 1). China is by far the jurisdiction in which the most UMs are filed.[116] In 2021 alone, there were 2.8 million Chinese UM filings out of a global total of 2.9 million (97.6%), and from 1990 to 2021, collectively, there were 19.8 million Chinese UM filings out of a global total of 23.5 million (84.4%). The growth of Chinese UM filings is discussed in greater detail below.

Other than China, several jurisdictions including Germany, Korea, Japan, Taiwan, and Russia have consistently had significant numbers of UM filings. Figure 1 shows the top 10 jurisdictions for UM filings in 2021, as well as cumulative UM filings for the period 1990 to 2021.

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110. *WIPO IP Statistics Data Center*, *supra* note 1.

111. IPLYTICS, https://platform.iplytics.com (last visited Dec. 15, 2023).

112. *Member States*, WORLD INTELL. PROP. ORG., https://www.wipo.int/members/en/ (updated as of Feb. 2023 at time of search).

113. IPLYTICS, IPLYTICS PLATFORM DATA SOURCES 5, https://platform.iplytics.com/pdf/IPlytics_DataSources_EN.pdf [https://perma.cc/GQ7M-GLD4].

114. *Unparalleled Global IP Case Data, Intelligence and Expertise: Darts-IP*, CLARIVATE, https://clarivate.com/darts-ip/ (last visited Dec. 12, 2023).

115. The IPlytics database, which we used in this study, does not distinguish between litigation in judicial proceedings and validity challenges at patent offices and other administrative tribunals.

116. For additional data and a discussion of UM filings in China, see Yu, *supra* note 64.

**Figure 1. Top 10 Utility Model Filing Jurisdictions (Excluding China), 1990–2021 and 2021**

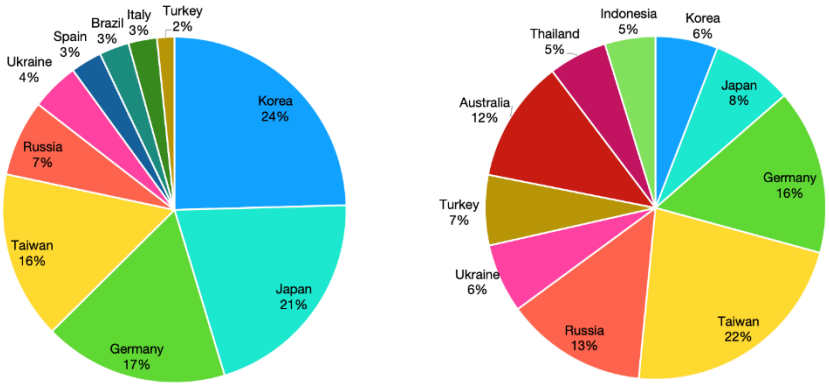
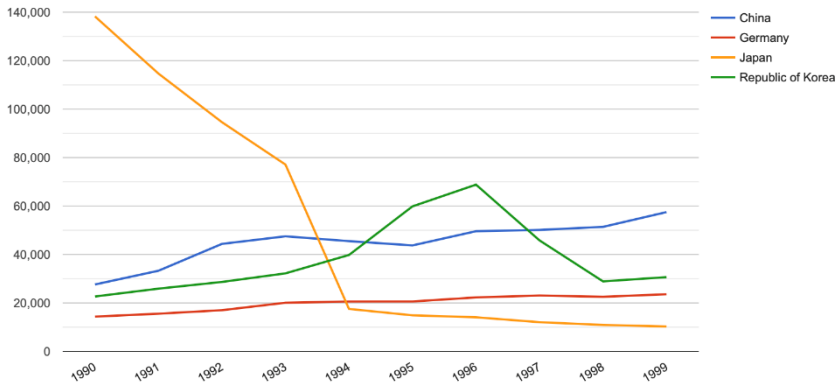



Figure 1 highlights a number of notable shifts in UM filings over time. First, Korea and Japan, both early leaders in UM filings, have dropped in ranking, leaving Germany and Taiwan as the highest filing jurisdictions after China. Countries in Central Europe and Asia Minor including Russia, Ukraine, and Turkey, as well as smaller Asian jurisdictions such as Thailand, Indonesia, Philippines, and Hong Kong have increased their rankings at the expense of European jurisdictions such as Spain, Italy, and Poland. Some of these trends are examined in greater detail below.

Figure 2 illustrates the filing trend for UMs during the 1990s, when four jurisdictions—China, Germany, Japan, and Korea—dominated, representing 1.5 million of 1.7 million total UM filings worldwide (89.5%). This period marks the beginning of China's rise to become the dominant jurisdiction for UM filings.

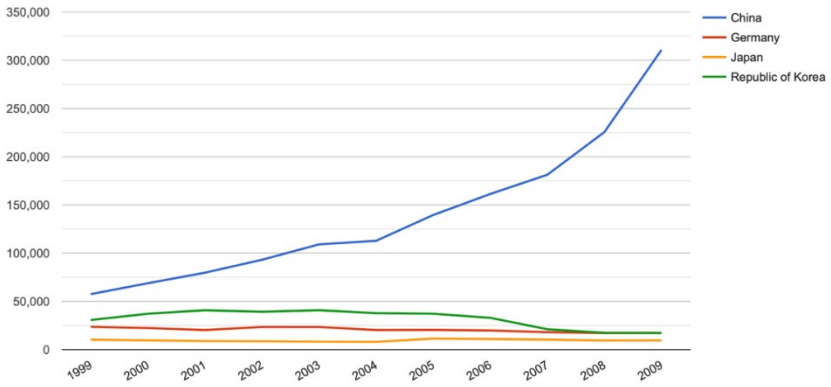
**Figure 2. Utility Model Filings 1990–1999 in Top 4 Jurisdictions**




From 1990 to 1993, China, Germany, and Korea had comparable levels of UM filings, with Japan leading by a significant margin. A statutory change in Japan in 1993 led to a sharp decrease in Japanese filings.[117] From 1995 to 1997, Korea was the UM filing leader but was overtaken by China in 1997 with approximately 50,000 filings to Korea's 46,000.

As shown in Figure 3, annual Chinese filings began to increase rapidly in the early 2000s, breaking the 100,000 mark in 2003 (representing 52% of all filings worldwide).

**Figure 3. Utility Model Filings 1999–2009 in Top 4 Jurisdictions**



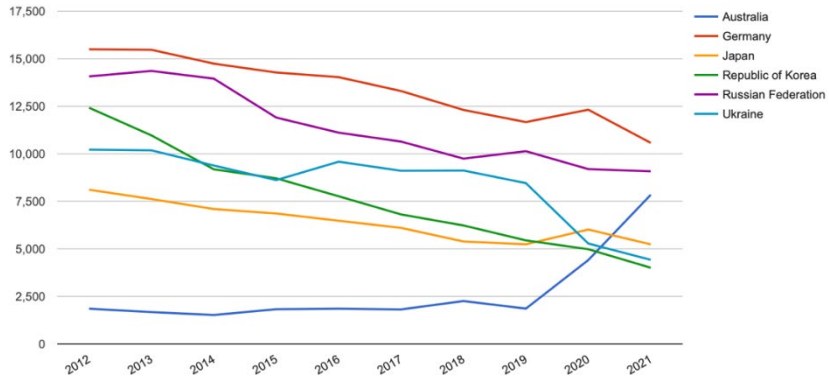

In 2011, China's 585,000 UM filings represented 87.2% of the 671,000 filings worldwide, and in 2021, China's 2.8 million filings represented 97.6% of

117. Suzuki, *supra* note 59.

the global total. The reasons for China's rapid embrace of UM filings has been discussed in the literature and is beyond the scope of this Article.[118]

As a result of China's massive surge of UM filings, analysis of activity in the rest of the world can only be appreciated if Chinese filings are omitted. Thus, from 2012 to 2021, approximately 424,000 filings in the top 6 jurisdictions other than China (Australia, Germany, Japan, Russia, Korea, and Ukraine) accounted for 55% of non-China filings during that period. These filings reveal a few interesting trends shown in Figure 4.

**Figure 4. Utility Model Filings, 2012–2021, Top 6 Jurisdictions (Excluding China)**




As shown in Figure 4, with the exception of Australia, filings in each of these jurisdictions declined during the period. Declines ranged from 32% (Germany, with approximately 11,000 filings in 2021) to 68% (Korea, with approximately 4,000 filings in 2021). Australia is the exception, possibly because, as noted above, Australia abolished its innovation patent (UM) system in 2021. Beginning in 2019, Australian filers may have sought to obtain as much protection as possible while it was still available.

### 2. *Utility Model Filers*

The UM systems of certain jurisdictions appear to be more attractive to foreign filers than others. For example, the vast majority of Japanese UM filers are firms headquartered in Japan. From 2000 to 2022, of the top 30 applicants for Japanese UMs, only two were non-Japanese (Foxconn (Taiwan)[119] and Applied Materials (United States)). Filings in Japan are also exceptionally distributed, with the top 1,000 filers representing only 8.4% of total applications during that period. A similar pattern appears to exist in China, where the vast majority of

118. *See, e.g.*, Yu, *supra* note 64; Prud'homme, *supra* note 4, at 52.

119. Foxconn is a Taiwan-based conglomerate that, for purposes of this Article, is used as an umbrella designation for Hon Hai Precision Industry Co., Fushikang (Kunshan) Computer Connectors Co. and Sharp.

UM applicants appear to be local Chinese firms, though the large number of Chinese UM filings make this observation difficult to verify empirically.

In Germany, on the other hand, 10 of the top 30 UM applicants are foreign based, including the top filer, Ford Motor Co., whose 1,959 applications are nearly double the number of applications by the second highest filer, Siemens (with 1,028 applications).[120] Other non-German applicants in the top 30 are based in the United States, Hong Kong, Taiwan, Korea, Japan, and Italy.[121] German UM applications are distributed, but far less so than Japanese UM applications, with the top 1,000 German UM applicants representing approximately 73,000 of 313,000 applications from 2000 to 2022 (23%).

## D. Findings—Standards Essential Utility Models (SEUMs)

Section III.C considered UM filings of all kinds. Section III.D focuses on SEUMs—UMs that are declared by a party to be essential to an industry standard.

### 1. *Technical Content of SEUMs*

As discussed in Section I.C.1, UMs may cover anything from very simple mechanical designs to complex technological systems. In the case of SEUMs, claimed inventions tend to be more complex, given that most standardized technologies covered by patents and UMs are electronic and software based. As a result, the technical descriptions and claims contained in these SEUM documents are largely indistinguishable from those contained in patent documents.

### 2. *SEUM Declarations*

In considering SEUMs, it is important to recall that a single UM (like a single patent) may be declared potentially essential to different standards and different versions of the same standard. Thus, when considering standards-essential patents (SEPs), from 1990 to 2022, approximately 5.9 million individual SEP declarations were made across all SDOs tracked by IPlytics, covering approximately 500,000 unique patents (counted by declaration year). The number of SEUMs is far lower. During the same period, approximately 7,700 SEUM declarations corresponding to 947 unique UMs were identified, representing approximately 0.2% of all SEP declarations.

It is worth noting that some SDOs (such as IEEE, responsible for the pervasive Wi-Fi standards) do not require the declaration of specific SEPs or SEUMs, and permit participants to make "blanket" commitments to license all patents/UMs that they hold on specified (i.e., FRAND or royalty-free) terms.[122] These patents/UMs, while potentially numerous, are not included in these data,

120. Ford may have a particular business strategy favoring UMs. *See* Cahoy & Oswald, *supra* note 3, at 568.

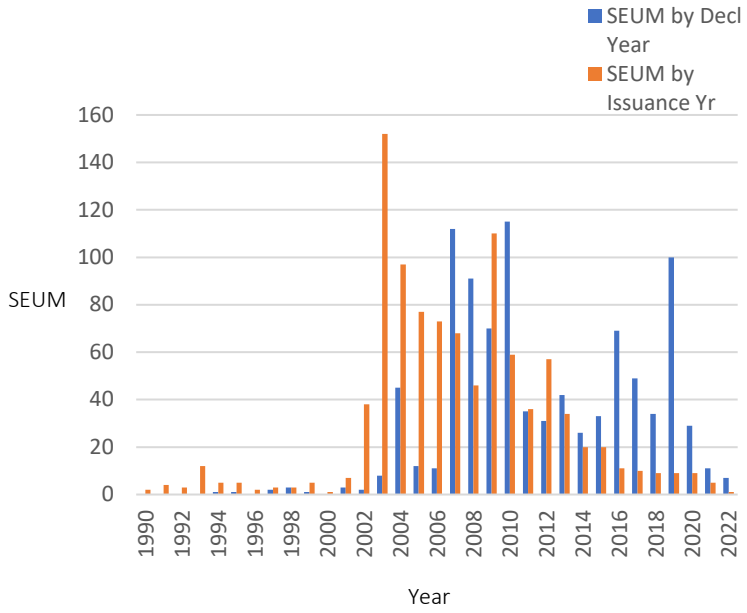
121. Cahoy and Oswald found that, as of 2017, firms based in the United States, Japan, China, Germany, Korea, and Switzerland filed the greatest number of UM applications outside of their home jurisdictions. Cahoy & Oswald, *supra* note 3, at 556–57.

122. *See* GUIDE TO PATENT POLICIES, *supra* note 97, at 74, 135.

which refer exclusively to UMs that are specifically identified (by application or registration number) as potentially essential to particular industry standards.

Figure 5 shows total declared SEUMs by year of UM issuance and year of first declaration. Declarations can be made years after a patent is issued (e.g., in response to a "call for patents" made when a draft standard is submitted to the SDO for approval[123]), explaining why declarations appear to be weighted toward later years in comparison to the years in which those UMs were issued. While SEUM declarations clearly began to increase after 2003, the fluctuating declaration pattern from 2003 to 2022 is difficult to explain except as a function of individual corporate strategies by UM holders (see Subsection 4, below).

**Figure 5. SEUM Filings by Year**




## 3. *Geographic Distribution of SEUMs*

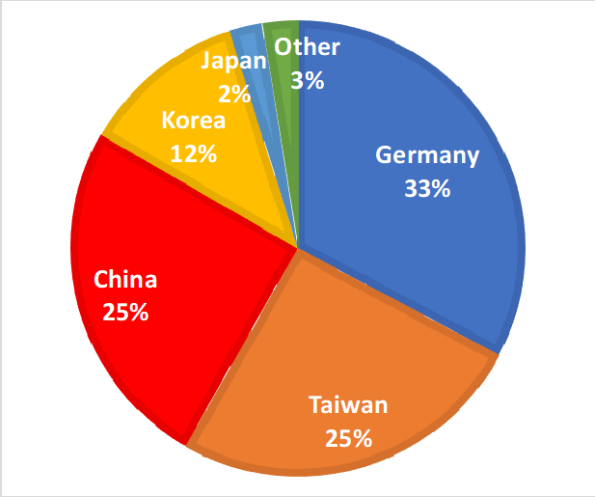
A total of 946 SEUMs were declared across a total of fourteen jurisdictions between 1990 and 2022.[124] Data regarding each jurisdiction in which SEUMs were declared during this period, compared to overall UM filings and SEP declarations in these jurisdictions, is contained in Appendix A's Supplemental Data Table 2.

123. *See id.* at 66–67, 124–25.

124. Excludes five apparently spurious/erroneous UM declarations arising from what appear to be errors in declaration documents filed with the ATSC SDO.

Figure 6 illustrates the distribution of declared SEUMs among jurisdictions. As shown, the distribution varies significantly from that of all SEP declarations and UMs generally. First, the number of SEUMs is considerably lower than the total number of declared SEPs in those jurisdictions (based on the data shown in Appendix A, Supplemental Data Table 2).[125] Second, SEUMs make up the highest portion of SEPs in Germany (4.26%) and Taiwan (2.05%). This percentage approaches zero in most other jurisdictions, with six or fewer SEUMs declared in all but the top 5 jurisdictions.[126]

**Figure 6. Share of SEUM Declarations by Jurisdiction, 1990–2022**




Perhaps the most notable divergence among filing rates of SEUMs, SEPs, and UMs within a jurisdiction can be seen in China, which has by far the greatest number of UMs worldwide (97.6%). While patents issued by China have been declared as SEPs more than patents issued by any other country in this study,[127] the total number of Chinese SEPs exceeds that of Japan and Korea by only a factor of two. Of Chinese SEPs, only 237 are SEUMs (0.32%), placing China behind both Germany and Taiwan in terms of SEUM declarations and behind Germany, Taiwan, Ukraine, and France in terms of the percentage of UMs that are declared as SEUMs. Moreover, given China's huge number of UMs (nearly 20 million), the percentage declared as SEUMs is vanishingly small. These results reinforce the notion that the Chinese UM system is largely oriented toward local manufacturing of simple products and not toward the type of sophisticated international technology development that occurs within SDOs. Nevertheless,

125. Note that total SEP figures include SEUMs.

126. While UMs filed in different jurisdictions may be, and likely are, related to the same or similar inventions, they are not readily identified as belonging to the same "family" in the same manner as patents. *See supra* note 113.

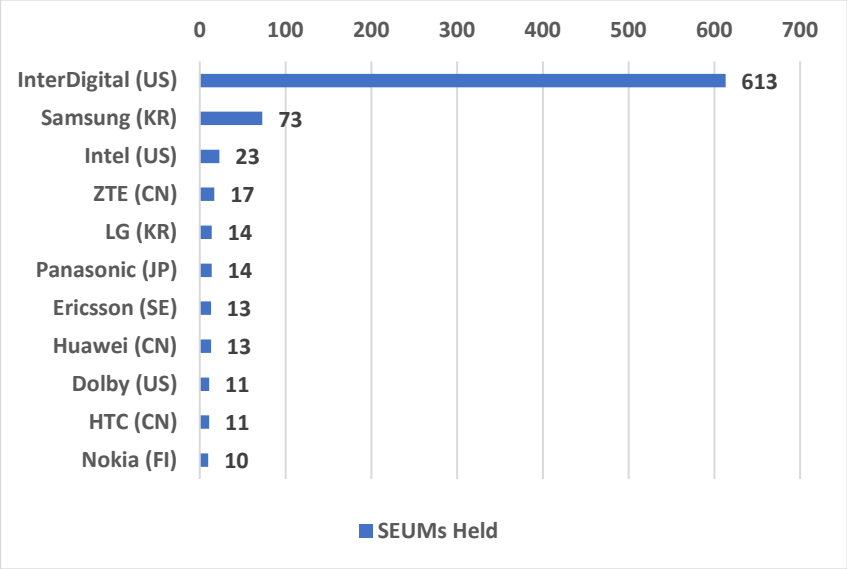
127. Data from countries that lack UM systems, such as the United States, are not included. From 1990 to 2022, 102,663 U.S. patents were declared as SEPs.

Chinese UMs are still declared as SEUMs more than UMs from any countries other than Germany and Taiwan. Thus, even though SEUMs represent a small percentage of China's overall UM volume, the number of Chinese SEUMs is significant.

### 4. *SEUM Declarants*

Unlike ordinary UMs, which have applicants from a broad cross-section of industries and geographies, the majority of SEUM declarations have been made by a single firm: U.S.-based Interdigital, which has, from 1990 to 2022, declared 613 of a total 985 declared SEUMs (61%). Figure 7 shows the number of declared SEUMs held by declarants of ten or more SEUMs during this period (with full data in Appendix A, Supplemental Data Table 3).

**Figure 7. Top SEUM Declarants, 1990–2022**




As shown in Figure 7, InterDigital, based in the United States, has been the most prolific declarant of SEUMs by a wide margin. Yet InterDigital's SEUM filing and declaration program is of largely historical interest. Representatives of InterDigital note that the company filed numerous UMs between March 2001 and January 2012, with the volume decreasing substantially beginning in 2009.[128] As of July 2023, InterDigital claims that it holds no active UMs.[129]

128. Email correspondence between Professor Contreras and Jim Harlan, Director of Standards & Competition Policy, InterDigital (July 25, 2023) (on file with author).

129. *Id.*

In addition to InterDigital, the top 11 SEUM filers include two other U.S. firms, Intel and Dolby Laboratories, despite the fact that the United States does not itself have a UM system. This observation suggests that firms such as these operate strategically across borders, irrespective of the rights offered by their home jurisdictions.[130] The other top SEUM holders originate from Korea (Samsung and LG), China (ZTE, Huawei), Taiwan (HTC), Japan (Panasonic), Sweden (Ericsson), and Finland (Nokia). Each of these jurisdictions has a UM system.

Below the top 11 firms, an additional 123 firms from a range of countries held between one and seven SEUMs each, with a total of 173 SEUMs among them. This "long tail" suggests that, other than InterDigital during the early 2000s and possibly some of the other top SEUM filers, firms involved in standardization have not developed a concerted strategy of filing UMs or declaring SEUMs to SDOs, resulting in SEUM declarations that are for the most part sporadic and nonpurposive.

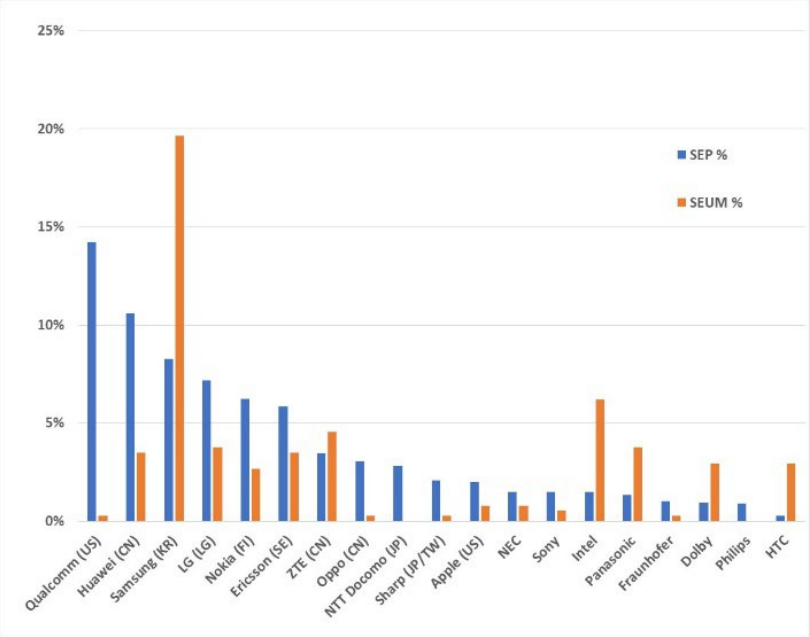
While the absolute number of SEUM declarations made by individual firms may allow conclusions to be drawn about firm strategy, additional insight can be gained by comparing SEUM declarations with SEP declarations made by these firms. Figure 8 compares the SEUM declarations made by the top SEUM declarants (excluding, for purposes of presentation, InterDigital[131]) with SEP declarations by those firms and other top SEP declarants, in each case based on the percentage that such firms' declarations represent of all SEUM and SEP declarations.

Interestingly, there appears to be little correspondence between the percentage of SEP and SEUM declarations made by any given firm. Most striking is InterDigital, which declared 613 of 985 SEUMs (62%) but only 21,404 of 502,717 SEPs (4.3%). As shown in Figure 8, Samsung, Intel, Panasonic, Dolby, and HTC follow a similar pattern, accounting for a much larger share of SEUM than SEP declarations. In contrast, firms such as Qualcomm, Huawei, LG, Nokia, Ericsson, Oppo, NTT Docomo, Sharp, and Apple were responsible for a much larger share of SEP than SEUM declarations.

130. *See* Cahoy & Oswald, *supra* note 3, at 529 (discussing firm strategy towards UM filings).

131. InterDigital is excluded from Figure 7 to avoid its graphical "swamping out" the distinctions among other SEUM declarants.

**Figure 8. Comparison of SEP and SEUM Declaration Shares by Top SEUM Declarants (excluding InterDigital), 1990–2022**




## 6. *Jurisdictional Choices by SEUM Declarants*

The jurisdictions in which SEUMs are issued do not correspond to the national origin of their declarants, nor do they follow any discernable pattern at all. Table 1 below shows the countries in which declared SEUMs have been issued for the top 5 SEUM holders.

**Table 1. Jurisdictions of SEUMs Filed by Top Filers, 1990–2022**

| | InterDigital | Samsung | Intel | ZTE | LG | TOTAL |
|---|---|---|---|---|---|---|
| **Taiwan** | 228 | | | | | 228 |
| **China** | 201 | | 9 | | | 210 |
| **Germany** | 105 | 66 | 13 | 9 | 9 | 202 |
| **Korea** | 79 | 6 | | | 5 | 90 |
| **Japan** | | 1 | | | | 1 |
| **France** | | | 1 | | | 1 |
| **Denmark** | | | | 5 | | 5 |
| **Hungary** | | | | 2 | | 2 |
| **Finland** | | | | 1 | | 1 |
| **TOTAL** | 613 | 73 | 23 | 17 | 14 | 740 |

Perhaps the only general conclusion that can be drawn from Table 1 is that most large holders of SEUMs declared German SEUMs. Despite China's significant share of all global UMs, only two U.S.-based firms, InterDigital and, to a lesser degree, Intel, have declared SEUM's issued in China.

Curiously, ZTE, a large Chinese handset manufacturer, has declared no SEUMs issued in China, but is the declarant of the only SEUMs issued by three smaller European jurisdictions (Denmark, Hungary, and Finland). While Finland, the headquarters of Nokia, may have been a factor in this single SEUM declaration, it is notable that Nokia itself is not a top SEUM declarant. Moreover, there is no obvious explanation for ZTE's interest in Denmark or Hungary, and this declaration pattern must be attributable to ZTE's unique business objectives and strategies. In short, these statistics reveal a highly idiosyncratic pattern of SEUM declaration across firms, which is likely driven by individual firm strategies.[132]

### 6. *SEUMs and SDOs*

SEUMs have been declared across a variety of SDOs. Table 2 shows the SDOs at which SEUMs have been declared from 1999 to 2022 across the top 5 UM filing jurisdictions.

**Table 2. SDOs in which SEUMs are Declared, 1999–2022**

| SDO | China | Germany | Japan | Korea | Taiwan |
|---|---|---|---|---|---|
| ANSI | 1 | | | | 1 |
| ARIB | | 1 | 2 | 1 | |
| ATSC | 7 | 22 | 4 | 7 | 7 |
| Blu-Ray | | 1 | | | |
| ETSI | 220 | 281 | 13 | 111 | 226 |
| IEC | 1 | | | | |
| IEEE | | 1 | | | |
| IETF | | | 1 | 1 | 1 |
| ISO | | 3 | | | |
| ITU-T | 1 | 9 | 1 | 1 | 2 |
| JEDEC | 7 | 6 | 1 | 2 | 4 |
| OMA | | 1 | | | |
| SMPTE | | | | 1 | |
| WPC | | 1 | | | |

Not surprisingly, the "xG" series of wireless telecommunications standards developed under the aegis of ETSI, which is documented as having the largest number of SEP declarations anywhere,[133] also has the most SEUMs declared against it. Yet several other SDOs also have declared SEUMs. ATSC, ITU-T,

132. Such idiosyncratic UM strategies were also observed by Cahoy and Oswald with respect to the automotive industry and its pursuit of UMs. *See* Cahoy & Oswald, *supra* note 3, at 568.

133. *See* Baron & Pohlmann, *supra* note 77, at 520 & tbls.5 & 6, 521.

and JEDEC include declared SEUMs from each of the top 5 SEUM jurisdictions, while nine other SDOs have a handful of SEUM declarations.

Moreover, individual firms choose which SDOs to participate in based on their own product offerings and research programs. Thus, firms primarily engaged in wireless telecommunications and heavily involved in standardization at ETSI would not necessarily participate in JEDEC, which focuses on semiconductor memory devices.

## E. SEUMs in the Judicial System

SEPs can give their owners significant leverage in the negotiation of licensing agreements, in part, because SEPs can be enforced in court against unlicensed implementers. Depending on the jurisdiction, a court may award an SEP holder that successfully enforces its SEP against an unlicensed implementer monetary damages and fee awards. The court may also enjoin the implementer from further manufacturing or selling standards-compliant products.[134] In recent years, there has been a significant amount of SEP- and FRAND-related litigation. One 2023 study commissioned by the European Commission identified more than 1,000 reported judicial decisions involving FRAND issues around the world between 2009 and 2021.[135] Another recent study found that in the United States, disclosed SEPs are more than five times more likely than non-SEPs to be litigated.[136] Litigation of SEPs is thus a significant feature of the standards-setting environment.

In addition to enforcement litigation, the validity of SEPs can be challenged in judicial and administrative proceedings around the world (e.g., oppositions at the European Patent Office and *inter partes* review proceedings at the U.S. Patent Trials and Appeal Board). We are unaware of statistics regarding the total number of such challenges, though Lemley and Simcoe recently studied validity rates of SEPs challenged in U.S. litigation.[137]

The frequency with which SEUMs are enforced or challenged in administrative proceedings (which, for the sake of convenience, we refer to as "litigated"), however, has not been studied. This Section provides initial descriptive statistics concerning litigation and challenge of UMs and SEUMs.

### 1. *Litigated Utility Models*

From 2000 to 2022, we identified approximately 30,000 UMs that were the subject of judicial proceedings, including both administrative challenges and court litigation.[138] These figures do not include UMs that were subject to arbi-

134. *See* Section II.C, *supra*.

135. *EC 2023 SEP Report*, *supra* note 94, at 71 fig.13.

136. Rudi Bekkers et al., *Disclosure Rules and Declared Essential Patents*, 52 RSCH. POL'Y (SPECIAL ISSUE), no. 1, 2023, art. no. 104618, at 1, 7 tbl.4 (2023).

137. Lemley & Simcoe, *supra* note 92, at 627 (finding that, in their sample of 49 U.S. cases, SEPs were found valid 83.7% of the time).

138. The IPlytics database, which we used in this study, does not distinguish between litigation in judicial proceedings and validity challenges at patent offices and other administrative tribunals. Moreover, some jurisdictions whose sub-patent systems are referred to by names other than

tration proceedings. As shown in Table 3, litigated UMs can be found across a wide range of jurisdictions, from large, developed economies to small and developing ones.

**Table 3. Jurisdictions Where Utility Models Were Litigated, 2000–2022**

| Jurisdiction | Litigated UMs | | Jurisdiction | Litigated UMs |
|---|---|---|---|---|
| China | 21,018 | | Peru | 22 |
| Germany | 2,589 | | Chile | 21 |
| Japan | 1,377 | | Austria | 14 |
| Russia | 1,292 | | Bulgaria | 14 |
| Taiwan | 1,213 | | Colombia | 13 |
| Korea | 911 | | Hungary | 11 |
| Brazil | 512 | | Australia | 6 |
| Turkey | 341 | | France | 6 |
| Czech Rep. | 257 | | Philippines | 4 |
| Spain | 249 | | Costa Rica | 4 |
| Italy | 101 | | Estonia | 4 |
| Poland | 97 | | Argentina | 3 |
| Finland | 79 | | Romania | 2 |
| Denmark | 36 | | Greece | 1 |
| Slovakia | 36 | | Moldova | 1 |
| Ukraine | 25 | | Portugal | 1 |

Consistent with its position as the leading jurisdiction in terms of overall UM filings, China is also the site of the greatest number of litigated UMs (69.5%). However, this share is significantly lower than China's share of overall UM filings during this period (95.6%). As such, China appears to have a somewhat lower rate of litigation than other jurisdictions.

Other jurisdictions in which large numbers of UMs are filed (i.e., Germany, Japan, Russia, Korea) also lead the rankings for litigated UMs. Nevertheless, there is a "long tail" of jurisdictions in which UMs are litigated but relatively few UMs have been issued. For example, Finland, with 79 litigated UMs, ranks 13th in terms of litigated UMs, but only 23rd in terms of overall UM filing during the period. Moreover, some jurisdictions that rank fairly high in terms of UM issuance (e.g., Australia, France, and the Philippines) have very little UM litigation, and Thailand, Mexico, and Hong Kong, which ranked 11th, 17th, and 19th, respectively, in terms of UM issuances during the period, reported no UM litigation during the period.

A wide range of parties have been involved in UM litigation, with no individual party holding more than 0.2% of total UMs subject to litigation (either as

"utility models," such as the now-discontinued "registration patents" in the Netherlands, are not identified by IPlytics as UMs, even though such rights may have been subject to significant litigation activity. *See* Van Engelen, *supra* note 61.

the plaintiff or defendant). Of the twenty firms holding the largest number of UMs subject to litigation from 2000 to 2022 (ranging from 22 to 63 UMs), three were Taiwanese and seventeen were Chinese. Even among the top 50 holders of litigated UMs, the large majority were Chinese (including Segway, the former U.S. manufacturer of personal mobility devices, now a Chinese-held firm), together with a handful of Taiwanese and Japanese firms.

### 2. *Litigated SEUMs*

Unlike UMs more generally, the IPlytics database includes only thirteen SEUMs that were involved in judicial or administrative proceedings around the world between 2000 and 2022: six in China and seven in Germany (Table 4).

**Table 4. Litigated SEUMs, 2000–2022**

| Jurisdiction | Type of Action | Owner | First Declared | SDO | Standard | UM Title |
|---|---|---|---|---|---|---|
| Germany | Admin. challenge | Samsung | 2003 | ETSI | 2G 3G 4G 5G | Device for channel coding and multiplexing in a CDMA communication system in a CDMA communication system |
| Germany | Admin. challenge | Samsung | 2003 | ETSI | 3G 4G 5G | Uplink transmitting device for mobile communication system, has rate matcher that bypasses information symbols and processes parts of first and second parity symbols according to given rate matching rule |
| China | Admin. challenge | InterDigital | 2008 | ETSI | 3G | User equipment for high-speed shared control channels |
| Germany | Enforced and Admin. Challenge | Netlist | 2010 | JEDEC | 3DS LRDIMM | System that uses distributed bytewise buffers on a memory module |

| Jurisdiction | Type of Action | Owner | First Declared | SDO | Standard | UM Title |
|---|---|---|---|---|---|---|
| China | Admin. challenge | InterDigital | 2011 | ETSI | 3G | User equipment of media access control multitasking/de-multitasking and base station |
| China | Admin. challenge | Foxconn | 2011 | JEDEC | SO-006 SODIMM | Opposite-linked connection assembly |
| Germany | Admin. challenge | ZTE | 2011 | ETSI | 5G | Apparatus for generating and breaking down signaling of uninterrupted means |
| China | Admin. challenge | Foxconn | 2013 | JEDEC | SO-018 | Card rim connector |
| Germany | Admin. challenge | Samsung | 2015 | ETSI | 3G 4G 5G | Device for performing a handover in a mobile communication system |
| China | Admin. challenge | InterDigital | 2016 | ETSI | 3G 4G 5G | Radio communication system for providing channel distribution information for supporting UL and DL channel |
| Germany | Enforced | Nokia | 2016 | ETSI | 4G | Randomization of block-spread signals |
| China | Admin. challenge | InterDigital | 2020 | ETSI | 2G 3G 4G | High-speed downstream chain circuit public channel subscriber equipment able to support mixed automatic repeated request |
| Germany | Enforced and Admin. Challenge | IP Bridge | 2020 | ETSI | 4G | Terminal device |

Despite the low number of litigated SEUMs, Table 4 allows a few observations. First, as noted above, SEUMs are technical in nature, often indistinguishable in their specifications and claims from patents. This being said, upon a cursory inspection, at least two of the three SEUMs declared with respect to

JEDEC standards appear to relate more to physical connections among electronic components than the internal functionality of those components (a more typical approach for UMs). The SEUMs declared with respect to ETSI standards, however, appear highly technical in nature and are of a nature similar to other SEPs declared at ETSI.

Second, the large majority of these cases (92%) involved administrative validity challenges to SEUMs. In China, these were brought in the Reexamination and Invalidation Department of the China Patent Office, though three of the six challenges were appealed to the Chinese courts.

In Germany, these administrative challenges were brought at the Deutsches Patent- und Markenamt (DPMA) (the German Patent and Trademark Office). Of the seven German SEUM cases identified, two involved both an administrative validity challenge at the DMPA and a judicial enforcement action (one in Düsseldorf and one in München), and one involved only an enforcement action (brought in München). All of the German administrative challenges appear to have failed, as all challenged UMs are recorded as having expired at the natural end of their 10-year terms (i.e., they were not prematurely canceled).[139]

The three German enforcement actions were brought by IP Bridge, a patent assertion entity, and Netlist and Nokia, product-based companies that are active in patent enforcement.[140] Mueller offers a first-hand report on the Netlist litigation, which involved prominent litigation counsel and sophisticated legal issues and was seemingly tied to related litigation in other jurisdictions.[141]

## F. Summary of Findings

The principal findings of this study can be summarized as follows:

1. Though some jurisdictions limit the subject matter of UMs to simple mechanical devices, others permit UMs covering complex technologies involving software and methods, such that the specifications and claims of many UMs are outwardly indistinguishable from those of patents.

2. Principal jurisdictions in which UMs are issued include China (by a wide margin), Taiwan, Germany, Korea, and Japan, all of which are involved in ICT standardization.

3. Some, but not all, SDOs expressly permit or require the disclosure and licensing of UMs that are potentially essential to their standards. The requirements of SDO policies that do not expressly mention UMs are ambiguous.

4. Nearly 1,000 UMs (SEUMs) have been declared as essential to broadly adopted industry standards at ETSI and other prominent SDOs in the ICT sector.

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139. The authors are grateful to Justus Baron for assistance in accessing DPMA records relevant to this study.

140. *See NPE Litigation Database*, STAN. L. SCH., https://npe.law.stanford.edu (last visited Dec. 21, 2023) (classifying patent asserters).

141. Mueller, *supra* note 13.

5. Firm strategies appear to differ dramatically in terms of SEUM declaration, ranging from intensive to virtually no SEUM activity, even among firms of similar size and market focus.

6. Though far less than other SEPs, SEUMs have been subject to litigation multiple times in China and Germany, and there appears to be no structural barrier to their litigation in other jurisdictions.

## IV. DISCUSSION

The findings of this study raise a number of implications for governmental policy, SDO operations, and firm strategy, and also suggest numerous avenues for additional research.

### A. SDO Policies and UMs: Is a UM a "Patent"?

One of the key questions raised about UMs is whether they should be considered to be "patents" for purposes of SDO policy requirements. While UMs are clearly distinct from patents under international IP treaties and the laws of countries with UM systems, the distinction may be less clear when viewed from outside those countries.[142] And, as noted at the beginning of this article, some jurisdictions refer to UMs as petty patents, innovation patents, or registration patents,[143] implying that, at least in a broad definitional sense, they are a form of patent.

As discussed in Section II.D, while some SDOs, such as ETSI and IETF, expressly require the disclosure and licensing of SEUMs in their IPR policies, other SDOs do not expressly include UMs within the scope of their patent disclosure and licensing commitments. Yet, as shown in Table 2, firms have nonetheless disclosed SEUMs to SDOs, such as JEDEC and ATSC, that fail to include UMs within their definitions of "patents."[144]

At these SDOs, the legal effect of such disclosures is not entirely clear. Would a UM declared essential to a standard be treated in the same manner as a patent declared under that policy and thus be subject to the SDO's FRAND licensing requirements? Or would the UM disclosure be disregarded as noncompliant with a policy that only permitted the disclosure of patents, and thus lack any legal effect?

The converse question also arises: if an SDO policy does not explicitly require the disclosure of UMs, then what obligation, if any, does the holder of a declared SEUM, or an undeclared UM, have to disclose or license that UM to implementers of the standard? Technically speaking, if UMs are not subject to an SDO's FRAND licensing requirements, then an SEUM holder might be free to charge supra-FRAND royalties for its SEUMs, or refuse to license them at

142. For example, in *In re Carlson*, 983 F.2d 1032, 1033 (Fed. Cir. 1992), the U.S. Court of Appeals for the Federal Circuit held that a German UM "constitutes an 'invention . . . patented . . . in . . . a foreign country' within the meaning of 35 U.S.C. § 102(a) (1988) and thus may be considered prior art."

143. *See supra* note 2 and accompanying text.

144. *See supra* notes 98–99 and accompanying text.

all. However, one could argue that the nondisclosure or concealment of a UM would implicitly violate the spirit of the SDO's disclosure and licensing policies, or even applicable competition law.[145]

It is likely that the answers to these questions would depend on the specific understandings and intentions of the SDO members who drafted and approved the relevant policy,[146] and would thus be highly fact specific (and vulnerable to differing recollections). To avoid these interpretive uncertainties, SDOs that have not expressly addressed the treatment of UMs under their disclosure and licensing policies (as well as any governmental policies relating to SEPs) would do well to do so.

## B. Including SEUMs in SEP Databases

While some UMs are currently included in SDO-maintained databases of SEPs,[147] it is sometimes difficult to distinguish SEUMs from ordinary SEPs.[148] Understanding this distinction could be useful for SDO participants and standards implementers, however, given the shorter duration of UMs and their different use in litigation (see Section C, below). SDOs could do more to clarify the type of rights that are listed in their databases by clearly identifying which disclosed rights are SEUMs versus SEPs.

In addition to SDOs, the European Commission recently proposed legislation that, among other things, would create a new official registry and database for SEPs issued in the European Union.[149] Though early drafts of the proposal included utility models within the scope of the proposed regulation,[150] the current proposal does not contemplate UMs,[151] thereby omitting these potentially important rights. The reasons for this change have not been disclosed publicly

145. *See* Renata B. Hesse & Frances Marshall, *U.S. Antitrust Aspects of FRAND Disputes*, *in* CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW: COMPETITION, ANTITRUST, AND PATENTS 270–75 (Jorge L. Contreras, ed., 2017) (describing legal enforcement actions against firms that withheld information about SEPs from SDO and other participants).

146. *See, e.g.*, Rambus, Inc. v. Infineon Techs. AG, 318 F.3d 1081, 1098 (Fed. Cir. 2003) (finding that while a literal reading of JEDEC's policy imposed no duty of disclosure on JEDEC members, SDO participants shared a common understanding that they should disclose patents necessary to practice JEDEC standards); Qualcomm Inc. v. Broadcom Corp., 548 F.3d 1004, 1016 (Fed. Cir. 2008) (finding similar duty to disclose patents based on informal norms and expectations of SDO participants); *see also* Jorge L. Contreras, *From Private Ordering to Public Law: The Legal Framework Governing Standards-Essential Patents*, 30 HARV. J. L. & TECH. 211, 219–20 (2017) (discussing cases in which understandings of SDO participants have been recognized notwithstanding SDO policy language to the contrary).

147. This is the source of the UMs collected by IPlytics and used in this study. *See supra* Section II.A (methodology).

148. Some countries designate UM numbers distinctly from patent numbers, but this distinction is not always easy to identify, particularly with non-Western character sets.

149. *Proposal for a Regulation of the European Parliament and of the Council on Standard Essential Patents and Amending Regulation (EU)2017/1001* COM (2023) 232 final (Apr. 27, 2023) [hereinafter *EC 2023 SEP Proposal*].

150. *Proposal for a Regulation of the European Parliament and of the Council on Standard Essential Patents* (leaked draft, Mar. 29, 2023), art. II(3) ("'[P]atent' means patent or utility model.").

151. *EC 2023 SEP Proposal*, *supra* note 149 (definitions in Art. II refer only to patents).

by the Commission.[152] As one of us has previously noted in written comments submitted to the Commission, it should revise its proposed regulation to include European UMs along with patents or, at a minimum, reduce ambiguity by indicating why UMs were excluded from the proposal.

## C. Enforcement of SEUMs

As discussed in Section I.C.4, the potential overlapping coverage of patent and UM protection and the malleable nature of UM claims (including the ability, in Germany, to alter them during the course of litigation), have led to their tactical use in infringement litigation.[153] This degree of uncertainty is not likely to improve the clarity or predictability of the standardization ecosystem, particularly if individual firms begin to increase their declaration of SEUMs. While it appears that little short of national UM reform or harmonization can fully address these concerns (see Section D, below), SDOs could eliminate at least some potential ambiguity by affirmatively including UMs within the scope of their disclosure and licensing requirements. Doing so would, at a minimum, reduce the likelihood that SEUMs could be used to obtain injunctions against the use of standards by implementers "willing" to obtain licenses of SEUMs on FRAND terms.[154]

## D. Essentiality of SEUMs

As discussed in Section II.B, patents are defined as SEPs only if they are "essential" to the implementation of a standard. Essentiality exists if a product implementing the standard necessarily infringes the claims of the patent.[155] The obligation to disclose SEPs (and, presumably, SEUMs) typically arises during development of a standard, before its approval and publication by the SDO.[156] Yet, as noted above, UM claims may be more malleable after issuance than those of patents.[157] This malleability raises questions concerning the potential essentiality of SEUMs, and the degree to which changes to claim scope can or should be taken into account when assessing the effect of FRAND commitments on UMs.

## E. SEUMs and FRAND Royalties

If SEUMs are deemed to constitute SEPs under an SDO's disclosure and licensing policies, SEUMs raise distinct but related questions regarding the cal-

152. Florian Mueller speculates that two factors may have contributed to the change: a desire not to subject shorter-term UMs to the mandatory nine-month deliberation period introduced elsewhere in the Proposal, and the possible legal issues arising from an attempt by the European Union to regulate UMs, which are not E.U.-harmonized rights. *See* Florian Mueller, *Standard-Essential Utility Models Are Major Loophole in Proposed EU SEP Regulation, Presumably Because of Fundamental Rights Issues: Structural Problems*, FOSS PATENTS (Sept. 9, 2023), http://www.fosspatents.com/2023/09/standard-essential-utility-models-are.html [https://perma.cc/ZY9Q-XDYS].

153. *See supra* notes 68–69 and accompanying text.

154. *See supra* note 95 and accompanying text.

155. *See supra* note 86 and accompanying text.

156. *See supra* note 90 and accompanying text.

157. *See supra* notes 68–69 and accompanying text.

culation of FRAND royalties. First, because UMs are generally not given substantive examination by relevant patent offices, their terms are shorter than those of patents, and in some jurisdictions they lack direct enforceability,[158] an argument could be made that UMs are, on average, less "valuable" than patents. As a result, an argument could be made that the "fair and reasonable" royalty payable with respect to an SEUM should be less than the "fair and reasonable" royalty payable with respect to an SEP. By extension, the value of (and the FRAND royalty payable with respect to) a portfolio that includes SEUMs should be less than the value of a similarly sized portfolio that includes only SEPs. If SEUMs are not distinguished from SEPs when portfolios are valued, incentives will exist for opportunistic firms to "stuff" their portfolios with cheap and easy-to-obtain SEUMs of questionable validity and essentiality to increase the size (and putative value) of those portfolios.

The issue of SEUM valuation has implications not only for transactions between individual holders of SEUMs and potential infringers, but for *all* holders of SEPs (and SEUMs) that are declared to be essential with respect to a particular standard. For example, when SEPs and SEUMs are placed into a pool for collective licensing to implementers of a standard, the royalty received from implementers is often distributed among pool members in proportion to the number of patents that they have licensed to the pool. The share of such royalties allocable to SEUMs, however, should arguably be lower than the share allocable to SEPs.

The same issue arises in connection with the "top-down" calculation of aggregate FRAND royalties payable with respect to a standard. Top-down royalty calculation methodologies seek to determine the overall value of a standard to a product, to use that value to assess an aggregate royalty for SEPs covering the standard, and then allocate a portion of the aggregate royalty to each holder of SEPs based on the number (and possibly the value) of its SEPs.[159] Top-down FRAND royalty calculations, which have already been used in judicial decisions in the United States, United Kingdom, and Japan, may take on even greater prominence under a recent E.U. proposal to implement a top-down calculation methodology in official calculations of aggregate SEP royalties.[160]

If SEUMs are valued lower than other SEPs, then in such top-down royalty determinations, the presence of SEUMs should be a factor used in determining both the overall level of royalties payable with respect to a standard, as well as the share of such aggregate royalty that is allocated to different holders of SEPs and SEUMs.

## F. UM Harmonization

Traditionally, UMs have existed largely as devices of national law with little harmonization among jurisdictions, even within closely knit regions such as

158. *See supra* Section I.C.

159. *See* Jorge L. Contreras, *Aggregated Royalties for Top-Down FRAND Determinations: Revisiting 'Joint Negotiation,'* 62 ANTITRUST BULL. 690, 692–96 (2017) (discussing top-down methodology and its usage in the courts).

160. *EC 2023 SEP Proposal*, *supra* note 149.

the European Union. Yet the entry of UMs into the field of technical standardization, an inherently multinational arena, begs the question whether UM systems should be harmonized to a greater degree. That is, if UMs can effectively be used to expand individual firm portfolios of patents subject to FRAND licensing, then jurisdictions that make it easier to obtain UMs are likely to attract more UM filers, and perhaps to draw applicants away from their own, or other, patent systems (e.g., if a UM can be obtained for one fourth the cost of a patent, in one fourth the time, but yield a similar value, then UMs could quickly become preferred instruments in some markets). What's more, fast and cheap UMs could result in a "race to the bottom" among jurisdictions seeking to capitalize on the "numbers game" among SEP holders. These considerations should encourage policy makers to consider more closely aligning UM systems across borders.

## G. The Costs of Uncertainty Surrounding SEUMs

As noted above, UMs involve substantial uncertainty, both with regard to their coverage and enforceability, as well as their status (or not) as SEPs. This uncertainty can be used opportunistically by actors within the standardization ecosystem. For example, depending on the relevant SDO policy in effect, the holders of UMs may argue that UMs are excluded from the SDO's FRAND disclosure or licensing commitments, thus giving them free rein to conceal these UMs from SDOs and implementers and to charge supra-FRAND royalties for the use of these rights. Likewise, UMs may be used tactically to seek injunctive relief against implementers before SEPs are issued. On the other hand, implementers that wish to delay negotiation over FRAND licenses (i.e., "holding out") may raise the inherent uncertainty of UMs when negotiating such licenses. This uncertainty could thus destabilize the standardization system, imposing greater transactional costs on both UM holders and implementers, delaying the development of important new standards, imposing costs on consumers, and depriving the market of new standardized products.

## H. SEUMs and Innovation

As noted at the beginning of this article, UM systems were introduced in many jurisdictions to stimulate local innovation and industry via a low-cost pathway to intellectual property protection for modest or incremental designs not rising to the level of patentable invention.[161] Yet the findings of this study show that SEUMs are largely being filed and declared by major international firms with active patenting programs, and that these UMs often cover technologies that are, or could also be, covered by patents. To the extent that UMs are being used primarily to obtain duplicative coverage for the same technological innovations, or for tactical litigation advantage, they seem not to be achieving the goals for which they were originally designed. As a result, policy makers may wish to consider the findings of this study when evaluating the ongoing value of UM systems in their countries.

161. *See supra* notes 8–10 and accompanying text.

## I. Areas for Further Research

This study is the first empirical assessment of SEUM declaration and litigation. Not surprisingly, there is much more to be studied with respect to UMs and the standardization ecosystem. One area for further research is the assessment of the "quality" of UMs that are declared as SEUMs, both in comparison to other UMs and to SEPs. The question of patent quality has attracted significant attention from scholars as well as governmental authorities in recent years, and numerous metrics for the measurement of patent quality have been developed (e.g., citation analysis). However, we are unaware of any significant study of UM quality or analysis whether the same metrics applied to patents can be applied to UMs. Further research of these questions would help to establish the value of SEUMs that form a part of SEP portfolios and to establish FRAND royalty rates both for individual SEUMs, portfolios including both SEUMs and SEPs, and for aggregate FRAND royalty determinations for entire standards.

It would also be useful to gain a better understanding of the business strategies that have led some firms to declare SEUMs in large quantities, while others have largely ignored them. Thus, just as Cahoy and Oswald observed that Ford Motor Co. adopted a business strategy involving the acquisition (and possibly assertion) of UMs,[162] Interdigital, during the 2000s, appears to have adopted a similar approach in the ICT sector, particularly around standards developed under the aegis of ETSI. Samsung, the second highest holder of SEUMs, appears to have adopted a similar strategy. A greater appreciation for firm strategy in relation to UMs could help policy makers to tailor their UM systems to the needs of the private sector.

Further research into SEUM assertion and litigation is also warranted. The litigation data that we reviewed could be supplemented with more detailed information regarding case outcomes, timing, and tactics. Greater visibility into these issues could help policy makers to assess whether UMs are being (or could be) abused as litigation devices, and whether procedural safeguards should be put in place to avoid such abuse in the future.

UMs, once a "backwater" of intellectual property scholarship,[163] may be more relevant to technology-intensive standards than previously thought. This study demonstrates that UMs are being declared essential to industry standards in significant numbers, at least by some firms. Given the relative ease, speed, and cost-effectiveness of obtaining UMs, it is possible that this trend will continue. Yet UMs involve a degree of uncertainty, both with regard to their coverage and enforceability, as well as their status (or not) as SEPs. Such uncertainty imposes unnecessary costs on the standardization ecosystem and can be used opportunistically both by UM holders and implementers. Accordingly, policy makers and SDOs should consider clarifying, and more intensely harmonizing,

162. Cahoy & Oswald, *supra* note 3, at 568.
163. Janis, *supra* note 11, at 152.

their rules concerning UMs and SEUMs. Firms and courts should likewise consider the value of SEUMs when calculating FRAND royalties for portfolios and overall standards. Finally, these findings invite reconsideration of the role of UMs in the innovation ecosystem.

## APPENDIX A

*Supplemental Data Table 1*[164]
*Top 20 Utility Model Applicants, 2021 and Cumulative 1990–2021*

| Country | 2021 rank | 2021 UM | 1990–2021 rank | 1990–2021 UM (n=23,515,896) |
|---|---|---|---|---|
| China[165] | 1 | 2,852,219 | 1 | 19,839,834 |
| Taiwan | 2 | 15,162 | 5 | 515,008 |
| Germany | 3 | 10,576 | 4 | 569,205 |
| Russia | 4 | 9,079 | 6 | 234,215 |
| Australia | 5 | 7,844 | 12 | 42,943 |
| Japan | 6 | 5,238 | 3 | 679,994 |
| Ukraine | 7 | 4,425 | 7 | 147,980 |
| Turkey | 8 | 4,490 | 11 | 53,555 |
| Korea[166] | 9 | 4,009 | 2 | 806,739 |
| Thailand | 10 | 3,762 | 13 | 42,039 |
| Indonesia | 11 | 3,249 | 18 | 15,844 |
| Spain | 12 | 3,091 | 8 | 96,124 |
| Brazil | 13 | 2,578 | 9 | 92,245 |
| Italy | 14 | 2,019 | 10 | 88,093 |
| Philippines | 15 | 1,799 | 17 | 22,316 |
| Czech Republic | 16 | 1,104 | 15 | 39,134 |
| Poland | 17 | 779 | 14 | 40,415 |
| Mexico | 18 | 706 | 19 | 15,556 |
| France | 19 | 673 | 24 | 8,910 |
| Hong Kong | 20 | 552 | 23 | 9,032 |

164. All data sourced from WIPO, other than data for Taiwan, which is sourced from IPlytics.

165. In this dataset, references to "China" refer to the People's Republic of China, excluding Hong Kong, Macau, and Taiwan (Republic of China).

166. References to "Korea" refer to the Republic of Korea.

*Supplemental Data Table 2*
*SEUM Declarations—All Jurisdictions, 1990–2022*

| Country | SEUMs (n=946) | SEUM Rank | Total UMs | UM Rank | Total Declared SEPs | Declared UM as % of SEPs |
|---|---|---|---|---|---|---|
| Germany | 310 | 1 | 569,205 | 4 | 7,280 | 4.26% |
| Taiwan | 241 | 2 | 515,008 | 5 | 11,754 | 2.05% |
| China | 237 | 3 | 19,839,834 | 1 | 74,190 | 0.32% |
| Korea | 112 | 4 | 806,739 | 2 | 36,648 | 0.31% |
| Japan | 22 | 5 | 679,994 | 3 | 39,027 | 0.05% |
| Ukraine | 6 | 6 | 147,980 | 7 | 697 | 0.86% |
| Denmark | 5 | 7 | 8,869 | 25 | 2,750 | 0.18% |
| France | 4 | 8 | 8,910 | 24 | 459 | 0.87% |
| Spain | 3 | 9 | 96,124 | 8 | 9,646 | 0.03% |
| Hungary | 2 | 10 | 8,605 | 26 | 2,009 | 0.10% |
| Brazil | 1 | 11 | 92,245 | 9 | 11,283 | -- |
| Argentina | 1 | 11 | 6,455 | 28 | 1,565 | 0.10% |
| Finland | 1 | 11 | 14,933 | 20 | 1,038 | 0.10% |
| Czech Rep. | 1 | 11 | 39,134 | 15 | 54 | 1.85% |

*Supplemental Data Table 3*
*Top SEUM and SEP Declarants, 1990–2022*

| | SEPs (n=502717) | SEP % | SEUM (n=985) | SEUM% | SEUM -IDC % (n=372) |
|---|---|---|---|---|---|
| Qualcomm (US) | 71634 | 14.2% | 1 | 0.1% | 0.3% |
| Huawei (CN) | 53329 | 10.6% | 13 | 1.3% | 3.5% |
| Samsung (KR) | 41522 | 8.3% | 73 | 7.4% | 19.6% |
| LG (LG) | 36070 | 7.2% | 14 | 1.4% | 3.8% |
| Nokia (FI) | 31287 | 6.2% | 10 | 1.0% | 2.7% |
| Ericsson (SE) | 29322 | 5.8% | 13 | 1.3% | 3.5% |
| ZTE (CN) | 17290 | 3.4% | 17 | 1.7% | 4.6% |
| Oppo (CN) | 15480 | 3.1% | 1 | 0.1% | 0.3% |
| NTT Docomo (JP) | 14231 | 2.8% | 0 | 0.0% | 0.0% |
| Sharp (JP/TW) | 10396 | 2.1% | 1 | 0.1% | 0.3% |
| Apple (US) | 10091 | 2.0% | 3 | 0.3% | 0.8% |
| NEC | 7566 | 1.5% | 3 | 0.3% | 0.8% |
| Sony | 7557 | 1.5% | 2 | 0.2% | 0.5% |
| Intel | 7485 | 1.5% | 23 | 2.3% | 6.2% |
| Panasonic | 6828 | 1.4% | 14 | 1.4% | 3.8% |
| Fraunhofer | 5245 | 1.0% | 1 | 0.1% | 0.3% |
| Dolby | 4857 | 1.0% | 11 | 1.1% | 3.0% |
| Philips | 4505 | 0.9% | 0 | 0.0% | 0.0% |
| HTC | 1358 | 0.3% | 11 | 1.1% | 3.0% |
| InterDigital | 21404 | 4.3% | 613 | 62.2% | n/a |