February 12, 2016

The Hon. Michelle K. Lee
Under Secretary of Commerce
Director, U.S. Patent and Trademark Office

Re: Request for Submission of Topics for USPTO Quality Case Studies

Dear Director Lee:

We write to you today in response to the U.S. Patent and Trademark Office’s (USPTO) Request for Submission of Topics for USPTO Quality Case Studies, published December 21, 2015.¹ We applaud the USPTO’s ongoing efforts to enhance the quality of U.S. patents, particularly those efforts that leverage the agency’s ability and expertise in collecting and analyzing quantitative data. Open patent data is a vital innovation asset that facilitates the transfer, management, and dissemination of innovation and currently supports well over 100 startups and patent data companies.² The additional datasets that have been made available during this Administration, particularly under the auspices of the Office of Chief Economist, should only bring more clarity and transparency to the innovation ecosystem. It is in this spirit of harnessing the power of data to improve patent quality that we offer our comments.

As empirical scholars interested in using data to drive policy-making, we commend the USPTO’s approach of using “case studies” of the type specified in the RFC—i.e., “reviews of applications” and “examiner work products”—to help illuminate, inform, and hypothesis-test potential best practices in patent quality. However, we would like to draw attention to two, thus far largely overlooked sources of data outside the USPTO’s own prosecution records: (1) the prosecution records of foreign patent offices that examine counterparts to applications filed in the U.S. and (2) the outcomes of lawsuits and other proceedings that review the validity of issued U.S. patents.

Below, we propose three case studies that leverage these data sources for your consideration:

² The Patent Data 100+; Colleen V. Chien and Reuben Bauer (forthcoming); working list of companies available at: http://tinyurl.com/patentdatacos.
Proposal for Study:
The European Patent Office (EPO) is consistently ranked as producing the highest quality patents in the world.\(^3\) A comparative study of the EPO’s examination practices may illuminate practices that the USPTO can adapt to US settings (or at least experiment with) to improve US patent quality.

Explanation:
While the substantive patent laws of Europe and the US are largely harmonized, the USPTO and EPO use different procedures to examine patents. For example, European examination is bifurcated into search and examination, whereas USPTO examiners integrate search and examination at every step. Examination at the EPO is also “front-loaded,” with an estimated 8-12 hours devoted to search at the outset of the review process,\(^4\) as compared to an estimated average 2 hours at the USPTO, though the amount allocated varies considerably.\(^5\) Moreover, unlike the EPO, the USPTO allows applicants to accelerate consideration of their patent applications, to “continue” examination after a final rejection, and (for small users) to pay reduced fees. However, the basic task between examiners on both sides of the Atlantic are the same – to evaluate the invention described in the patent and the patent itself, in light of the relevant prior art, for its novelty, nonobviousness, and the other requirements of patentability.

In surveys of patentholders and patent practitioners, the EPO has consistently ranked highest in patent quality, as well as customer service.\(^6\) The agency’s top marks in service, which we understand to indicate customer satisfaction, are particularly interesting because they were earned despite a relatively low allowance rate\(^7\) and a relatively high rate of withdrawal by the

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To further explore what the EPO does to ensure both high patent quality and satisfied stakeholders, the USPTO could consider publishing an RFC or holding a roundtable to better understand why the EPO is perceived to produce high quality patents.

The USPTO could also consider conducting a study of matched samples of international patent applications that were filed with both the USPTO and EPO. Existing studies of this kind suggest that EPO examination procedures successfully weed out many low quality applications that, in US, are granted and are later enforced at great cost to those forced to challenge them. One of us recently found, for example that, of 169 US patents challenged in inter partes review that had foreign counterpart applications filed with the EPO, more than half were issued only in the US, with a large proportion of the non-issued EPO applications withdrawn.

**Title:**
**Case Study of the Examiner Citation of Non-Patent Literature (NPL) and Foreign Prior Art (FPA)**

**Proposal for Study:**
A high quality patent must be novel and nonobvious in light of all applicable prior art. However, not all relevant prior is readily accessible to applicants and examiners. Non-patent literature (NPL) and foreign prior art (FPA) can be unusually difficult to locate and consider. A study of the relative rates of NPL citation across USPTO art units, as well as in comparison to that of parallel EPO examinations can help the USPTO determine whether, and how, to support examiners’ consideration of NPL and FPA.

**Explanation:**
Several studies related to patent quality support the USPTO’s focus on NPL as a significant quality lever, through for example, its February 20, 2014 executive action on crowd-sourcing prior art and the automated pre-examination search pilot, efforts that we applaud. For example, an analysis that one of us did of 311 patents that were the subject of inter partes review decisions, found that NPL was cited by the examiner during the prosecution of around 16% of the 311 cases, but the PTAB cited NPL around 40% of the time. Moreover, it appears that across all types of patents, EPO examiners are more likely to include NPL in their search reports than are US examiners to cite NPL in their examination. In addition, multiple studies of litigated patents

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8 Colleen V. Chien 2015, supra, at slide 20-21.
9 A sizeable literature, including papers by one of us, explains various approaches to conducting such studies. See, e.g. cites supra. We are happy to share additional details upon request.
10 Colleen V. Chien 2015, supra, at slide 21.
11 Colleen V. Chien, unpublished analysis, available on request.
12 Colleen V. Chien 2015, supra, at slide 23.
have found a significant, positive correlation between validity and the citation of FPA during examination.\(^\text{13}\)

The USPTO could study the use of NPL and FPA by US examiners and also compare US citation rates with those of the EPO examiners. The USPTO might then decide, for example, to take corrective action in art units that exhibit the greatest disparities. In addition, looking at citation trends within USPTO prosecution over time and across art units may reveal how efforts like the Biotechnology Partnership and the executive action on crowdsourcing, as well as the development of new tools like the Automated Search contemplated by the Quality Initiative, and Google Prior Art Finder have led to greater use and awareness of NPL and FPA sources.

**Title:**

Case Study of Patents Adjudicated by Courts and Other Tribunals

**Proposal for Study:**

Courts and other adjudicative tribunals, like the PTAB, regularly evaluate the validity of patents issued by the USPTO. Whether a patent can survive a post-issuance validity challenge is an important quality check, thus, data on the outcomes of such challenges can inform efforts to improve quality. For example, a study that compares the characteristics of patents that have survived a post-grant validity challenge with the characteristics of patents invalidated post-issuance can help the USPTO identify ways to improve the examination process.

**Explanation:**

Opinions issued by adjudicative bodies—including federal courts, the International Trade Commission, and the Patent Trial and Appeal Board—that review the validity of issued patents are a largely untapped source of quality-related data. While several scholars have studied the characteristics of adjudicated patents,\(^\text{14}\) these studies have generally been modest in scale, due in large measure to the effort historically required to identify litigated patents and access their prosecution histories. Fortunately, data on patent litigation and prosecution – in part thanks to the USPTO’s own open data initiatives – is more accessible today than it ever has been before. Companies like Lex Machina now collect patent litigation documents that were previously only available through PACER and make them available in a single, searchable database, which the GAO has already utilized to study patent quality.\(^\text{15}\) The USPTO recent release of a large amount

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of application-level data on patent prosecution that was previously only available through PAIR\textsuperscript{16} has already started to stimulate research and study.\textsuperscript{17} In short, the USPTO’s ability to access and analyze this kind of information has never been greater.

By cross referencing data on patent validity determination with data on patents’ characteristics and prosecution histories, the USPTO can determine whether any patent characteristics correlate strongly with validity and, if so, which ones.\textsuperscript{18} For example, this analysis might reveal that the citation of NPL or FPA during prosecution, as described above, is strongly and positively correlated with validity. If so, the USPTO might decide in the future to stress to its examiners the importance of looking for prior art outside databases of U.S. patents or to implement additional training for examiners in this regard.

While in an ideal world the USPTO might conduct this kind of study using with a complete sample of all patents adjudicated by any tribunal, the USPTO could focus first on “institution decisions” and “final written decisions” issued by the Patent Trial and Appeal Board in inter partes reviews (IPRs).\textsuperscript{19} In the last three years, thousands of invalid claims in hundreds of issued patents have been eliminated in IPRs and many more have been deemed likely invalid in reviews that were settled after an institution decision.\textsuperscript{20} As the USPTO has already recognized, these decisions offer useful feedback for (at least) the examiner of record of invalidated patents.\textsuperscript{21} Moreover, the USPTO has already collected a good deal of data on PTAB outcomes and, thus, likely need not rely on databases created by third parties (or otherwise reinvent the wheel) to identify confirmed and invalidated patents.\textsuperscript{22} Finally, compared to litigation outcomes (as well as reexaminations), IPR decisions are made (and become final) relatively quickly\textsuperscript{23} and likely involve newer patents – facts that help mitigate the confounding influence of the fact that legal rules and USPTO policies have shifted over time.

* * *

We are delighted that the USPTO is carrying out quality case studies and in support of this effort, encourage the USPTO to take a broad view of what “case studies” it might be possible to carry


\textsuperscript{18} Lists of patent characteristics that could be studied are available in the literature. See, e.g., Mann & Underweiser, supra.

\textsuperscript{19} One of us has already begun to conduct just such a study. If the USPTO is interested, we are available to share more details on this ongoing project.


\textsuperscript{21} Evolving Programs of the Enhanced Patent Quality Initiative, available at http://www.uspto.gov/sites/default/files/documents/Evolving%20Programs%20One-Sheeter%20Public%20Final.pdf (suggesting that the USPTO plans to “develop a process for providing post-grant outcomes from sources, such as the Patent Trial and Appeal Board (PTAB), to the examiner of record and the examiners of related applications”).


\textsuperscript{23} Love & Ambwani, supra, at 99.
out. We believe that the three case studies described above, which include data from PTAB, other tribuals, and the EPO, will improve the agency’s Patent Quality Initiative, and can also serve as effective pilots for future PTO efforts to study patent quality.

Sincerely,

Colleen V. Chien

Brian J. Love
You are doing well.

Comparative Patent Quality

Colleen Chien
Associate Professor, Santa Clara University School of Law
Former White House Office of Science and Technology Policy
Contact: colleenchien@gmail.com, @colleen_chien
Patent quality is an international priority

“Only high-quality patents and processes serve the needs of inventors, innovation and society alike”
- EPO Annual Report 2014
The difficulty in ensuring patent quality are not new

"I know well the difficulty of drawing a line between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not.“ – Thomas Jefferson, 1813
But recent developments highlight the cost of low-quality patents

DataTreasury Patents Nixed By PTAB In AIA Review

By Matthew Bultman
And the question of when and how broadly quality filters should be applied

<table>
<thead>
<tr>
<th>Stage of Patent Lifecycle</th>
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This presentation applies a comparative lens to patent quality

Rating of the quality of patents issued by each of the five largest IP offices

*Intellectual Asset Management Magazine benchmark survey 2015 among 650 patent professionals*

Private practice lawyers and attorneys

- **87%** excellent very good
- **25%** good
- **62%** excellent very good

EPO

- 70% good
- 37% excellent very good

JPO

- 69% good
- 39% excellent very good

USPTO

- 49% good
- 29% excellent very good

KPO

- 40% good
- 26% excellent very good

SIPO
Bearing in mind that there are many differences between the European and US systems...

<table>
<thead>
<tr>
<th>Factor</th>
<th>US</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examiner Pay</td>
<td>US civil service grades</td>
<td>Double US levels, limited taxes</td>
</tr>
<tr>
<td>Examiner Turnover</td>
<td>~33% per year</td>
<td>5% per year</td>
</tr>
<tr>
<td>Bifurcation of Search &amp; Examination</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Loser Pays</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

“And the wisdom to know the difference…”

This presentation considers US and EP outcomes at aggregate and “matched pair” levels

- “Exact match” matched pair approach for prosecution outcomes (Graham & Harhoff, 2006). Filing date / priority date matches.
- Data sources: Innography, Lex Machina, PATSTAT, Google Patents, WIPO/Schmcoch, NSF, PTO/EPO
The quantity and quality of patents in force is the result of three sets of decisions.
Each is influenced by doctrinal, institutional, economical, and market factors.
Comparing the US and EP at each of these stages…
At each stage, the US tilts towards more quantity – ex: 2002

US PATENTS (FILED 2002)

273K US applications
x
74% grant rate
x
37% projected* Y20 renewal rate

EPO PATENTS (FILED 2002)

120K EPO applications
x
50% grant rate
x
12% projected* Y20 renewal rate


2.3 x applications
x
1.5 x grant rate
x
3x renewal rate

75K US $ patents in force in Y20 $

6.9K EPO patents in force in Y20

10x more US $ patents in force than EPO $

Sources: PATSTAT 2015 (application and grant numbers), Trilateral Statistics 2002 Report (projected renewal rates).
The disparities are greatest in tech, and growing

**EPO v. US PATENTS (2002)**

2.3 x applications  
1.5 x grant rate  
3x renewal rate

10x more US patents in force than EPO

**EPO v. US Patents (Tech* 2002)**

3.0 x applications  
1.8 x grant rate  
3x renewal rate

17x more US tech patents in force than EPO

**EPO v. US PATENTS (2013)**

3.8 x applications  
1.8 x grant rate  
2x renewal rate

14x more US patents in force than EPO

Sources: PATSTAT 2015 (application and grant numbers), Trilateral Statistics 2002 Report (projected renewal rates).*“Electrical Engineering” patents as defined by WIPO/Schmoch
What explains the differences in applications?


2.3 x applications
x
1.5 x grant rate
x
3x renewal rate

10x more US $ patents in force than EPO $
The EPO did not experience the same surge in tech patenting that the US did.

Source: PATSTAT 2015, Sector data based on WIPO in accordance with Schmoch (2008)
What has driven the surge in US tech patents? Defensive/FTO driven patenting is likely one factor.
Other factors that contribute to the differences include:

- Relative value of US v. EU patents
- Scope of patentability
- Size, importance of US v. EU markets
- Loser pays in EU, overall enforcement climate
What explains the differences in grants?

EPO v. US PATENTS
(2002)

2.3 x applications
x
1.5 x grant rate
x
3x renewal rate

10x more US $ patents in force than EPO $
Across categories US patents are more likely to be issued than EPO patents, on the same applications.

Comparative Patent Grant Rates
(September 2002 ~7K Matched Patent Applications)*

- Mechanical engineering: US 66%, EPO 82%
- Instruments: US 53%, EPO 75%
- Electrical engineering: US 43%, EPO 76%
- Chemistry: US 52%, EPO 68%

EPO’s lower grant rate is due to higher applicant withdrawal rates (not refusals)


The majority of nongranted apps in the EPO are withdrawn, not refused
Less than half of IPRed US patents* that were filed for in Europe have actually been granted in Europe… with many of the remainder withdrawn…

*IPRed patents that have been the subject of a final decision as of June 2015. Source: Lex Machina, Innography
The ‘137 DataTreasury patent was the subject of 7 EP applications, none of which matured into a patent.
EPO examiners are more likely to cite non-patent literature (NPL)

FIG___: US v. EPO Examiner Use of Non-Patent Literature (~7K 2002 Matched App Pairs)

- Chemistry: 27% US, 59% EPO
- Electrical engineering: 13% US, 50% EPO
- Mechanical engineering: 6% US, 29% EPO
- Instruments: 11% US, 34% EPO
- Other fields: 6% US, 20% EPO
- Average All: 14% US, 44% EPO

Source: EP Register 2015, USPTO PAIR 2015, Google Patents (Front Page information)
Sources of Data

(12) **United States Patent**
Guevremont et al.

(54) **TANDEM FAIMS/ION-TRAPPING APPARATUS AND METHOD**

(75) Inventors: Roger Guevremont, Gloucester (CA); Randy Purves, Gloucester (CA); David Barnett, Orleans (CA)

(10) **Patent No.** US 6,703,609 B2
(45) **Date of Patent** Mar. 9, 2004

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

**OTHER PUBLICATIONS**

* cited by examiner

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**Citations: EP1266394**

**Google Patents, 2015 Edition:**

**NON-PATENT CITATIONS**

**Reference**
1 * See references of WO2015047422A2

* Cited by examiner
Why does EP have high satisfaction even with relatively lower grant rate?

Rating of the quality of patents issued by each of the five largest IP offices

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EPO’s lower grant rate is due to higher applicant withdrawal rates (not refusals)


The majority of nongranted apps in the EPO are withdrawn, not refused
What makes EPO applicants withdraw?

“In the EPO, patents are granted in 49% of total filings, with 22% of applications abandoned after the search report and 29% abandoned after examination.”

- EPO President Battistelli at the 30th Annual US Bar- EPO Liaison Council Meeting, 10/30/2014
EPO conducts a single search, invests in quality upfront. PTO is more tolerant, allows refilings.

While time for searching prior art varies, EP prior art searching take ~8-12 avg., vs. ~2 hours on average at the PTO (van Pottelsberghe de la Potterie (2011), EPO)
Time pressure during examination is nothing new

Jefferson was “quite favorable to the granting of patents, and granted them with great consideration, the other duties of members of this Board, in view of their high offices, made it impossible for them to devote much time to this work. As a result the law was changed in 1793 to make the granting of patents a clerical function.” – PJ Frederico, 1952
What explains the difference in renewal rates?

EPO vs. USPTO Patent Maintenance

Source: IP5 2013 Report
US Patents may be more valuable – they are also cheaper and easier to renew

Stepping back...
Should we worry about quality for every patent? When is the right time?

Sorting between patents that matter and patents that don’t

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Who should decide?

Sorting between patents that are likely to be enforced and those that aren’t

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My proposal to enhance quality: reward patentees for designating patents as defensive only or available for FRAND-licensing

Sorting between patents that are likely to be enforced and those that aren’t

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<td>Post Grant</td>
<td>Post Grant Procedures</td>
<td>Defensive only/FRAND-friendly patent option</td>
</tr>
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Facilitating “Defensive Only” / “FRAND” friendly patent options

- Patentee can elect at any time to make patent “defensive” or available on FRAND and in return, get a 50% discount on fees
- Once a patent becomes defensive, must remain defensive
- Demand expressed in the marketplace through proliferation of defensive pledges: OIN, DPL, LOT, Tesla, many others
- Companies that go defensive will reduce their own costs and costs of entry/patenting for startups
- Akin to DE/UK License of Right

Sources:
Chien, Exclusionary and Diffusionary Levers in Patent Law, 2015
Thank you

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