Strategies for Solving the Problems of Backlog and Unreliable Examination Quality in the Global Patent System

An Outline of a Systematic and Quantitative Strategic Approach to Analyzing an Array of Potential Solutions to the Problems

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Abstract

This paper outlines a proposed approach to analyzing the likely causes-of and potential solutions-to two related problems in the administration of the patent system worldwide: the global backlog (or deadlock) in processing patent applications, currently estimated to be at least several million patents currently in the pipeline; and, inconsistent or unreliable quality in the decision-making of patent offices regarding the granting of patents. It does so by presenting a *systematic* and *quantitative* approach to analyzing an array of plausible or salient explanations for the two problems and to analyzing an array of alternative solutions to those same problems. The approach advocated herein additionally presents a *dynamic* approach to analysis of solutions by taking in to account the interdependencies of the alternative strategies. The practical application of the approach is illustrated by employing it in an expert thought experiment. The experiment demonstrates how adopting a systematic and quantitative analytical approach along the lines followed here may reveal a more powerful set of strategy scenarios (each consisting of an array of dynamically related sub-strategies) than has previously emerged in the literature for addressing the twin problems of backlog and unreliable examination quality in the global patent system.

Introduction: A Chorus of Critics

The global patent system is currently undergoing heavy criticism for, among other things, not being able to function with sufficient efficiency and reliability.[1] Such criticisms arise from "customers" (i.e., inventors and organizations that own inventions) who are apparently unable to obtain patent protection in a timely and trustworthy manner[2], from legislators or government agencies concerned about the role of the patent system within a wider policy framework[3], from academic commentators (some of whom are sympathetic[4] and some of whom are not sympathetic to the patent system for a variety of intellectual and other reasons[5]), from informed independent analysts and observers[6], from patent professionals and

[1] Adam. B. Jaffe and Josh Lerner, *Innovation and Its Discontents: How Our Broken Patent System is Endangering Innovation and Progress, and What to Do About It* (Princeton: Princeton University Press, 2004); Mark A. Lemley, Douglas Lichtman and Bhaven N. Sampat, "What to Do About Bad Patents?" *Regulation* 28, 4 (2006): 10-13. Criticisms along these lines have even been voiced by senior authorities in the patent offices themselves, as symbolized by a recent poignant assertion by the President of the European Patent Office: "The patent system can foster innovation ... but then you'd better have a functioning patent system. ... The patent system is drifting toward disfunctionality, and thus needs reform" (Alison Brimelow, remarks made at the European Patent Forum, 7 May 2008, at Ljubljana, Slovenia, reported by the European Patent Office [cited 26 December 2008], available from http://www.epo.org/topics/news/2008/20080507a.html).

[2] Jon Van, "Patent Backlog Hampers Nanotech Sector," *The Seattle Times*, November 27 2006, available from http://seattletimes.nwsource.com/html/businesstechnology/2003449208_btpatents27.html [cited December 23 2008].

[3] Andrew Noyes, "Subcommittee Grills PTO Director on Patent Backlog, Morale," *Government Executive*, February 28 2008 [cited December 23 2008], available from http://governmentexecutive.com/story_page.cfm?articleid=39388&ref=rellink; USGAO, United States Government Accountability Office, *U.S. Patent and Trademark Office: Hiring Efforts Are Not Sufficient to Reduce the Patent Application Backlog*, Report to the Ranking Member, Committee on Oversight and Government Reform, House of Representatives (Washington, D.C.: United States Government Accountability Office, 2007); Senate of the United States, 110th Congress Calendar No. 563, 2007, *Bill to amend title 35, United States Code, to provide for patent reform,* 2d Session, S. 1145 [Report No. 110-259]; Senate of the United States, 110th Congress, Calendar No. 563, 2008, *An original bill making appropriations for the Departments of Commerce and Justice, science, and related agencies for the fiscal year ending September 30, 2009, and for other purposes,* 2d Session, S. 3182 [Report 110-397].

[4] Jeremy Philips, "Patent Delay," *Journal of Intellectual Property Law and Practice* 3, 12 (2008): 745; F. Scott Kieff, "The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules," *Boston College Law Review* 55 (2003): 45.

[5] James Bessen and Michael J. Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk* (Princeton and Oxford: Princeton University Press, 2008); Michele Boldrin and David K. Levine, *Against Intellectual Monopoly* (New York: Cambridge University Press, 2008); F. M.Scherer, *The Political Economy of Patent Policy Reform in the United States* [Working Paper], Research on Innovation, September 2007, available from http://www.researchoninnovation.org/scherer/patpolic.pdf [cited December 23 2008]; Peter Drahos and John Braithwaite, *Information Feudalism: Who Owns the Knowledge Economy?* (London: Earthscan Publications Ltd., 2002).

legal service providers[7], from experienced participants within the patent system[8], and from political activists who are generally opposed to the development and enforcement of intellectual property.[9] In response to both pressure and criticism from a variety of directions, the world's main patent organizations themselves have also engaged in a number of policy reviews and self-examination exercises, both individually[10] and cooperatively[11], aimed at addressing salient concerns related to the efficiency and reliability of the patent system.

In this paper at least two practical problems that lie behind the current criticisms of the system will be addressed. The primary problem is the large backlog in the processing of patent applications by the World's major patent offices.[12] The following quote from a well-

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[6] Cece Gassner, *Patent Backlog* [Blog], Law under the Microscope, June 21 2005 [cited December 22 2008], available from http://lifetech.blogs.com/bionanoblawg/2005/06/patent_backlog.html; Layer 8, *US Patent Backlog, Employee Attrition Grows at Alarming Rates* [Blog], NetworkWorld, February 27 2008 [cited December 23 2008], available from http://www.networkworld.com/community/node/25467; Greg Aharonian, *Article - PATNEWS Excerpts from GAO Studies of PTO Management Problems* [Internet Patent News Service], Source Translation & Optimization, 24 June 2005 [cited 26 December 2008], available from http://www.bustpatents.com/gao.htm.

[7] Stephen A. Becker and Astrid R. Spain, "Perspective Lost: Alleviating the Patent Office's Backlog at the Expense of Innovation," *Intellectual Property and Technology Law Journal* 18, 6 (2006): 10-12.

[8] Congress Daily, "Former Patent Officials Say Backlog Should Become a Top Priority," *Government Executive*, 12 December 2008, available from http://www.govexec.com/dailyfed/1208/121208cdam1.htm [cited December 22 2008].

[9] A pertinent example is the Foundation for a Free Information Infrastructure (FFII) (see Foundation for a Free Information Infrastructure, *What We Do; Our Principles; How to Help Us*, available from http://www.ffii.org [cited December 23 2008]).

[10] U.S. Patent and Trademark Office, Office of Corporate Planning, *Performance and Accountability Report: Fiscal Year 2008* (Alexandria: United States Patent and Trademark Office, 2008); European Patent Office, "In Focus: Raising the Bar on Patent Quality," in *Annual Report 2007*, edited by O. Schröder (Munich: European Patent Office, 2007); Policy Committee on Innovation and Intellectual Property (JPO), *New Intellectual Property Policy for Pro-Innovation - Intellectual Property System as Global Infrastructure*, Report of the "Policy Committee on Innovation and Intellectual Property," August 2008 (Tokyo: Japan Patent Office, 2008), available at http://www.jpo.go.jp/torikumi_e/puresu_e/pdf/press_new_intellectual_property_policy/report_e.pdf [cited 26 December 2008].

[11] The most prominent example is the "Trilateral Cooperation" initiative of the Japan Patent Office, the U.S. Patent and Trademark Office and the European Patent Office. For basic descriptions of the work of the Trilateral Cooperation, see http://www.trilateral.net/ and http://www.jpo.go.jp/torikumi/kokusai/kokusai3/sankyoku_list.htm. Cf., Trilateral Offices, *Trilateral Roundtable Meeting Notes Summary*, 28 October 2008, EPO Patent Information Conference 2008, Stockholm, Sweden6 pages, available at http://documents.epo.org/projects/babylon/eponet.nsf/0/CF3210C9BDEEB51FC125752F0033B86D/$File/2008_10_Strockholm_%20Roundtable_en.pdf. For an example of a European-level cooperative exercise, see: T. Fuggenthaler, J. Schreiner and W. Aleker, *Benchmarking Project - Productivity of the EPO, UKIPO & DPMA* (Munich: Ernst & Young, 2007).

[12] Stephen Barr, "Backlog, Quotas Overwhelm Patent Examiners," *The Washington Post*, October 8 2007 [cited December 22 2008], available from http://www.washingtonpost.com/wp-dyn/content/article/2007/10/07/AR2007100701199_pf.html; Richard A. Epstein, "Breaking the Patent Logjam,"

known web-log (blog) in the United States devoted to intellectual property issues provides a typical example of an impassioned but well-informed expression of concern about the issue:

> As of the end of Fiscal Year 2008 there are 1,208,076 patent applications still pending at the [US] Patent Office. At the end of Fiscal Year 1997 the number of pending applications left over was only 275,295, so over the last 11 years there has been a 439% increase in the number of pending applications left over that could not be resolved. That is alarming. Each year since 1997 this number has gone up, first going over the 1 million mark in 2006. As patent applications continue to pile up the US patent system is plunging further and further into irrelevance, and that is not a good thing for our economy or for the future of innovation. Something needs to be done immediately to reverse this trend.[13]

Similar expressions of concern may be found in Europe:

> Increasing globalization and changes in social, political and technological trends have created a surge in the number of applications filed in the world's patent systems. The demand for patents is growing faster than the number of patents processed, creating a backlog of between five to ten million pending applications globally. The escalating pendency of applications is creating uncertainty in the patent system, and casting pressure across the IP landscape, as applicants have to wait up to ten years to see their patents granted. Ciáran McGinley a senior European Patent Office (EPO) official recently described this as 'Global patent warming'.[14]

Japan has also been experiencing a similar problem:

> For over 30 years, the Japan Patent Office has been known for its slow patent examination, with applicants often waiting around 30 months to receive a first examination letter from the JPO. The Japanese backlog increased substantially from 522 000 in 2003 to 755 000 in 2005. To slow the trend, the JPO has revised some of its procedures and is expanding outsourcing (in 2005, 75 percent of the workload was outsourced). It is also implementing a plan to recruit 500 more examiners over a period of five years.[15]

The Financial Times, August 28 2008 [cited December 22 2008], available from http://www.ft.com/cms/s/0/bf055c78-7508-11dd-ab30-0000779fd18c.html?nclick_check=1; Joseph Straus, "Is There a Global Warming of Patents?" *The Journal of World Intellectual Property* 11, 1 (2008): 58–62.

[13] Gene Quinn, "How to Fix the USPTO" [Blog], *IP Watchdog*, November 21 2008 [cited December 23 2008], available from http://www.ipwatchdog.com/2008/11/21/how-to-fix-the-uspto/id=441/.

[14] Vasheharan Kanesarajah, "Global Patent Warming - Tackling the Surge in Global Patent Applications," *Scientific Newsletters*, Thomson Reuters, December 2008 [cited December 24 2008], available from http://scientific.thomsonreuters.com/news/2008-12/8492552/.

[15] European Patent Office (EPO), *Patents Around the World*, European Patent Office, April 5 2007 [cited December 24 2008], available from http://www.epo.org/topics/patent-system/patents-around-the-world.html.

Despite the oft-mentioned problems of patents in general, and the international opposition to patents that has arisen from both academic and political sources, applications from inventors and the owners of inventions have continued apace. There has been a steep world-wide growth in demand for patents during the last decade; and the World's major patent offices have, as a consequence, been stretched to the limits of their capacity.[16] They have also therefore been forced to re-examine the effectiveness of practices and procedures that may have been adequate a few decades ago but which may now need revising.

The second problem that will be addressed by his paper is the widespread perception of uncertain, non-rigorous and irregular quality of patent examination procedures between, and within, those same patent offices.[17] The ensuing uncertainty about the reliability of patents appears to have led to uncomfortably high uncertainty in business and also to financially wasteful legal disputes[18], not to mention the emergence of emotive web-logs and volatile protests from affected persons closely associated with the patent system. [19]

Debates about the seriousness and urgency of the problems of questionable patent quality have garnered notable attention from member states of the European Patent

[16] This phenomenon has also been described succinctly by Straus, op cit. *Global Warming* (2008).

[17] European Patent Office, "Raising the Bar on Patent Quality," *op. cit.* (2007); Policy Committee (JPO), *New Intellectual Property Policy, op cit.* (2008); Stuart J. H. Graham, Bronwyn H. Hall, Dietmar Harhoff and David C. Mowery, "Post-Issue Patent 'Quality Control': A Comparative Study of US Patent Re-examinations and European Patent Oppositions," NBER Working Paper No. W8807, National Bureau of Economic Research (NBER), February 2002 [cited December 23 2008], available from http://ssrn.com/abstract=301428; Jing-Yuan Chiou, "The Patent Quality Control Process: Can We Afford (Rationally) Ignorant Patent Offices?" Working Paper, Canadian Law and Economics Association (CLEA), May 1 2008 [cited December 23 2008], available from http://ssrn.com/abstract=1099948.

[18] Bronwyn Hall, Stuart Graham, Dietmar Harhoff and David Mowery, *Prospects for Improving U.S. Patent Quality via Post-grant Opposition*, IBER Working Paper No. E03-329 (Berkeley: Institute of Business and Economic Research, University of California at Berkeley, 2003). Cf., U.S. Chamber of Commerce, *Recommendations for Consideration by the Incoming Administration Regarding the U.S. Patent and Trademark Office* (Washington, D.C.: U.S. Chamber of Commerce, 2008), esp. pp. 5-7.

[19] Out-Law.com, "EPO Staff Strike Over Patent Quality: Accuse Office Directors of Profiteering," *The Register*, September 25 2008, available from http://www.theregister.co.uk/2008/0., 9/25/epo_staff_strike/ [cited December 23 2008]. At least one web site, operating under the rubric of "Patent and IP Law Quality" (http://www.iplaw-quality.com), is devoted to tackling the issue of patent quality and carries the following slogan on its homepage: "Patents are too important as tools of commerce to allow their quality to continue to be so poor" [cited 26 December 2008].

Convention[20], from representatives of both government and industry in Japan[21], as well as in the Congress of the United States, where the contentious patent reform bill has provided a focal point for expression of concern related to this topic by various stakeholders.[22]

The two problems of backlog and quality control in the issuing of patents are often closely linked, both practically and in the minds of concerned stakeholders.[23] Furthermore, as suggested by the following comment by the President of the European Patent Office, Alison Brimelow, the cumulative compound effect of the problems may have become so serious as to confound attempts to find a viable and readily palatable solution:

> Huge backlogs change the nature of the patenting system and create ambiguities which can be exploited in ways unforeseen by those who established the patent system. ... I am not clear that we will ever get ourselves back to the position that can be regarded as "healthy balance". I think that the effect of backlogs in the use of intellectual property is probably irreversible,

[20] The quality of patents and of patent information more generally has been a prominent theme for discussion recently at the European Patent Office (see, e.g.: EPO Media Relations Team, *Quality is a Shared Burden*, News item, European Patent Office, 4 November 2008 [cited 26 December 2008], available from http://www.epo.org/topics/news/2008/20081104.html; Stephen Adams, *An Ethical Patent System – Revisiting the Social Contract, EPOPIC 2008, Stockholm – Summary and Comments*, paper read at EPO Patent Information Conference, 30 October 2008, in Stockholm, Sweden, available at http://documents.epo.org/projects/babylon/eponet.nsf/0/0CCE90A67F4A1689C125750C004ABDF7/$File/conference_summary_en.pdf [cited 26 December 2008]; European Patent Academy, *Quality Matters: Quality in the European Patent System*, Proceedings of a Conference at the EPO, The Hague, 21 & 22 November 2005, CD-ROM (Munich: European Patent Office, 2006).

[21] Policy Committee (JPO), *New Intellectual Property Policy, Op cit.* (2008).

[22] United States House of Representatives, Subcommittee on Courts, the Internet, and Intellectual Property of the Committee on the Judiciary, First Session, 108th Congress, *Hearing on Patent Quality Improvement*, 24 July 2003 [Serial No. 38]; Daniel B. Ravicher, *American Innovation at Risk: The Case for Patent Reform*, Statement before the Subcommittee on Courts, the Internet, and Intellectual Property of the Committee on the Judiciary, House of Representatives, Congress of the United States, 15 February 2007 (New York: Public Patent Foundation), available at http://judiciary.house.gov/hearings/February2007/ravicher070215.pdf [cited 26 December 2008]; Charles E. Van Horn, *Patent Quality Improvement*, Statement before the Subcommittee on Courts, the Internet, and Intellectual Property of the Committee on the Judiciary, House of Representatives, Congress of the United States, 24 July 2003 (Arlington, VA: American Intellectual Property Law Association), available at http://www.aipla.org/Content/ContentGroups/Legislative_Action/108th_Congress1/Testimony2/Testimony_on_the_Patent_Quality_Improvement_Act.htm [cited on 26 December 2008].

[23] For example, Hall *et al.* (Prospects, *Op. cit*. (2003), p. 4) write: "The issuance of low-quality patents also is likely to spur significant increases in patent applications, further straining the already overburdened examination processes of the USPTO. A kind of vicious circle may result, in which cursory examinations of patent applications result in the issue of low-quality patents, which triggers rapid growth in applications, further taxing the limited resources of the USPTO, further limiting the examination of individual applications, and further degrading the quality of patents."

> and that raises big questions for world patent offices. More generally, there is the theme of quality and fitness-for-purpose of the patent system.[24]

With such an assessment of the situation in mind, Brimelow has touted the possibility of radical solutions, such as dramatically reducing the number of patents issued by patent offices and achieving such as reduction by raising the legal threshold of patentability of inventions significantly above that which characterizes the current patent regime.[25]

A series of analyses, internal projects and inter-office conferences have taken place amongst the world's major patent offices on the theme of this paper, with the major players being the EPO, the JPO, the USPTO and to some extent the WIPO; in addition, other offices such as SIPO, UKIPO, DPMA, and KIPO are increasingly engaged with such issues.[26] Some private consulting projects have been conducted for the offices, dealing for example with operational efficiency issues[27]; and various projects aimed at better cooperation and information sharing between the major patent offices have emerged.[28]

However, at this stage no solutions have emerged from these efforts sufficient in scale to ameliorate the problems at greater than a modest level. In the United States, for instance, a Senate budget appropriations committee report recently contained the following statement:

> The Committee remains frustrated by the lack of progress toward reducing patent pendency and the overall patent backlog. The Committee notes that the Patent Office took 3 weeks not the 3 years to award the patent for the invention of the telephone to Alexander Graham Bell. During the early part of this decade the Committee heard concerns about the redirection of patent filing fees and has since provided the USPTO with full access to its fees since

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[24] Alison Brimelow, *We Need to Face up to New Challenges*, Interview transcript, European Patent Office, 2 July 2007 [cited 26 December 2008], available from http://www.epo.org/about-us/press/backgrounders/interview.html.

[25] *Id.*

[26] Jürgen Schade, "Synergies Created by International Cooperation in the Patent Area?" (pp. 619-632) in *Patents and Technological Progress in a Globalized World: Liber Amicorum Joseph Straus*, edited by W. Prinz zu Waldeck und Pyrmont, M. J. Adelman, R. Brauneis, J. Drexl and R. Nack (Berlin & Heidelberg: Springer-Verlag, 2009).

[27] Fuggenthaler, Schreiner and Aleker, *op cit*., *Benchmarking Project* (2007).

[28] The "Trilateral Cooperation" initiative of the USPTO, the JPO and the EPO (http://www.trilateral.net/) is the most prominent example (see, e.g., http://www.trilateral.net/); however, the patent offices of China and Korea have now entered into cooperation with the Trilateral Cooperation members to form a "group of five" major patent offices collaborating to address the problems of efficiency and reliability in the administration of the global patent system (see Schade, "Synergies," *op cit*. (2009)).

> 2005. The subsequent years [have] seen the USPTO budget grow by over [$500,000,000], yet pendency and backlog grow worse. As such the Committee has provided bill language to transfer funding to the Office of Inspector General for the express purpose of conducting continual audit engagements and oversight at the USPTO.[29]

It appears that, in view of the seemingly intractable nature of the problems, members of the Senate are contemplating a less "arms length" approach to the budgetary oversight and management of the USPTO than may previously have been the case.

I conclude this brief introduction with the following observations. A belief that the administration of the global patent system is seriously hampered by the twin problems of a backlog in the processing of patent applications and unreliable quality in the examination and decision-making process for issuing patents is ubiquitous amongst informed observers. A variety of stakeholders in the patent system—ranging from industry representatives, through legal-professional service providers, to social and political activists (and even some employees of the patent organizations themselves)—are speaking out in favor of reform of the patent system, including both its laws and its administration. These perceptions and expressions of concern are international in scope and origin. Furthermore, the respective governments of the world's major patent offices are engaged in debate, with legislative and policy intent, regarding the reform of the patent system to address, among other things, the twin problems that are the subject of this paper. Some of the proposals for reform that have emerged may be perceived by observers as being at least contentious, if not radical, in both concept and likely impact. Finally, the way forward is not clear. In other words, much disagreement exists between various stakeholders as to the exact nature of the problems, the origins and causes of the problems, and the preferred solutions to the problems.

[29] Senate of the United States, *op cit.*, 2d Session, Bill S. 3182 [Report 110-397] (2008). [Note: the Senate report actually mentions "$500,00,000" [sic.] as the USPTO budget growth from 2005 onwards. However this must be a typographical error. A quick review by this author of the USPTO's financial results in its annual reports over the last several years revealed that the USPTO's budget has actually increased by about $403 million since 2005 and by about $680 million since 2004.]

The question that is evoked by this situation is how might the respective authorities go about determining the best way to develop a strategy or strategies for reaching an optimal solution to the problems? The rest of this paper will be devoted to answering that question.

Basic Principles for the Proposed Approach to Analyzing the Causes of the Problems and Identifying an Appropriate Mix of Solutions

With so many stakeholders demanding solutions to the patent system's problems as a matter of priority it might be tempting for legislators to quickly embrace one or two of the plausible-sounding ideas for reform that have recently been proposed by commentators and critics. Such ideas might include, for example, radically restricting the number of patents issued by "raising the bar" of the legal requirements for patentability, excluding certain categories of technology from patentability for various "policy" reasons, or making patents less attractive to applicants by reducing the term length of patents to something less than the current norm of 20 years. However, given the immense value of what is at stake in the patent system—technological innovation, the diffusion of technical knowledge, business investment, industry development and economic development—it would seem prudent to devote great care to ensuring that any solution adopted was really likely to be efficacious. In addition, it would be prudent to ensure that costs of imposing such a solution were not greater than its benefits, and that the unintended side-effects of the solution were not likely to be deleterious. How might such prudence be expressed? In this paper I suggest that it would be prudent to follow a systematic and comprehensive strategic-analysis approach that is based on solid and consciously adopted basic principles.

In one sense, such a "systematic and comprehensive strategic-analysis approach" might be seen by many as amounting to nothing more than using common sense. Perhaps. However, the approach advocated in this paper—whether or not it may be properly described as "common sense"—would require disciplining the imagination through the filters of

rigorous, systematic and strategic analysis, taking into account the complementarities and interdependencies of the alternative proposed solutions. Let me begin by laying out the basic principles and assumptions that should underlie such analysis.

1. The "problem" is actually a compound-problem comprised of a pair of ostensibly distinct problems: the global backlog in the processing of patent applications; and the inconsistent or unreliable quality of the decision-making of patent offices regarding the granting of patents. These two problems are closely intertwined.

2. There is no one simple explanation for the problems and no singular cause for the problems. There are multiple plausible explanations for the problems. There are also multiple salient explanations for the problems (in the literature and amongst the expressed opinions of interested observers), not all of which are equally plausible, but which deserve at least some consideration as part of a systematic and comprehensive approach.

3. It is therefore necessary to identify and take in to account the *relative cogency* of each explanation of the problems.

4. The optimal solution, or set of solutions, to the problems will depend upon the actual explanations, or causes, of the problems that are identified. Hence, the analysis of solutions ought to be linked to the systematic analysis of plausible or salient explanations of the problems.

5. Because there is both an *array* of plausible explanations and an *array* of potential solutions, we need a manageable way to link *arrays* of problems and solutions.

6. Some solutions that may appear optimal following a thorough analysis of the plausible explanations of the problems may not actually be very feasible, due to political constraints, powerful vested interests, or other practical constraints that may

have no relationship at all with the original causes of the problems. Thus, it will be advisable to evaluate each alternative proposed solution as to its political and practical viability, not just for its operational or logical appeal as a "rational" solution.

7. Some solutions may work best if they are juxtaposed with other complementary solutions; and some solutions may even be dependent on the implementation of other solutions for their success. Thus, it will be advisable to analyze the interdependency of various proposed solutions.

8. Thus, the "solution" to the compound problems of unacceptable backlog and unreliable examination quality in the administration of the patent system may in fact consist of one or more alternative strategies—each of which, in turn, may be comprised of a configuration of selected solutions. In fact, the preferred strategy might even take the form of a "meta-strategy" comprised of two or more sub-strategies. There may even be a choice between more than one viable strategy, depending upon the preferences and politics of the authorities and other stakeholders involved in the policy-making process.

9. The optimal strategy for solving the problems may vary from country to country, depending upon the nature of the forces at work in each jurisdiction.

In conclusion, rather than simply choose some solutions to the backlog and quality problems that seem to be most palatable, in this paper I advocate following a disciplined and structured methodology for identifying one or more alternative strategies for solving the problems. I also advocate that the methodology be based on the above set of nine basic principles.

The balance of the paper will summarize, step by step, what such a methodology might look like. The data provided herein represent the results of a thought experiment to illustrate how the methodology might work, in principle. In other words, they are estimates based on the reasonable judgment of an educated and professionally informed person in the

field. Rigorous data will be generated extensively and objectively later during the full-scale implementation of the project, after the conceptual framework and methodology is further refined.

The proposed methodology entails the following six general phases:

Phase One: Identify plausible or salient explanations for the problems of backlog and unreliable examination quality in the global patent system

Phase Two: Identify alternative potential solutions to the problems of backlog and unreliable examination quality in the global patent system

Phase Three: Detailed analysis of the relationships between the problems and the solutions

Phase Four: Review the results of systematically analyzing the relationships between the explanations of the problems and alternative solutions

Phase Five: Detailed analysis of the relationships between the alternative solutions

Phase Six: Development of strategy concepts based on analysis of relationships between explanations and solutions and on analysis of dependencies between the alternative solutions.

Each phase consists of several steps and elements. This paper, which contains the outline of a suggested analytical methodology, is the first outcome of the preliminary stage of a proposed full-scale research project devoted to analyzing the twin problems of patent backlog and unreliable quality in the global patent system. During the main stage of the full-scale project the methodology will be refined and the categories and measures will be modified or augmented as appropriate.

Phase One: Identify Plausible or Salient Explanations for the Problems of Backlog and Unreliable Examination Quality in the Global Patent System

The following list is an attempt to lay out the full range of intelligible explanations for the problems in a conceptually simple and non-redundant manner, based on a preliminary assessment of the pertinent literature and on personal professional and academic knowledge. In other words, it is a conceptual and systematic list rather than an organic synthesis of popularly touted explanations. During the full-scale implementation of the research project, of which this paper is the first result, these categories and descriptions will be justified and elaborated, and perhaps also altered or re-arranged, based upon the results of detailed research.

"Salient" explanations are those explanations that have already been proposed in one form or another in either the pertinent literature or in various policy debates or fora for the discussion of patent issues, regardless of whether or not they are plausible in the light of rigorous analysis. "Plausible" explanations are those explanations for the problems that appear to the current author to be reasonable and potentially convincing to a rational and well-informed analyst in the field, whether or not such explanations have already become salient. Inclusion of an explanation in the list should not thereby be interpreted to mean that it is necessarily persuasive or powerful as a cause of the problems.

1. *Inadequate knowledge in the examiner corps*

   There is a lack of adequate knowledge and skill related to newer fields of invention, especially those associated with computer software and business methods, but also across all fields of new technology, within the examiner corps of the patent offices. This lack of expertise leads to slower processing of patent applications and poorer quality decisions by examiners (e.g., due to many "false positive" decisions out of fear of alienating applicants).

2. *Ambiguity and confusion in patent law*

   There is ambiguity and confusion in the laws of the respective jurisdictions regarding criteria for the patentability of inventions (e.g., whether or not, or under what circumstances, software technology may be patented). This ambiguity confounds the decision making process of examiners.

3. *Inconsistency between the patent laws of major jurisdictions*

   Inconsistency and incompatibility between the laws of the respective jurisdictions regarding criteria for the patentability of inventions weakens the efficiency and effectiveness of cooperation between patent offices in cases where multiple patent applications are filed across multiple jurisdictions for a single invention.

4. *Financial constraints – government budgets*

   National governments refuse to allow patent offices a sufficient budget to do their job efficiently and effectively. This may be because national governments see patent offices as "profit centers" and hence would rather extract financial surpluses from the offices than allow the revenue to be channeled back in to improving the quality and efficiency of the offices' work. Alternatively, it may be because national legislatures and executive branches simply do not like the budgets of patent offices to grow very quickly or to appear large compared with other categories of expenditure (even if the patent offices are actually self-funding).

5. *Financial constraints – market preferences*

   Patent applicants are not willing to pay the amount of money required to cover the true costs of the examination and decision-making process, thereby causing patent offices to charge prices that are suboptimal. This, in effect, means that the "market" for patent examination services is biased towards low-cost/low-quality services, rather than high-cost/high-quality services.

6. *Financial constraints – civil service rigidities*

   Civil service regulations and traditions constrain national governments from allowing their respective patent offices to pay patent examiners sufficient remuneration to prevent them from choosing more lucrative patent-related jobs in the private sector. This financial constraint has the insidious effect of leading to patent examiners being less experienced and of lower quality than their counterparts in the private sector.

7. *Insufficient supply of examiners – demographic constraints*

   There is an insufficient supply of suitably qualified and eligible people in the world to be recruited and trained by patent offices to meet the demand for patent examiners. In other words, apart from the issue of whether or not patent offices are free to pay adequate remuneration for such examiners, there is simply not enough suitable people available to be recruited.

8. *Political constraints – patent volume*

   Some national governments may wish, for political reasons, to limit the number of patents issued; and hence some respective patent offices are not given sufficient resources by their respective governments to meet the demands placed on them by patent applicants. Even a supra-national patent office may be subject to political pressures from member governments to limit operations or limit spending on the examination of patents.

9. *Political constraints – low threshold for quality*

   Some national governments may wish, for political reasons, to maximize the number of patents issued to local (national) applicants and hence may want to maintain low quality thresholds in the examination process (and, hence, may limit the amount of resources available for the examination process accordingly).

10. Political constraints – high threshold for quality

Some national governments may wish, for political reasons, to minimize the number of patents issued and may see imposing high thresholds in the examination process (i.e., "raising the bar") as a vehicle for minimizing the volume of issued patents. Limiting the amount of resources available for the examination process may also, ironically, be a useful way of minimizing the volume of issued patents.

11. High growth rate in level of application for patents

The rapid growth in patent applications submitted to the world's major patent offices, including those from China and various developing countries in the wake of their accession to the WTO, creates a momentum of pressure on the examiner corps that is simply overwhelming and which is impossible to accommodate, no matter how much money is allocated to the patent offices.

12. Explosion of prior art

The cost of conducting comprehensive prior art searches, and of analyzing the results of those searches, is ballooning, due to an explosion in the volume of published technical knowledge, the increasing accessibility of technical knowledge across national and language barriers, and the growth of non-published but publicly-practiced inventions that need to be included as part of prior art. This generates a huge increase in the amount of time and effort that must be devoted to the examination of each patent – an increase that goes beyond a level that is politically or organizationally easy for those responsible for patent offices to recognize or accommodate.

13. High number of "inappropriate" patent applications

Some governments may wish to limit the capacity of patent offices to examine more patents out of a belief that there are too many—maybe millions too many—patent

applications being filed that are not "appropriate." Such an opinion may be held regardless of whether what is an "appropriate" level may be defined.

Phase Two: Identify Alternative Potential Solutions to the Problems of Backlog and Unreliable Examination Quality in the Global Patent System

The following list constitutes an attempt to lay out the full range of salient and plausible solutions to the problems in a conceptually simple and non-redundant manner, based on a preliminary assessment of the pertinent literature and on basic professional and academic knowledge of the field. As was explained above in relation to the list of salient and plausible explanations for the problems, the categorization and description of these proposed solutions may be altered or re-arranged, based upon the results of detailed research during the full-scale implementation of the project of which this paper is the first result. In any case, during the full-scale implementation of the project these solutions will be more fully elaborated, justified and explained.

1. *International cooperation solution*

   Enhanced cooperation between the world's major patent offices, to reduce redundancy in operations, to harmonize patent standards and to share patent examination work.

2. *Private-sector outsourcing solution*

   Outsourcing of patent examination work to private organizations.

3. *Public-sector outsourcing solution*

   Outsourcing of patent examination work to other patent offices.

4. *Public-sector certification solution*

   Modified PCT process whereby a standardized "opinion" (i.e., certification) would be issued by WIPO containing a rating of the quality and strength of a patent application, in addition to the normal PCT search report.

5. *Independent non-government certification solution*

   Establishment of an independent international patent certification organization, analogous to the International Standards Organization (ISO), that would issue standardized ratings of the quality and strength of patents and patent applications.

6. *Private-sector certification solution*

   Establishment of a private international patent certification service that would issue standardized ratings of the quality and strength of patents and patent applications.

7. *International quasi-patent solution*

   Modified PCT process whereby a "quasi patent" would be issued by WIPO (similar to an actual patent, but without the formal standing of a national patent), based on globally standardized examination criteria. This would be analogous to the European Patent as currently issued by the EPO, before entering the national stage, but global rather than European in geographic scope.

8. *Private-sector financial solution*

   Patent offices would charges fees from patent applicants and patentees that are sufficiently high to easily cover the total cost of developing and maintaining an adequate high-quality, efficient and timely patent-examination system.

9. *Public-sector financial solution*

   National governments would allocate budgets to their respective national patent offices, and also to supra-national patent offices such as the EPO over which they have some influence, that are sufficiently large to easily cover the total cost of developing and maintaining an adequate high-quality, efficient and timely patent-examination system.

Phase Three: Detailed Analysis of the Relationships Between the Problems and the Solutions

Table 1 illustrates how a simple table may be set up to facilitate analysis of the feasibility of an array of potential solutions in the light of an array of plausible or salient explanations. The table may be created using any commonly available spreadsheet software on a microcomputer. After creating the table, five separate procedures are required.

1. *Analysis of Cogency of Explanations*

   Analyze each of the thirteen explanations of the problems to determine just how cogent each one is, in itself, and relative to the other explanations. The results of this *cogency* analysis should be expressed as a score for each individual explanation (negligible, low, medium, high). The first vertical column in the table is intended for this purpose.

2. *Analysis of Political and Practical Viability of Solutions*

   Analyze each of the nine alternative solutions to determine just how viable it is likely to be, taking into account political factors and other practical factors. This assessment of political and practical viability, or feasibility, should disregard the operational or logical appeal of each option as a "rational" solution to the problems. The results of this *viability* analysis should be expressed as a score for each individual solution (negligible, low, medium, high). The first horizontal row in the table is intended for this purpose.

3. *Analysis of the Probability of Solutions Actually Addressing the Problems as Explained*

   Analyze each solution to determine the probability that it will adequately address the problems as characterized in each respective explanation. The results of this *probability* analysis should be expressed as a score for each individual solution

(negligible, low, medium, high). Each individual cell in the matrix (consisting of a total of 117 cells) is intended for this purpose. The type of thinking required here is to ask for each solution, "How likely is it that this solution will actually solve the twin-problems of patent-backlog and patent-quality, on the assumption that the respective explanation provides a credible description of the causes of the problems?" In other words, for this analytical exercise it is inappropriate to think about whether or not the explanation really is cogent; rather, on the assumption that it is cogent, it is necessary to judge the likelihood that the respective solution will successfully address the problems as characterized by each respective explanation.

An illustration of the results of the above three analytical steps is provided in Table 2. These results were produced by the current author based on a preliminary assessment of the pertinent literature and on general professional and academic knowledge. During the full-scale implementation of the project each one of the scores would be justified on the basis of systematic and substantive research.

4. *Assign Quantitative Weights for the Qualitative Scores in the Table*

   In order to make the analysis robust and objective it is necessary to assign a quantitative score (or weight) to each qualitative score used in the explanations/solutions table. In the spreadsheet developed for this purpose by the current author the following weights were assigned: negligible = 1, low = 2, medium = 3, high = 4. Thus, each cross, tick or combination of ticks scored in the table would be automatically converted by the spreadsheet in to a number, based on the assigned weights (which could be varied according to analytical requirements or professional judgment, as needed). There is no table containing these transformed scores provided here, but the results would be identical in form and meaning to those portrayed in Table 2.

5. *Calculate the Weighted Probability of Success of Each Solution in Relation to Each Explanation*

   The score for each cell in the matrix, obtained using the procedure just described (in step #4), can then be multiplied by the weighted scores for the cogency of the explanations (obtained from steps #1 and #4) and also multiplied by the weighted scores for the political and practical viability of the solutions (obtained from steps #2 and #4). The resulting number in each cell of the matrix will represent the probability that each solution will adequately address the problems as characterized in each explanation, taking in to account the cogency of the respective explanation and the political and practical viability of the solution. The results of this exercise are portrayed in Table 3. These results are calculated automatically by the author's spreadsheets developed for this purpose (hereinafter just called the "spreadsheets"). In short, Table 3 weights the results of the rational scoring exercise summarized in Table 2 to adjust for the problem that some explanations that are salient in the literature and policy debates might not be very cogent and that some solutions might not be very feasible, due to political or other practical constraints.

Phase Four: Review the Results of Systematically Analyzing the Relationships Between the Explanations of the Problems and Alternative Solutions

The results of the above calculations may be expressed graphically, as illustrated by Figure 1 and Figure 2.

Figure 1 illustrates, on the basis of the systematic and quantitative scoring exercises described in the foregoing pages, what the likelihood is of each underlying cause of the twin problems of backlog and unreliable examination quality in the patent system being addressed if *all* of the alternative solutions are adopted. These results incorporate the cogency and viability weightings discussed in Step #5 (of Phase #3). Highlighting a few elements from the

Figure may illustrate the potential power of this approach. The Figure shows that if we in fact believed that the primary reasons for the twin problems were (i) ambiguity and confusion in patent law, (ii) lack of willingness of patent applicants and owners to pay the full cost of an effective patent system (i.e., financial constraints – market preferences), (iii) an insufficient supply of suitable people in the population to be recruited as examiners, or (iv) a high number of inappropriate (or "junk") patent applications—all four of which explanations are salient—then we should expect no real improvement in the situation, even if *all* of the nine proposed solutions were successfully implemented. Furthermore, if we really believed in the validity and primacy of the four explanations just mentioned, then we would be forced to search for other (presumably more radical) solutions, beyond those previously envisioned. It can also perhaps help us to understand why someone as eminent as the President of the EPO might have been led to say something as unsettling as "I think that the effect of backlogs in the use of intellectual property is probably irreversible."[30]

On a more positive note, examining the results presented in Figure 1 might also prompt policy makers to review and revise their previous presumptions about what the real explanations for the problems might be. For example, if a more rigorous and objective review of the evidence led policy makers to believe that the true causes of the problems lay with such factors as (i) an explosion in the volume of prior art, (ii) an explosion in the demand for patents (for reasons more to do with aggregate growth in economic and technological activity in the world, for example, than to do with problems of patent law), or (iii) with civil service rigidities and financial constraints associated with patent offices being part of government, then they could have confidence that applying all of the nine proposed solutions would probably actually address the problems.

[30] Brimelow, *New Challenges*, op cit. (2007).

Of course, the scenarios just discussed are just hypothetical at this stage, as the numbers behind the results in Figure 1 are based on preliminary analysis only. More extensive research, a more sophisticated scoring and weighting system, or the participation of a larger group of experts in the scoring process, would no doubt modify the results. However, I think that this quick exercise effectively illustrates the potential power of the approach advocated here to illuminate various contrasting conceptions of the problems embraced by policy makers.

In contrast with Figure 1 (which focused on the thirteen alternative *explanations*) Figure 2 is a graphical representation of the relative power of each of the nine *solutions* to address the ensemble of underlying causes of the twin problems. In other words, while Figure 1 illustrates the likelihood of each individual underlying cause being addressed if all solutions are adopted, Figure 2 illustrates the likelihood of each individual solution addressing the whole set of causes behind the problems. Figure 2 also illustrates the difference that is generated by explicitly considering the impact of the political and other practical constraints that may act as obstacles to the implementation of each solution.

The notable insight that is produced by the results in Figure 2 is that when political and other practical constraints are explicitly analyzed, in a step-by-step systematic manner, using quantitative scoring techniques, the three "certification" solutions, together with the private-sector financial solution, rise in relative importance. This insight is of course subject to the same caveats that apply to interpretation of the results in Figure 1. Nevertheless, we can see from this simple exercise how adopting the approach advocated here may lead to quite productive, and sometimes surprising, outcomes in analyzing potential alternative solutions to the problems.

Phase Five: Detailed Analysis of the Relationships Between the Alternative Solutions

If we take seriously the basic principles enunciated earlier then it follows that we will need to think carefully about the interaction effects and dependency relationships of the various solutions. A viable strategy to solve the problems will need to incorporate the results of that thinking. The practical and simple methodology recommended here for pursuing that goal will involve three steps, as follows:

1. *Create a Matrix to Map the Interactions of the Alternative Solutions*

   Table 4 illustrates how the array of solutions can be mapped against itself to facilitate identification of the strategic relationships between the solutions.

2. *Analyze the Dependency Relationships of the Solutions*

   The next step is to consider each of the nine solutions individually and to ask to what degree its successful implementation will depend upon the adoption of each of the other solutions. The product of this analysis should be expressed as a score for each individual relationship (negligible, low, medium, high), for a total of 72 cells in the matrix. The results of this exercise conducted by the current author—based on a preliminary assessment of the pertinent literature and on general professional and academic knowledge—are presented in Table 5. During the full-scale implementation of the project each one of the scores would be justified on the basis of systematic and substantive research (the same situation that applies to the scores in Table 2).

3. *Assign Quantitative Weights for the Qualitative Scores in the Table*

   In order to make the dependency analysis quantitative and objective rather than just systematic it is necessary to assign a quantitative score (or weight) to each qualitative score used in the matrix. In the spreadsheet developed for this purpose by the current author the following weights were assigned: negligible = 0, low = 1, medium = 3,

high = 10. Thus, each cross, tick or combination of ticks scored in the table would be automatically converted by the spreadsheet in to a number, based on the assigned weights (which could be varied according to analytical requirements or professional judgment, as needed). The results of this exercise are reproduced in Table 6. The number in each cell is an index of the degree to which the successful implementation of the solution listed at the top of its column would depend upon the adoption of the respective solution listed at the left of its row. The number in the cell at the end of each row (i.e., the horizontal total of the scores) is an indicator of the degree of influence that particular solution has on the likelihood of success of all of the other solutions combined (this can be called an "inter-strategy influence index"). The number in the cell at the bottom of each column is an indicator of the degree to which the likelihood of success of that particular solution is dependent upon all of the other solutions combined.

Phase Six: Development of Strategy Concepts Based on Analysis of Relationships Between Explanations and Solutions and on Analysis of Dependencies Between the Alternative Solutions

By juxtaposing the results of the analyses summarized in Figure 2 and Table 6 we are able to produce Table 7, which portrays three quantitative ratings of each alternative proposed solution to the twin problems of backlog and unreliable examination quality in the patent system: an *Intrinsic Problem-solving Power Index*, an *Inter-strategy Influence Index*, and an *Inter-strategy Dependency Index*. The numbers in Table 7 can then be graphed as shown in Figure 3 to illustrate the likely strategic relationships between the alternative solutions to the problems. These results can be produced automatically on a spreadsheet, based entirely on the scores entered in to Table 1 (shown on Table 2) and in to Table 4 (shown on Table 5).

In Figure 3, the size of the bubble corresponding to each solution represents an index of the estimated relative power of that solution to address the underlying twin problems of backlog and unreliable examination quality in the global patent system (i.e., the Intrinsic Problem-solving Power Index). The precise value of the index for each solution is indicated by the number in each bubble. The position of each bubble on the vertical axis represents the degree to which the respective solution is dependent upon the prior implementation of other solutions for its success (i.e., the Inter-strategy Dependency Index). The position of each bubble on the horizontal axis represents the degree to which the respective solution may act as a precursor or precondition for implementation of solutions positioned high on the vertical axis (i.e., the Inter-strategy Influence Index). The figure portrays not so much an estimate of the feasibility of implementing each solution, given the requisite level of political will, etc., but rather an estimate of the feasibility of actually solving the underlying problems, taking in to account the strategic relationships of the alternative solutions.

Any conclusions we may draw from reviewing the information in Figure 3 must be covered by the same caveats we previously applied to our possible interpretation of Figures 1 and 2. Nevertheless, it is easy to see from the figure what a powerful tool the methodology described in the preceding pages may be for conceptualizing strategies to solve the patent problems discussed in this paper. By appropriately juxtaposing complementary solutions and taking in to account their dependency-upon or influence-upon each other, policy makers are more likely to be successful in their quest of solving the problems at hand than would otherwise be the case.

To illustrate how this tool might be applied, I will make a few simple and casual observations. Of the four solutions grouped together in Zone C as “dependent strategies,” two of them (the public-sector outsourcing solution and the private-sector outsourcing solution) are already practiced to some degree by some patent offices. Figure 3 tells us that no matter

how well these two solutions might be implemented they are not likely to have a big impact on actually solving the underlying problems unless the solutions in Zone B are first of all implemented. In addition, Figure 3 also suggests that, when we take the size of the bubbles in to account, that dealing with the underlying financial constraints of the patent system (generating sufficient fees from users of the patent system and obtaining adequate budget allowances from government to cover the full cost of running an efficient and reliable service) may provide a very powerful stepping stone towards eventually implementing Zone C solutions. In addition, the very ambitious Zone C solution of implementing a world-wide patent system of some sort (once again, a solution that has already been touted by some—albeit cautiously—in the debates, as a grand master solution to the problems) will most likely only work after all of the other solutions have first of all been put in place. In other words, it will only ever be a prize for completing the strategic journey rather than a key to success in making the journey. In addition, the "wild card" certification solutions in Zone A (which, incidentally, have so far been mostly ignored in the literature and the debates) are intriguing in that while they may exert only modest leverage on other strategies they are potentially very powerful in effectively addressing the problems directly while simultaneously also being largely independent of other strategies.

There is insufficient space here to further interpret Figure 3 or to elaborate upon any of the strategy concepts. That will have to wait until implementation of the full-scale research project. The most important thing to observe at this stage is that the methodology outlined in this paper may produce some very simple but powerful analytical tools to help policy makers and legislators plot viable strategies for solving the twin problems of the global backlog in processing patent applications and the unreliable quality in the examination processes and decision-making of patent offices regarding the granting of patents. Figure 3 also illustrates how adopting a systematic and rigorous analytical process, employing quantitative

techniques for scoring and presenting results from the assessment exercise, may lead to insights that may sometimes be counterintuitive.

Comments on Data Collection for the Full-Scale Research Project

There are two alternative methods by which data may be assembled during the implementation of the full-scale research project. Both methods lead to the same practical end, namely, the entry of scores in to Table 1 (as illustrated by the example in Table 2) and in to Table 4 (as illustrated by the example in Table 5).

The first method requires the principle researcher to conduct detailed research (incorporating the collection of empirical data, the review of official documents and reports, the review of pertinent academic sources, and the systematic consideration of various practical and theoretical arguments, as appropriate) relevant to the subject matter of each and every cell in each table, namely139 cells for Table 1 (139 = 117 + 13 + 9) and 72 cells for Table 4. A score corresponding to one of the four codes indicated (negligible, low, medium, high) would be entered by the researcher in to each cell, with each score being justified individually and analytically by the detailed research conducted for each cell. We could call this first method the "detailed substantive research" approach.

The second method, which we might call the "modified Delphi technique" approach, would involve selecting an international panel of experts in the fields of patent law and patent practice, and requiring each expert to independently provide scores for each of the cells in the two tables, based upon their prior expert knowledge. This exercise would be preceded by the principle researcher first of all explaining the meaning of the elements in the tables to the experts. The panel of experts would be classified in to several groups—based upon some yet-to-be-determined criteria related to their demographic, geographic, professional or academic backgrounds. The results of the scoring exercise would be aggregated for the whole panel (in

the form of median or mean scores) and dis-aggregated to show differences in results between the several groups. These aggregated and disaggregated results would then be shared with panel of experts who would be invited to share questions, comments or explanations on any of the results with all the other experts. Following the ensuing discussion, each panel member would re-score the tables, taking into account the insights gained from the interim reporting and discussion exercise. The revised scores would then be aggregated (in the form of median or mean scores), and once again dis-aggregated to show differences in results between the several groups. If a high degree of consensus was reached by this stage then the resulting scores from the second round could be used as final results from the modified Delphi exercise. If appropriate, an additional round of scoring and discussion could take place in the hope of reaching reasonable consensus. In the event that a reasonable consensus could not be reached the final results could be presented in a disaggregated form, with comparison of the results across the several groups acting as a useful vehicle to help elucidate alternative strategies to address the problems.

The *modified Delphi technique* approach could be implemented in either of two ways. First, the table-scoring and the feed-back and discussion exercises could be administered at a distance by email, web-based scoring or old-fashioned correspondence, with some kind of multi-media communications (e.g., video-conferencing) being used to facilitate the discussion phase of each exercise. Alternatively, a one-day workshop of all panel members could be conducted in person, involving face to face discussion, and multiple iterations of the scoring / aggregation / discussion process as appropriate. Which of the two options would be appropriate would depend primarily on the level of funding available for the project.

The two approaches—the *detailed substantive research* approach and the *modified Delphi technique* approach—are complementary methods. The *detailed substantive research* approach can be employed usefully to prepare background information to aid discussions that

take place within the *modified Delphi technique* approach and to ensure that the categories employed in the two tables are optimal. In addition, the background research conducted as part of the *detailed substantive research* exercise may be used to help interpret the results of the *modified Delphi technique* exercise.

The two alternative methods will arguably be best employed as complementary methods as part of one larger project. If it turned out, however, that there were funding or other constraints that limited the scope of the research activity, then the either one of the two methods could be implemented alone.

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Tables and Figures

The following tables and figures are all drawn from a spreadsheet software tool developed by the current author (Dr. Kelvin Willoughby) to automatically carry out the analysis described in this paper.

Table 1
Blank Matrix of Explanations and Solutions

Strategies for Solving the Problems of Deadlock and Unreliable Examination Quality in the Global Patent System

Plausible or Salient Explanations of Problems	*Level of cogency of explanation*	*Probability that Each Solution Will Adequately Address the Problems as Characterized in Each Explanation* — **Alternative Solutions**								
		A	B	C	D	E	F	G	H	I
		International cooperation solution	Private-sector outsourcing solution	Public-sector outsourcing solution	Public-sector certification solution	Independent non-government certification solution	Private-sector certification solution	International quasi-patent solution	Private-sector financial solution	Public-sector financial solution
	Political and practical viability of the Solution									
1	Inadequate knowledge in the examiner corps									
2	Ambiguity and confusion in patent law									
3	Inconsistency between the patent laws of major jurisdictions									
4	Financial constraints - government budgets									
5	Financial constraints - market preferences									
6	Financial constraints - civil service rigidities									
7	Insufficient supply of examiners - demographic constraints									
8	Political constraints - patent volume									
9	Political constraints - low threshold for quality									
10	Political constraints - high threshold for quality									
11	High growth rate in level of application for patents									
12	Explosion of prior art									
13	High number of "inappropriate" patent applications									

× = "Negligible" ✓ = "Low" ✓✓ = "Medium" ✓✓✓ = "High"

Table 2
Sample of Scored Matrix of Explanations and Solutions

Strategies for Solving the Problems of Deadlock and Unreliable Examination Quality in the Global Patent System

	Plausible or Salient Explanations of Problems	*Level of cogency of explanation*	*Probability that Each Solution Will Adequately Address the Problems as Characterized in Each Explanation* — **Alternative Solutions**								
			A International cooperation solution	B Private-sector outsourcing solution	C Public-sector outsourcing solution	D Public-sector certification solution	E Independent non-government certification solution	F Private-sector certification solution	G International quasi-patent solution	H Private-sector financial solution	I Public-sector financial solution
	Political and practical viability of the Solution		✓✓	✓	✓✓	✓	✓✓	✓✓✓	×	✓✓	×
1	Inadequate knowledge in the examiner corps	✓✓	×	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓	✓✓✓	✓✓✓
2	Ambiguity and confusion in patent law	✓✓	×	×	×	×	×	×	✓✓	×	×
3	Inconsistency between the patent laws of major jurisdictions	✓✓	✓✓✓	×	×	✓✓✓	✓✓✓	✓✓✓	✓✓✓	×	×
4	Financial constraints - government budgets	✓✓✓	✓✓	×	✓✓	✓✓✓	✓✓✓	✓✓✓	✓	×	✓✓✓
5	Financial constraints - market preferences	✓	×	×	×	×	×	×	✓	×	✓
6	Financial constraints - civil service rigidities	✓✓✓	✓✓	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
7	Insufficient supply of examiners - demographic constraints	✓	✓	✓✓	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
8	Political constraints - patent volume	✓✓	×	×	×	✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
9	Political constraints - low threshold for quality	✓	✓	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	✓	✓
10	Political constraints - high threshold for quality	✓	✓	✓✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
11	High growth rate in level of application for patents	✓✓✓	✓	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
12	Explosion of prior art	✓✓✓	✓✓	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
13	High number of "inappropriate" patent applications	×	×	×	×	✓✓✓	✓✓✓	✓✓✓	✓	✓✓✓	✓✓✓

× = "Negligible" ✓ = "Low" ✓✓ = "Medium" ✓✓✓ = "High"

Table 3
Weighted Scores of the Probability that Solutions Will Effectively Address the Problems

Strategies for Solving the Problems of Deadlock and Unreliable Examination Quality in the Global Patent System											
		Probability that Each Solution Will Adequately Address the Problems as Characterized in Each Explanation (Weighted to reflect both the cogency of the respective Explanation and the political and practical viability of the Solution)									
		Alternative Solutions									
Plausible or Salient Explanations of Problems	*Level of cogency of explanation*	A International cooperation solution	B Private-sector outsourcing solution	C Public-sector outsourcing solution	D Public-sector certification solution	E Independent non-government certification solution	F Private-sector certification solution	G International quasi-patent solution	H Private-sector financial solution	I Public-sector financial solution	**Row total**
Political and practical viability of the Solution		**3**	**2**	**3**	**2**	**3**	**4**	**1**	**3**	**1**	
1 Inadequate knowledge in the examiner corps	**3**	0	18	27	18	90	120	3	90	30	**396**
2 Ambiguity and confusion in patent law	**3**	0	0	0	0	0	0	9	0	0	**9**
3 Inconsistency between the patent laws of major jurisdictions	**3**	90	0	0	60	90	120	30	0	0	**390**
4 Financial constraints - government budgets	**4**	36	0	36	80	120	160	4	0	40	**476**
5 Financial constraints - market preferences	**2**	0	0	0	0	0	0	2	0	2	**4**
6 Financial constraints - civil service rigidities	**4**	36	8	12	80	120	160	12	120	40	**588**
7 Insufficient supply of examiners - demographic constraints	**2**	6	12	6	12	18	24	6	18	6	**108**
8 Political constraints - patent volume	**3**	0	0	0	18	90	120	9	90	30	**357**
9 Political constraints - low threshold for quality	**2**	6	4	6	12	60	80	6	6	2	**182**
10 Political constraints - high threshold for quality	**2**	6	12	6	40	60	80	6	60	20	**290**
11 High growth rate in level of application for patents	**4**	12	8	12	80	120	160	12	120	40	**564**
12 Explosion of prior art	**4**	36	8	12	80	120	160	12	120	40	**588**
13 High number of "inappropriate" patent applications	**1**	0	0	0	20	30	40	1	30	10	**131**
Column total		**228**	**70**	**117**	**500**	**918**	**1224**	**112**	**654**	**260**	

Weighted score for solution probability = raw probability score x weight for explanation cogency x weight for political and practical viability

Figure 1

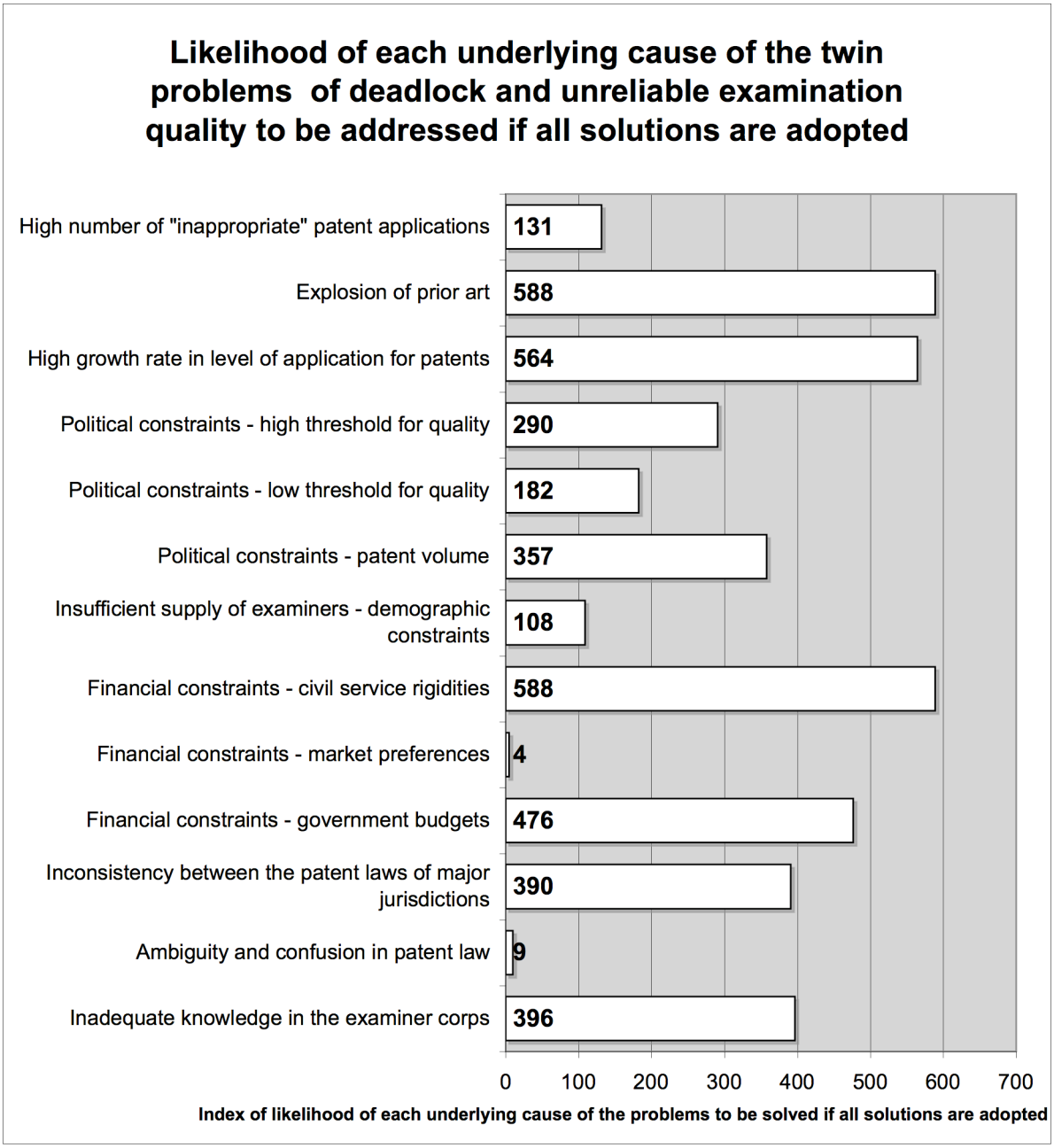

Likelihood of each underlying cause of the twin problems of deadlock and unreliable examination quality to be addressed if all solutions are adopted
High number of "inappropriate" patent applications
131
Explosion of prior art
588
High growth rate in level of application for patents
564
Political constraints - high threshold for quality
290
Political constraints - low threshold for quality
182
Political constraints - patent volume
357
Insufficient supply of examiners - demographic constraints
108
Financial constraints - civil service rigidities
588
Financial constraints - market preferences
4
Financial constraints - government budgets
476
Inconsistency between the patent laws of major jurisdictions
390
Ambiguity and confusion in patent law
9
Inadequate knowledge in the examiner corps
396
0
100
200
300
400
500
600
700
Index of likelihood of each underlying cause of the problems to be solved if all solutions are adopted

Figure 2

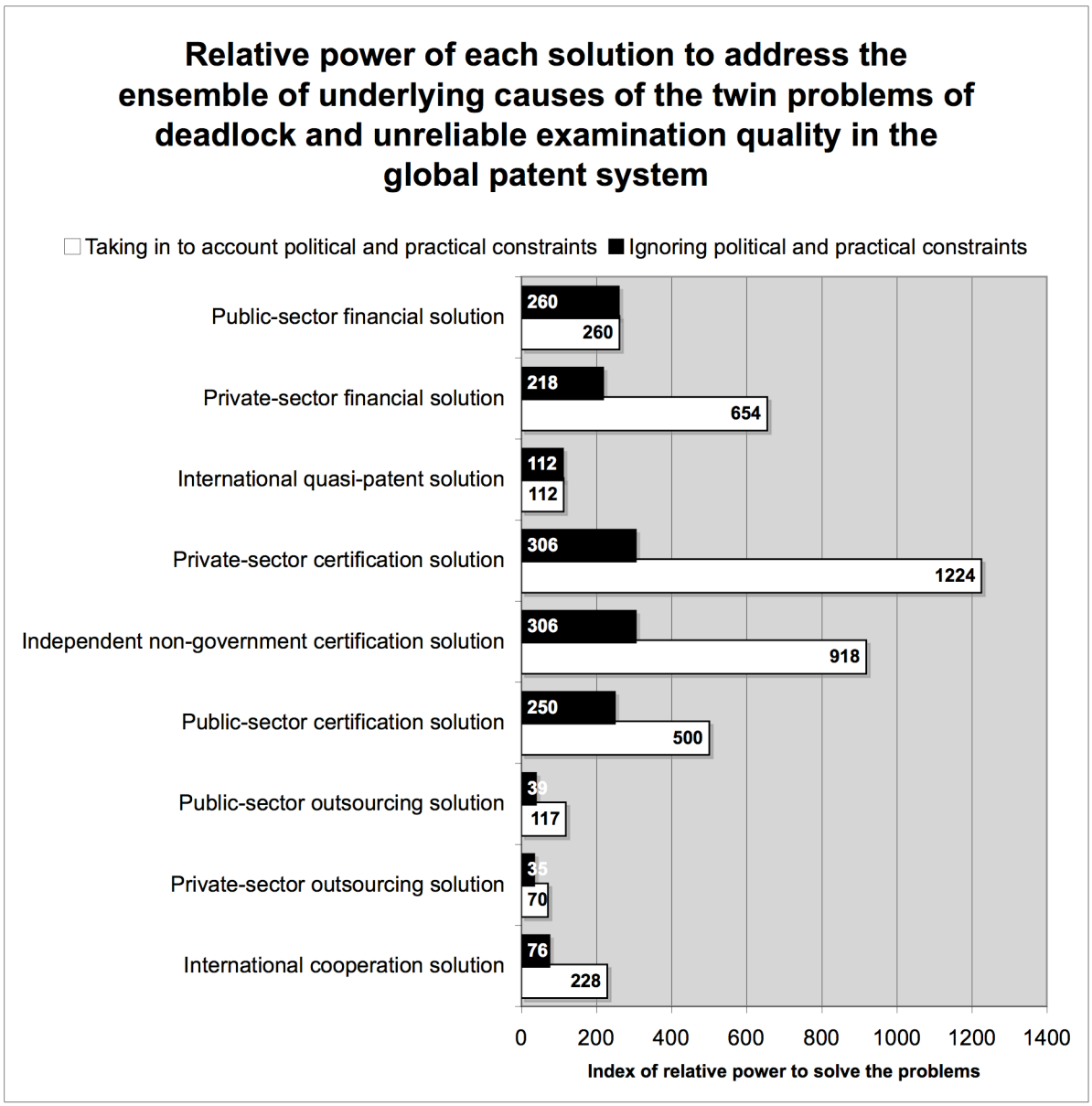

Relative power of each solution to address the ensemble of underlying causes of the twin problems of deadlock and unreliable examination quality in the global patent system
Taking in to account political and practical constraints
Ignoring political and practical constraints
Public-sector financial solution
260
260
Private-sector financial solution
218
654
International quasi-patent solution
112
112
Private-sector certification solution
306
1224
Independent non-government certification solution
306
918
Public-sector certification solution
250
500
Public-sector outsourcing solution
39
117
Private-sector outsourcing solution
35
70
International cooperation solution
76
228
0
200
400
600
800
1000
1200
1400
Index of relative power to solve the problems

Table 4
Blank Matrix of Interdependencies Between Solutions

Strategic Relationships Between Solutions to the Problems of Deadlock and Unreliable Examination Quality in the Global Patent System

Enter scores from top to bottom of columns (excluding diagonals) -- asking, "To what degree does the solution at the top of the column depend upon the adoption of the respective solution on the left of the row for its success?"	*Degree to which successful implementation of the other solution is a prerequisite for implementation of this solution* **Dependence of this Solution on the Other Solution**								
	A International cooperation solution	B Private-sector outsourcing solution	C Public-sector outsourcing solution	D Public-sector certification solution	E Independent non-government certification solution	F Private-sector certification solution	G International quasi-patent solution	H Private-sector financial solution	I Public-sector financial solution
A International cooperation solution									
B Private-sector outsourcing solution									
C Public-sector outsourcing solution									
D Public-sector certification solution									
E Independent non-government certification solution									
F Private-sector certification solution									
G International quasi-patent solution									
H Private-sector financial solution									
I Public-sector financial solution									

"Negligible" = ×
"Low" = ✓
"Medium" = ✓✓
"High" = ✓✓✓

Table 5
Sample of Scored Matrix of Interdependencies Between Solutions

Strategic Relationships Between Solutions to the Problems of Deadlock and Unreliable Examination Quality in the Global Patent System

Enter scores from top to bottom of columns (excluding diagonals) -- asking, "To what degree does the solution at the top of the column depend upon the adoption of the respective solution on the left of the row for its success?"	*Degree to which successful implementation of the other solution is a prerequisite for implementation of this solution* **Dependence of this Solution on the Other Solution**								
	A International cooperation solution	B Private-sector outsourcing solution	C Public-sector outsourcing solution	D Public-sector certification solution	E Independent non-government certification solution	F Private-sector certification solution	G International quasi-patent solution	H Private-sector financial solution	I Public-sector financial solution
A International cooperation solution		×	✓✓✓	✓✓✓	✓	×	✓✓✓	✓✓	✓✓✓
B Private-sector outsourcing solution	×		×	×	×	×	✓✓	×	×
C Public-sector outsourcing solution	✓✓✓	✓✓		×	×	×	✓✓✓	✓	✓
D Public-sector certification solution	×	×	×		×	×	×	×	×
E Independent non-government certification solution	×	×	×	×		×	✓✓	×	×
F Private-sector certification solution	×	×	×	×	×		✓✓✓	×	×
G International quasi-patent solution	×	×	×	✓✓	✓	×		✓	×
H Private-sector financial solution	✓	✓✓✓	✓✓✓	✓✓✓	×	×	✓✓✓		✓✓
I Public-sector financial solution	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓	×	✓✓✓	✓	

"Negligible" = ×
"Low" = ✓
"Medium" = ✓✓
"High" = ✓✓✓

Table 6
Sample of Transformed Scored Matrix of Interdependencies Between Solutions

Strategic Relationships Between Solutions to the Problems of Deadlock and Unreliable Examination Quality in the Global Patent System										
	Degree to which successful implementation of the other solution is a prerequisite for implementation of this solution									
	Dependence of this Solution on the Other Solution									
Influence of this Solution on the Other Solution	A International cooperation solution	B Private-sector outsourcing solution	C Public-sector outsourcing solution	D Public-sector certification solution	E Independent non-government certification solution	F Private-sector certification solution	G International quasi-patent solution	H Private-sector financial solution	I Public-sector financial solution	**Row total (influence index)**
A International cooperation solution		**0**	**10**	**10**	**1**	**0**	**10**	**3**	**10**	**44**
B Private-sector outsourcing solution	**0**		**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**
C Public-sector outsourcing solution	**10**	**3**		**0**	**0**	**0**	**10**	**1**	**1**	**25**
D Public-sector certification solution	**0**	**0**	**0**		**0**	**0**	**0**	**0**	**0**	**0**
E Independent non-government certification solution	**0**	**0**	**0**	**0**		**0**	**3**	**0**	**0**	**3**
F Private-sector certification solution	**0**	**0**	**0**	**0**	**0**		**10**	**0**	**0**	**10**
G International quasi-patent solution	**0**	**0**	**0**	**3**	**1**	**0**		**1**	**0**	**5**
H Private-sector financial solution	**1**	**10**	**10**	**10**	**0**	**0**	**10**		**3**	**44**
I Public-sector financial solution	**10**	**10**	**10**	**10**	**1**	**0**	**10**	**1**		**52**
Column total (dependency index)	**21**	**23**	**30**	**33**	**3**	**0**	**56**	**6**	**14**	

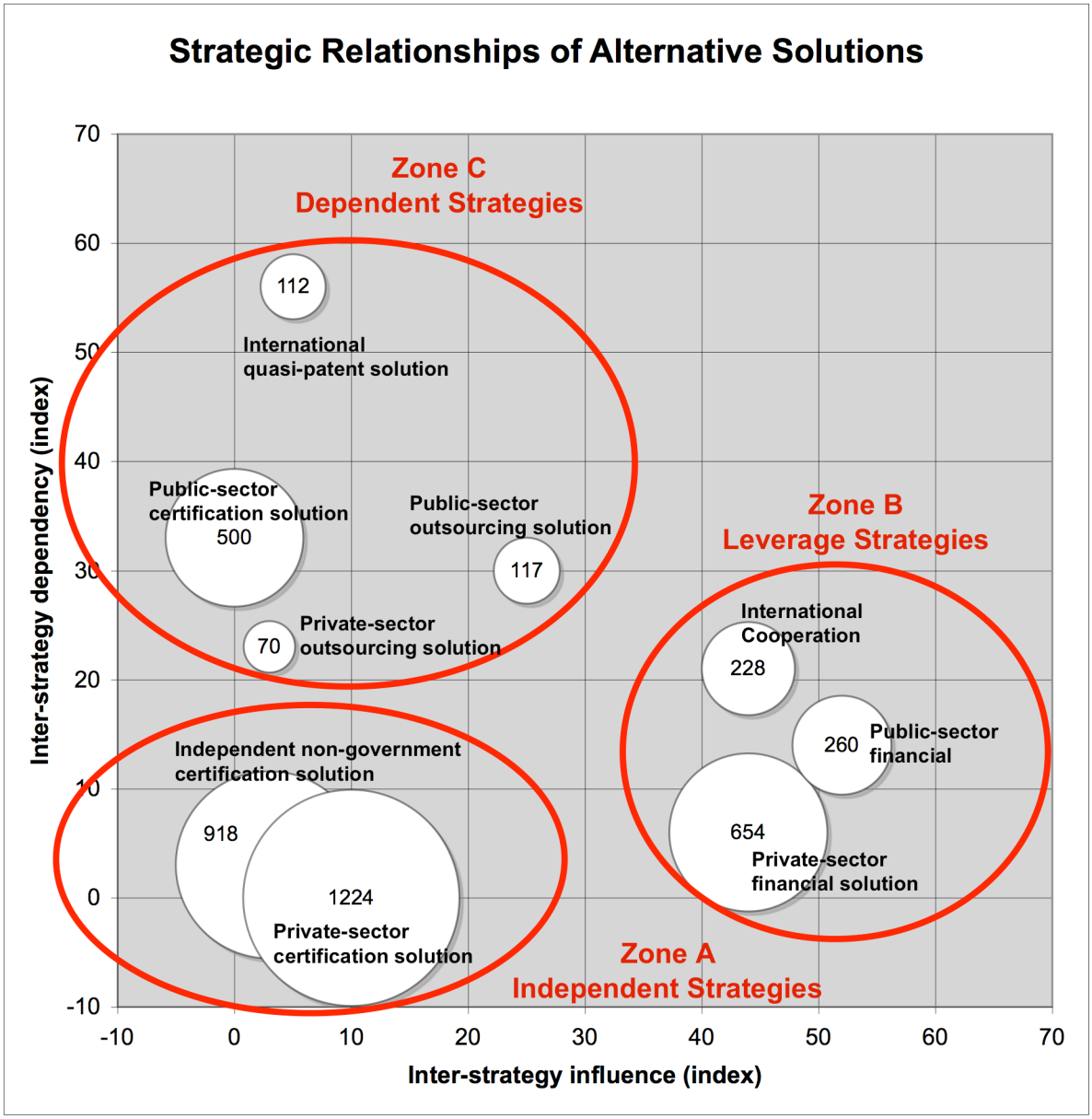
"Negligible" = 0
"Low" = 1
"Medium" = 3
"High" = 10

Table 7
Summary of Analysis Portrayed in Table 3 and Table 6

Strategic Relationships of Alternative Solutions

Solutions	Inter-strategy Influence (index)	Inter-strategy Dependency (index)	Intrinsic problem-solving power
International cooperation solution	44	21	228
Private-sector outsourcing solution	3	23	70
Public-sector outsourcing solution	25	30	117
Public-sector certification solution	0	33	500
Independent non-government certification solution	3	3	918
Private-sector certification solution	10	0	1224
International quasi-patent solution	5	56	112
Private-sector financial solution	44	6	654
Public-sector financial solution	52	14	260

Figure 3



Explanation: The size of the bubble corresponding to each solution represents an index of the estimated relative power of that solution to address the underlying twin problems of deadlock and unreliable examination quality in the global patent system. The precise value of the index for each solution is indicated by the number in each bubble. The position of each bubble on the vertical axis represents the degree to which the respective solution is dependent upon the prior implementation of other solutions for its success. The position of each bubble on the horizontal axis represents the degree to which the respective solution may act as a precursor or precondition for implementation of solutions positioned high on the vertical axis.

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