Journal of Intellectual Property Rights
Vol 16, September 2011, pp 409-417

Best Mode Disclosure for Patent Applications: An International and Comparative Perspective

Bingbin Lu†
Nanjing University Law School, No 22, Hankou Road, Nanjing, 210 093, China

Received 13 June 2011, revised 13 July 2011

The best mode disclosure requirement helps to ensure that the public receives a full and honest disclosure in return for the grant of patent. It has a profound theoretical basis and foundation. The best mode disclosure requirement is an optional obligation under the TRIPS Agreement in its Article 29. Among the most important developed countries that have implemented this disclosure requirement are the US and Japan; however, there are certain differences in their national laws and practices, especially with regard to the legal effect of this requirement. In the US, patent reform is tending towards removing the best mode disclosure from the list of reasons to invalidate a granted patent; although, the requirement will still apply to all patent applications during patent prosecutions. Developing countries are recommended to consider adopting the best mode disclosure requirement in their patent laws. It is proposed that patent applicants be required to disclose the best mode which shall be a substantive condition for patent grant; however, the failure to disclose the best mode may not constitute a reason to invalidate a granted patent.

The objective of this article is to study the best mode disclosure requirement from an international and comparative perspective, and suggest how developing countries should implement this disclosure requirement. The article also seeks to answer to two questions: whether a developing country should implement the best mode disclosure requirement, and if so, how to best implement it?

Keywords: Patent, best mode, disclosure requirements, TRIPS Agreement

Disclosure is one of the key issues in the patent system. To obtain a valid patent, a patent application must meet several requirements. The invention must be not only patentable subject matter, useful, novel, and nonobvious, but in the patent application, the applicant must provide a specification that sufficiently discloses the invention. The last one is commonly known as disclosure requirements. Disclosure is the counterpart for patent grant, and is what the applicant brings in exchange for a monopoly whose duration is limited in time.

The best mode disclosure is one of requirements in patent applications that can be found in patent laws, regulations or guidelines of countries including the United States, Japan, China and India. Under this disclosure requirement, an applicant or inventor must, at the time of filing his or her patent application, disclose not only the invention and how to make and use the invention, but also the best mode contemplated for carrying out the invention.

The representative rule of the best mode disclosure requirement is the first paragraph of Section 112, Title 35 of the United States Code (the US Patent Act), which requires the inventor to adequately describe the three elements in the patent application: (1) a written description of the invention itself; (2) the manner and process of making and using the invention (the enablement requirement); and (3) the best mode contemplated for carrying out the invention (the best mode requirement).

In order to understand the best mode disclosure requirement, the differences between the enablement requirement and best mode requirement shall firstly be analysed. These two requirements are 'separate and distinct' from one another. The enablement requirement pertains to the sufficiency of the disclosure to teach one of ordinary skill to implement the invention; whereas, the best mode pertains to the quality of such disclosure and the honesty of patent applicant. The 'essence of (the enablement requirement) is that a specification of a patent shall disclose an invention in such a manner as will enable one skilled in the art to make and utilize it.'[1] In contrast, the 'sole purpose of (the best mode)

Email: Lbingbin@hotmail.com

requirement is to restrain inventors from applying for patents while at the same time concealing from the public preferred embodiments of their inventions which they have in fact conceived.'[1] All countries which implement the best mode requirement are similar in requiring the most advantageous or most preferable mode (compared to other simultaneously disclosed solutions) to be disclosed in the patent application.

The Theoretical Foundations of Best Mode Disclosure

Before inquiring into the best mode disclosure requirement from an international and comparative perspective, the theoretical foundation including the public policy behind the best mode disclosure requirement needs to be investigated thoroughly.

The contract theory of patents is the principle theory for disclosure requirements. In exchange for the right and liberty to exclude, a patent applicant must disclose certain aspects of his invention in an application for patent. Through disclosure, the patent system introduces new designs and technologies into the public domain, and thereby increases the public store of knowledge and information.[2] The purpose of the statutory disclosure requirements, in general, and the best mode requirement, in particular, is to compensate the public for the cost of the monopoly conferred on a patentee. Disclosure is thus of central importance to patents. The requirement of clear and complete disclosure is the contribution of the inventor for obtaining a monopoly right limited in time. The best mode requirement is intended to allow the public to compete fairly with the patentee following the expiration of the patents.[3] Under the contract theory of patents, the disclosure of invention is the *quid pro quo* or consideration for the grant of patent protection. Patent right is considered as a reward for inventors or applicants for making their inventions available to the public instead of keeping them secret.[4]

The best mode disclosure reflects the deepest distinction between patent protection and trade secret protection. The tension between patent protection and trade secret protection boils down to the best mode requirement. Given the option, a patent applicant would prefer to protect the broad idea of his or her invention with a patent, but maintain the best features as a trade secret. A company could obtain a significant competitive advantage if the company obtained broad patent protection covering a new process of making a special material, yet maintained as a trade secret the optimal reaction conditions for that process. However, the best mode disclosure requirement prevents such gaming of the patent system by requiring a patent applicant to disclose what the inventor considers to be the best mode of practicing the invention.[5] Absent best mode, the patent system as a whole would be undermined since such a weakened system would permit the granting of patent protection for an invention that is at least partly protected by trade secret. The inventor would thus be able to have the best of both the patent and trade secret worlds.[6] The most valuable information of the invention could be protected by trade secret during the life of the patent without best mode compliance. After the patent's expiration, the inventor would be able to continue to maintain the 'heart' of the invention as a trade secret, assuming that the undisclosed best mode continues to retain the attributes of a trade secret.[6] Thus, comparatively speaking, enablement is a less-than-stringent requirement. Disclosing any mode of carrying out the invention evidences compliance with enablement; even a mode that the inventor knows to be inadequate in the marketplace. This puts any competitor, seeking to enter the market upon expiration of the patent, at a huge competitive disadvantage, and undermines the *quid-pro-quo* for the patent grant.[6]

In sum, the best mode disclosure requirement helps to improve the quality of the patent grant, and helps to ensure that the public receives a full and honest disclosure in return for the grant of exclusivity. This rule is supported by profound theoretical foundations.

Best Mode Disclosure under the TRIPS Agreement

Article 29 of the TRIPS Agreement, a clause that includes the best mode disclosure requirement, is a substantive rule introduced by the TRIPS Agreement, which was lacking in the Paris Convention.[7]

The first paragraph of Article 29 of the TRIPS Agreement provides that: 'Members shall require that an applicant for a patent shall disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art and may require the applicant to indicate the best mode for carrying out the invention known to the inventor at the filing date or, where priority is claimed, at the priority date of the application.' This

paragraph includes two disclosure requirements: the enablement disclosure and the best mode disclosure requirement. The enablement disclosure requirement is a compulsory obligation which WTO members must adopt in national patent laws. However, the requirement to indicate the best mode for carrying out the invention is optional. It is left to the discretion of the Members to include this requirement as a mandatory provision in their national laws.

The optional obligation clause is different from the authorization clause. In an optional obligation with set limitations, though, WTO members are not totally free to determine how to implement the requirement provided in international treaties. They are required to meet the limitations which were set in international treaties. There are two limitations contained in Article 29(1). Firstly, the requirement is referred to the date of filing or the priority date. It is not obligatory for the patent applicant to update the newly found best mode during patent prosecution; otherwise this requirement will be too burdensome. Theoretically, there is no reason to require the applicant to constantly update the application with respect to best mode. The failure to disclose the best mode will not invalidate a patent if the inventor, at the time of filing the application, did not know of the best mode or did not appreciate that it was the best method. Secondly, the best mode to be disclosed is with reference to the inventor's knowledge not that of the applicant. All applicants are required to disclose the best mode contemplated by the inventor for the claimed subject matter, even though applicant may not have been the discoverer of that mode. This specific choice of words has not been accidental. The TRIPS negotiations have recognized that the inventors and patent applicants seldom are the same person or entity. Actually, Article 29(1) contains the only reference to an inventor in the entire TRIPS Agreement.[8] The research and development activities in modern society are usually conducted by enterprises and inventors are often employees of applicants.

Article 29 of the TRIPS Agreement is currently the topmost harmonization on disclosure requirements. It is an advance over the Patent Cooperation Treaty (PCT) rules and contributes to the evolution of international treaty system on patent law. Before the TRIPS Agreement, Rule 5 of the Regulations under the PCT governing the description of the invention, requires the applicant to describe the best mode contemplated for carrying out the invention, however, the rule specifies that 'where the national law of the designated State does not require the description of the best mode, but is satisfied with the description of any mode (whether it is the best contemplated or not), failure to describe the best mode contemplated shall have no effect in that state.' Unlike the Article 29 of the TRIPS Agreement, the PCT treaty obligation is limited to international PCT applications. Also, the treaty obligation under the PCT is limited to the procedural and formality aspects of the disclosure requirement. According to Article 27(1) of the PCT, no national law shall require compliance with requirements relating to the form or contents of the international application different from or additional to those which are provided for in the PCT and its Regulations. The first paragraph of Article 27(5) of the PCT provides that: 'Nothing in this Treaty and the Regulations is intended to be construed as prescribing anything that would limit the freedom of each Contracting State to prescribe such substantive conditions of patentability as it desires.' The PCT does not deal with substantive patent law, thus only regulates the best mode disclosure requirement from the procedural and formality aspects. The treaty obligation under the TRIPS Agreement extends the best mode disclosure requirement to direct national filing of patent and to the substantive aspect of disclosure requirement. The best mode disclosure is not just a formality; it could also be a substantive requirement, since it could substantively affect the grant and validity of a patent.

Best Mode Disclosure in Developed Countries' Patent Laws

The US, Japan and Germany are the top three countries which receive the largest number of patent applications.[9] Whereas the US is a representative nation with a common law system, Germany has a civil law system. Japan derives its patent law from Germany with some elements added from the US patent law, and acts as a leading patent country after World War II. These three countries' patent laws deserve an in-depth and precise study.

Among these three most important developed countries on patent law, only Germany explicitly renounces a best mode disclosure requirement. The German Guidelines for Examination Procedure specifically state that the disclosure of preferred or

best mode for carrying out the invention is not necessary. According to the examination guidelines, it is not relevant to the issue of disclosure of the invention whether an item in the description has been mentioned as advantageous, useful or preferable as compared to other simultaneously disclosed solutions. In Germany, special highlighting or emphasizing, for instance as an embodiment or example, or the marking as advantageous, useful or preferable simply make it easier to recognize that the corresponding feature is disclosed as constituting a part of the invention claimed.[10]

Both the US and Japan have implemented the best mode disclosure requirement. However, there are certain differences between their national laws and practices, especially with regard to the legal effect of this requirement. The following discussion shall focus on the US law as the most typical law concerning best mode disclosure requirement, and provide a brief comparative study on the Japanese law and practice.

Best Mode Disclosure under the US Law

The United States is the most typical country which implements the best mode disclosure requirement for patent application. Actually, the best mode clause in the TRIPS Agreement was drawn from the US law.

Section 112 of the United States Patent Act, 1952 requires that 'the specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms so as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.' The last clause is the best mode disclosure requirement. Under the US law, a patent application must disclose the best mode of carrying out the claimed invention, not merely a mode of making and using what is claimed, and thus a specification can be enabling yet fail to disclose an inventor's contemplated best mode.

The best mode disclosure requirement is deeply rooted in the US patent law and has profound historical significance. The earliest US Patent Act of 1790 was an 'Act to promote the progress of useful arts' and included a patent infringement defence where a patent specification failed to contain the 'whole of the truth' about the patentee's invention or discovery.[11] The Patent Act of 1793 repealed and modified the original patent statute, but essentially retained the 'whole of the truth' defence, rewording it but still requiring a patentee's specification to contain the 'whole truth' related to the patentee's invention.[12] In other words, an alleged infringer could invalidate a patent where a patentee neglected to disclose the whole truth relating to the invention. An ordinary language interpretation of the defence implies that the phrase 'the whole truth' is a very broad requirement - broad enough to implicitly encompass a narrower requirement such as best mode. The Patent Act of 1836 required inventors of machines, to fully disclose the several modes in which the inventor contemplated carrying out his invention. The requirement was modified in the Patent Act of 1870 which required the inventor to explain the principle of a machine and the 'best mode' contemplated in applying that principle.[13] While it did not substantially change enablement, the Patent Act of 1952 modified best mode in two ways. First, the 1952 Act broadened best mode to encompass not only patent applications on machines, but patent applications for all types of inventions. Second, the new form of best mode under Section 112 replaced the whole truth defence.[14] The essence of the best mode provision has not changed since 1952.

The best mode provision of 35 USC 112 is not directed to a situation where the application fails to set forth any mode - such failure is equivalent to non-enablement.[15] As noted, the best mode requirement is a separate and distinct requirement from the enablement requirement of the first paragraph of 35 USC 112. The enablement requirement looks to placing the subject matter of the claims generally in the possession of the public. If, however, the applicant develops specific instrumentalities or techniques which are recognized by the applicant at the time of filing as the best way of carrying out the invention, then the best mode requirement imposes an obligation to disclose that information to the public as well.[16] The best mode requirement creates a statutory bargained-for-exchange by which a patentee obtains the right to exclude others from practising the claimed invention for a certain time period, and the public receives knowledge of the preferred embodiments for practising the claimed invention.[17]

In the US, best mode disclosure is not just a condition to obtain a patent, but also a very important and frequently used reason to challenge and invalidate a patent. The US federal courts have developed review standards for the best mode requirement

entailing a two-prong inquiry, namely, subjective analysis and objective analysis. First, it must be determined whether, at the time of filing the application, the inventor possessed a mode of practising the claimed invention that was considered to be better than any other. This is a subjective inquiry which focuses on the inventor's state of mind at the time of filing. Secondly, if the inventor did possess a best mode, whether the knowledge in possession of the inventor compared with what he disclosed. It must be determined whether the written description disclosed the best mode in a manner such that a person skilled in the art could practise it. This is an objective inquiry, focusing on the scope of the claimed invention and the level of skill in the art.[17,18]

The best mode disclosure requirement has produced a substantial and escalating amount of litigation in the past twenty-five years. As a result, many patents have been invalidated by courts for violation of this requirement. However, the best mode inquiry focuses on the inventor's state of mind as of the time he filed his application-a subjective, factual question. Because the defence depends on historical facts and because the inventor's state of mind usually can only be established by circumstantial evidence, litigation over this issue—especially pretrial discovery—can be expensive and time consuming.[19] This leads to the debate on elimination of best mode requirement, which is discussed in a separate section.

Japan's Best Mode Disclosure Requirement Compared to the US Law

Among the developed world, Japan is another important country which implements the best mode disclosure requirement. Similarly to the US, Japan requires that a patent applicant discloses not only the invention and how to make and use the invention, but also the best mode contemplated for carrying out the invention. In other words, both the US and Japan require the patent applicant to disclose specific technical information beyond enablement. However, there are three specific differences as compared to the US law.

Firstly, the US explicitly provides for a best mode disclosure requirement in its Patent Act, whereas, the Japanese Patent Law itself does not provide for a best mode disclosure requirement. This requirement is found in the Examination Guidelines for Patent and Utility Model in Japan issued by the Japanese Patent Office (JPO). Section 3.2.1 of Part I of the examination guidelines requires a patent applicant to describe in the detail at least one mode that an applicant considers to be the best among the various modes of carrying out the invention, in compliance with the requirements in Article 36(4)(i) of Japanese Patent Law. There is also a special note added to explain it which reads, '…regarding a point to describe what the applicant considers to be the best, it is not required as a requirement base on Article 36(4). Therefore it does not constitute reasons for refusal even if it is clear that what an applicant for patent considers to be the best has not been described.'

Secondly and most importantly, the legal effect of best mode disclosure in Japan is totally different from the US law. In Japan, failure to disclose the best mode does not have any effect on the grant or validity of patent. Best mode disclosure is a 'soft requirement' as compared to the US law. It is thus, just a formality in Japan, adding to the transparency of patent application, inherently different from the US law, where failure to disclose the best mode constitutes a reason for refusal of patent grant.

Thirdly, the Japanese examination guidelines refer the best mode disclosure to the applicant, while the US Patent Act refers the best mode disclosure to the inventor. Considering that most of research and development activities are conducted by corporations, and the inventor is usually different from the applicant, it is more sensible to require the applicant to disclose 'the best mode contemplated by the inventor of carrying out his invention' as stipulated in the US law and similarly in the TRIPS Agreement.

The comparative studies between the US law and Japanese law indicate that the same rule can be prescribed and applied in different ways. The best mode disclosure requirement can be implemented in a very rigid manner, namely, a substantive requirement as in the US; or in a very soft manner, i.e., a formality as in the case of Japan. If developing countries want to adopt and implement the best mode disclosure requirement, the legal effect of such a requirement is a key issue that needs consideration.

The Debate on Best Mode Disclosure Requirement and its Trends

In order to design an operational and effective best mode disclosure requirement for developing countries, it is necessary to examine the development of the rule in countries which have implemented it.

For instance, the debate on elimination of the best mode disclosure requirement has never stopped in the US. In 1992, the Advisory Commission on Patent Law Reform recommended elimination of the best mode requirement. This Commission believed that the best mode requirement is not necessary to ensure 'full and fair' disclosure of patented inventions.[20] The recommendation was based on several perceptions including; that the best mode requirement is unreasonably unpredictable, that the cost of the best mode requirement exceeds its value, and that best mode is an obstacle to international harmonization.

The Commission's recommendation and its reasoning are however, flawed, and do not survive a close scrutiny. Best mode and enablement are conceptually related to the earliest patent laws in the US. These two disclosure requirements are predicated on different policies and are designed to achieve complementary goals. Neither litigants nor courts have treated them as congruent obligations.[14] If the best mode requirement is eliminated, the burden on those who prepare patent applications would be reduced. However, the net result of elimination of the best mode may be an adverse effect on the *quid pro quo* exchange between patent applicants and the society. Besides, through a cost-benefit analysis, the public benefit assured by the best mode requirement should not be ignored.

It is mistakenly believed that only the US imposes a best-mode requirement, and that it is an additional burden imposing an element of uncertainty on foreign patentees in the US.[19] Unfortunately, this conception is wrong. Back in 1978, J Philip Anderegg, noted that a growing number of countries were requiring patentees to disclose the best mode of practicing an invention. At the time of Anderegg's writing, the best mode requirement appeared in the laws of the United States, Ireland, Australia, Bahamas, Canada, India, Malawi, Mexico, New Zealand, South Africa, and Zambia.[21] According to Daniel Gervais, the authoritative scholar on the history of the TRIPS Agreement, the terminology best mode or best method was used in different national patent laws even before the negotiation of the TRIPS Agreement. For instance, the Canadian Patent Act, the Patent Law of Ghana and the US Patent Law imposed the best mode requirement, and the Australian Patent Act 1990, the Irish Patents Act 1992 and the Mexican Industrial Patent Law (as amended in 1994) imposed a requirement called best method disclosure.[7] Many more countries have since included the best mode disclosure in their laws. Besides, variations of the best mode requirement are found in the patent systems of other countries.[6]

In recent years, efforts have continually been made to eliminate or modify the best mode requirement in the US. Legislation introduced in the 109th Congress proposed the elimination of the best mode requirement. However, in the 110th Congress, the Patent Reform Act of 2007 (H R 1908), which was passed by the House of Representatives, took a different approach. Under this Patent Reform Act, the best mode requirement continued to apply to all patents, but it no longer formed the basis for a defence to a charge of patent infringement during enforcement litigation or post-grant review proceedings. Compliance with the best mode requirement would remain subject to review by USPTO examiners during the initial prosecution of a patent.[22] This is a compromise approach to suit both detractors and supporters of the best mode requirement. This attitude has not been changed since the 2007 Patent Reform Act. Both the Section 15 of the Patent Reform Act of 2010 and Section 15 of two versions of the America Invents Act (the 2011 Patent Reform Act) which were separately passed in the Senate or the House of Representatives provide that, '…the failure to disclose the best mode shall not be a basis on which any claim of a patent may be cancelled or held invalid or otherwise unenforceable.' From the debate and reform proposals of the best mode requirement in the US, it can be seen that the key issue is to design its legal effect. The legislative reform in the US concerning the best mode requirement is bound to have a global impact, and may constitute this rule's future trend.

Suggestions to Developing Countries

Many developing countries have already implemented the best mode disclosure requirement in national patent laws or regulations. Among these countries, India and China are two typical examples. Section 10(4)(b) of the Indian Patent Act requires disclosure of the best method of performing the invention which is known to the applicant. In China, the Patent Law does not stipulate a best mode disclosure requirement however; there is a 'preferred mode' disclosure requirement in the Implementing Regulations of the Patent Law of the People's

Republic of China.[23] Rule 18 of the Implementing Regulations provides that in the description of embodiments of the invention, the patent application shall describe in detail the preferred mode contemplated by the applicant for carrying out the invention. However, the problem of this rule is its ambiguity. It is not a provision of patent law, so it cannot be a reason for refusal of patent grant. At the same time, it appears in the Chinese patent legal system as a further implementing rule of patent law. In fact, the State Intellectual Property Office (SIPO) of China and Chinese courts never enforced the preferred mode disclosure requirement in invalidation or appeal cases. Practically, the preferred mode disclosure requirement is an ineffective rule in China. This situation needs to be resolved.

At the beginning of this article, two questions were put forward. First, whether a developing country should implement the best mode disclosure requirement? For these developing countries already have such a requirement, they are recommended to maintain it. For those developing countries that do not currently have such a requirement in place yet, they are recommended to consider adopting one.

Primarily, best mode disclosure has its special values and constitutes a key rule of patent supported by profound theoretical foundations. Best mode disclosure enhances the quality of patent. From the perspective of society as a whole, the best mode disclosure adds the crown jewels of the invention to the building of common knowledge, thus strengthening disclosure as the essence of patent system. From the perspective of the patent applicant too, there are certain advantages to disclose the best mode. There is an ever-present danger in omitting any mode, particularly the best, which has commercial value. This is because a competitor can later file an application covering the specific omitted mode.[24] As Professor Chisum noted, 'the priority rules on patent rights create ample incentives for inventors to disclose valuable 'best modes,' even if there were no best mode requirement.'[25]

Secondly, since there is a movement towards international harmonization of substantive patent law, the best mode disclosure requirement is an international trend in patent law. In favour is also the fact that even after nearly twenty years' debate on elimination of this requirement, the US still adheres to this requirement. Furthermore, there are already dozens of countries that adopted this requirement, including many developing countries. The developing countries have greater need to improve the patent quality and fully exert the information dissemination function of the patent system. Best mode disclosure can help developing countries to improve their patent system.

Further, from a practical perspective, in a world interconnected, the best mode disclosure requirement is necessary considering a leading country in technology and patent implements it. As many multi-national foreign patent holders tend to file patent in the US, they are already bound by the best mode requirement and would not be adversely affected by comprehensive adoption of the standard in more countries.

Lastly, developing countries are usually importers of technologies, and have growing need to import more valuable technologies; the best mode disclosure requirement will ensure that developing countries get access to those technologies with sufficient and valuable information. Because of the territorial nature of patent rights, patent application in the imported country is the precondition of technology transfer. If the best mode disclosure requirement is well enforced, the most valuable information of invention will be included in the patent applications, and developing countries can use such information to facilitate economic growth and competitiveness. This will also be advantageous to domestic companies in order to build newer technologies based on the imported technologies with sufficient and pivotal information.

The choice of developing countries on this particular issue of patent law will surely have a great effect both on the society and patent applicant. The author believes that the best mode requirement is necessary if this requirement were applied in a reasonable and logical manner. How to implement a best mode disclosure in developing countries is a further key issue needs serious consideration by relevant national authorities. There are two issues especially vital to a well functioning best mode disclosure requirement.

The first issue is which best mode should be disclosed? The best mode contemplated by the applicant or contemplated by the inventor? Article 29 of the TRIPS Agreement uses the language 'the best mode for carrying out the invention known to the inventor', and the US Patent Act also refers the best

mode known to the inventor. As a matter of fact, in this business, the best mode known to the inventor and the best mode known to the applicant usually are different. It is a better choice to require the patent applicant to disclose the best mode known to the inventor. This legal design is functional, as the US law has shown.

The second and the most important issue, in implementation a best mode disclosure requirement, is to design its legal effect. Among the developed countries, the US and Japan have dissimilar laws. In the US, the failure to disclose the best mode constitutes a reason to refuse a patent and also constitutes a reason to invalidate a granted patent. In Japan, the failure to disclose the best mode neither constitutes a reason to refuse a patent nor is a reason to invalidate a granted patent. Considering China as an example of developing countries, the legal effect of the best mode disclosure requirement is ambiguous in China rendering the rule ineffective in practice. How to enforce the existing rule is the core issue shall be considered by developing countries. In order to effectively enforce this rule, the legal effect of the best mode disclosure shall reasonably be designed. The experiences of developing countries can be learned. The problem of best mode disclosure is that it focuses on the inventor's state of mind at the time he or she filed an application-a subjective, factual question. In the US, the patent reform trend is to eliminate the best mode disclosure from the list of defences to a charge of patent infringement during enforcement litigation or post-grant review proceedings, but to apply the requirement to all patent applications during patent prosecutions. This is a balance between the advantage and disadvantage of this disclosure requirement, and probably is the future trend of its implementation in patent law. Developing countries should seriously consider the legal effect of best mode disclosure and take timely measures to make it a substantive condition for patent grant, but not a reason to invalidate a patent. This institutional design will make the best mode disclosure requirement better operational and more effective in practice.

Conclusion

The best mode disclosure requirement is a vital rule of patent which is supported by profound theoretical foundations. Under the TRIPS Agreement, the requirement to indicate the best mode is an optional obligation for WTO members. The most typical example of this rule can be found in the US Patent Act. In the US, best mode disclosure will affect the grant of patent and even its validity. Japan implements the best mode disclosure requirement as a formality with little effect on the patent application. This disclosure requirement is necessary and effective if implemented in a reasonable and logical manner. There are two key issues to be noted when implementing a best mode disclosure requirement. Firstly, it is better to require the patent applicant to disclose the best mode known to the inventor. Secondly, the best mode disclosure shall be a substantive condition for patent grant, which means, the failure to disclose the best mode shall constitute a reason to refuse a patent grant; however, the failure to disclose it may not constitute a reason to invalidate a granted patent. This is a choice with the right balance for national laws. It can save cost to patent litigants and courts, at the same time, maintain the important function and vital value of this disclosure requirement.

References

1 *In re* Gay, 309 F.2d 769, 772 (CCPA 1962).
2 Marchese Christopher S, Confusion, uncertainty, and the best mode requirement, *Federal Circuit Bar Journal*, 2 (1) (1992) 7.
3 *Christianson* v *Colt Indus Operating Corp*, 870 F.2d 1292, 1302 n 8 (7th Cir 1989).
4 *WTO-Trade-Related Aspects of Intellectual Property Rights*, edited by Peter-Tobias Stoll, Jan Busche & Katrin Arend (Martinus Nijhoff Publishers, Leiden), 2008, p. 525.
5 Dowd Matthew J, Leith Nancy J & Weaver Jeffrey S, Nanotechnology and the best mode, *Nanotechnology Law and Business*, 2 (3) (2005) 238-248.
6 Carlson Dale, Przychodzen Katarzyna & Scamborova Petra, Patent linchpin for the 21st century?-Best mode revisited, *Journal of the Patent and Trademark Office Society*, 87 (2) (2005) 94, 105, 112.
7 Gervais Daniel J, *The TRIPS Agreement: Drafting History and Analysis*, (Sweet & Maxwell, London), 1998, p. 156, 157.
8 de Carvalho Nuno Pires, *The TRIPS Regime of Patent Rights* (Kluwer Law International, London, New York), 2002, p. 217-218.
9 World Intellectual Property Indicators, 2010, http://www.wipo.int/ipstats/en/statistics/patents/(10 June 2011).
10 Guidelines for the examination procedure (Examination guidelines), 1 March 2004, DPMA, Section 3.3.3.1, http://www.dpma.de/docs/service/formulare_eng/patent_eng/p2796_1.pdf (1 June 2011).
11 The US Patent Act of 1790, ch 7, §6, 1 Stat 109, 111 (repealed 1793).
12 The US Patent Act of 1793, ch 11, §6, 1 Stat 318, 322 (repealed 1836).
13 The US Patent Act of 1870, ch 230, §26, 16 Stat 198.

14 Selinger Jerry R, In defense of "best mode": Preserving the benefit of the bargain for the public, *Catholic University Law Review*, 43 (2) (1994) 1080-1097.
15 *In re* Glass, 492 F.2d 1228, 181 USPQ 31 (CCPA 1974).
16 Spectra-Physics Inc *v* Coherent Inc, 827 F.2d 1524, 3 USPQ 2d 1737 (Fed Cir), cert denied, 484 US 954 (1987).
17 *Eli Lilly & Co* v *Barr Laboratories Inc*, 251 F.3d 955, 963, 58 USPQ2d 1865, 1874 (Fed Cir 2001).
18 *Chemcast Corp* v *Arco Indus Corp*, 913 F.2d 923 (Fed. Cir. 1990).
19 Merrill Stephen A, Richard C & Myers Mark B, *A Patent System for the 21st Century* (National Academies Press Levin, Washington DC), 2004, p. 121, 126.
20 *A Report to the Secretary of Commerce*, The Advisory Commission on Patent Law Reform, 1992, p. 100-103; Wegner Harold, *Patent Harmonization* (Sweet & Maxwell, London), 1993, p. 164-165.
21 Anderegg Philip, The best mode requirement of 35 U.S.C. Section 112, *APLA Quarterly Journal*, 6 (4) (1978) 219, 245.
22 Adelman Martin J, Rader Randall & Thomas John, *Cases and Materials on Patent Law*, 3rd edn (Thomson Reuters, Minnesota), 2009, p. 457.
23 Implementing Regulations of the Patent Law of the People's Republic of China (*zhong hua ren min gong he guo zhuan li fa shi shi xi ze* in Chinese Pinyin), last amended 9 January 2010 according to the Decision of the State Council on Amendments to the Implementing Regulations of the Patent Law of the People's Republic of China.
24 Walmsley Steven B, A plea to repair or sacrifice this broken requirement of United States Patent Law, *Michigan Telecommunications and Technology Law Review*, 9 (1) (2002) 163.
25 Chisum Donald S, Best mode concealment and inequitable conduct in patent procurement: A nutshell, A review of recent federal circuit cases and a plea for modest reform, *Santa Clara Computer and High Technology Law Journal*, 13 (2) (1997) 318.