Equilibrium of Intellectual Property Rights Under Fair Use: Case Study of Copyright Law and Trade Secrets Law Derivation of Reverse Engineering in Developing Countries

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Abstract
The balancing of interest is an important objective according to Article 7 of the TRIPS Agreement, which requires the States Parties to implement the provisions of international law in the national legal system. However, each country faces differences in social, economic, political, and cultural backgrounds, especially differences of the developed countries when compared to the developing countries. There is a significant difference in the use of intellectual property law in each country. Therefore, the criteria for the exception of reverse engineering vary from country to country. The purpose of this research is to study the equilibrium of intellectual property rights under fair use derivation from reverse engineering in a developing economy. This study leads to the proposed recommendations for the criterion of intellectual property rights protection for reverse engineering in developing countries and the legislative amendment into two Thai Acts which in the Copyright Act B.E. 2537 (1994), and in the Trade Secret Act B.E. 2545 (2002). Thus, the development of economy in developing countries should amend the intellectual property law that related to reverse engineering.
Keywords: Reverse Engineering, Fair Use, Copyright, Trade Secret

Introduction
The Definition of Reverse Engineering
Reverse Engineering is a process which analyses through deconstructed to reveal its extract knowledge from the original product. In other words, Reverse engineering is usually conducted to obtain missing knowledge, ideas, and design philosophy when such information is unavailable. In some cases, the information is owned by someone who is not willing to share them. In other cases, the information has been lost or destroyed. (Eilam, 2005: 3)
Reverse Engineering is crucial to the economic development, especially for developing countries, as not only can it potentially lead to self-sustainable technological advancement, but also enhances the economic competitiveness and uplifts a country's capacity to compete with other nations (National Science and Technology Development Agency, 2014: 30). The practice of reverse engineering is allowed under exceptional circumstances in accordance with Article 7 of the TRIPS Agreement (1994), which strikes a balance between public interests and the holder of rights. However, from the producer's perspectives, there should be strict intellectual property legal mechanisms in place. This reflects the views of the developed countries to prevent the benefiting and utilization of

intellectual properties; this can be perceived as an attempt to control the flow and exchange of information. On the other hand, from the developing countries' points of view, access to intellectual properties is crucial, and reverse engineering is a useful tool that can be utilized on many technologies. (UNESCO, 2010). At the same time, this could also lead to intellectual property violation. These factors make the owners of rights complacent in developing new technologies. Consequently, the access to the product of reverse engineering without proper framework will create difficulties in the protection of rights, which could lead to the problems of copied technologies and counterfeit goods, without adding anything substantive to the innovation. This will also result in economic damages to the rights owners Therefore, to create equilibrium on intellectual property right should use under Agreement. (Evans Tonya M, 2013). The obvious article of international legal agreement that refers to create the balance between public interests and the rights of the rights holders is in Berne convention section 9 (2) and the TRIPS Agreement in section 13. Furthermore, the principle of good faith and the theories of fair use and fair dealing should be considerate to approach the purpose of Article 7 of the TRIPS Agreement.

International agreements on the exception of infringement include the TRIPS Agreement, Article 13, and Article 9 (2) of the Berne Convention for the Protection of Literary and Artistic Works. the TRIPS Agreement provides only a minimum standard of intellectual property protection, without any provision for implementation. In terms of purposes, the TRIPS Agreement does not seek to standardize or streamline the legal frameworks of the member nations. Article 13 of the TRIPS Agreement provides an outline of the exception of infringement as follows:

1) Limitations or exceptions to exclusive rights are allowed in certain special cases
2) The practice does not conflict with a normal exploitation of the work
3) The practice must not unreasonably prejudice the legitimate interests of the right holder

The Berne Convention provides stipulations on the exception of infringement under Article 9 (2), also known as the (Three Steps Test). The purpose of the Article is to strike a balance between the benefits of the rights holders and those who would like to access the intellectual property without having to pay or obtain consent from the creators. (Ginsburg, 2001) In this way, reverse engineering is accepted as a justifiable exception to the norms, if practiced under the aforementioned conditions, similar to the stipulations found in the TRIPS Agreement. (Christophe, Daniel, and Martin, 2013)

In Thailand, Intellectual Property (IP) legal mechanism which contains elements related to the practice of reverse engineering under exceptional circumstances is Article 32 of Copyright Act B.E. 2537. It was found that most cases involving reverse engineering are in the case of computer programs, which is covered under Article 35 of the Copyright Act B.E. 2537; in principle, in order for a case to fall under the purview of Article 35, it must fall under the exceptional circumstances stipulated under the first paragraph of Article 32 and Article 7 of the Trade Secret Act B.E. 2545.

In the United States, the practice of reverse engineering as a process of discovering trade secrets of others' products is allowed as long as the one conducting the reverse engineering process does it by utilizing already well-known products. (Nateekanjanalap, 2009) As a result, the new products derived from reverse engineering are therefore the results of constant learning and improving older designs. In the United State, there is a main legislation that provides the provision for reverse engineering. The United States' Uniform Trade Secrets Act (cited hereinafter as UTSA) establishes the expanded principles on reverse engineering. It focuses on the justification of reverse engineering; the practice of reverse engineering must be conducted in

good faith and in a fair manner. The stipulation sets the conditions on "Acquisition", which require the process to be conducted in good faith and fairly. Consequently, the products of reverse engineering that are acquired through duplication, modification, imitation, or other unlawful means, whether or not they are new and improved products, will not receive protection as ‘acquired' results from proper reverse engineering. (Kolasa, 2018: 40). In fact, such cases may lead to violations against the rights holders. (Samuelson, P. and Scotchmen, S. 2000). In each country, can be set the criterions for the exception of infringements under article 7 of TRIPs Agreement with relating to its public policy and acting in the good faith.

The Principle of Good Faith

The definition of "Good Faith" refers to the "[a] state of mind consisting in (1) honesty in belief or purpose, (2) faithfulness to one's duty or obligation, (3) observance of reasonable commercial standards of fair dealing in a given trade or business, or (4) absence of intent to defraud or to seek unconscionable advantage." (Shingto, 2013). The principle of good faith acts as a modifier to ensure equity, specifically by giving importance and flexibility to the constantly-changing contexts, both economically and socially. (O’ Connor, 1991: 1-148) Good faith, therefore, exists to accentuate the spirit of the law and can be considered a general principle of law. (Section 5 of The Thailand Civil and Commercial Code, 1992). Good faith is an important element for a variety of situation including creating equilibrium rights in intellectual property law.

The Theories of Fair Use and Fair Dealing (Khuanpoth, 2013: 5)

Both theories are legally doctrine in the law which permits limited use of Copyright holder. The theories intend to make equilibrium of intellectual property right. There are some difference factors to be considered for use between both as follow in table 1

Table 1 Comparison Fair use under Section 107 of United States Copyright Act and Fair dealing of Copyright, Designs and Patents Act 1988

Fair use (called four factors)	**Fair dealing**
1. The purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes 2. The nature of the copyrighted work; 3. The amount and substantiality of the portion used in relation to the copyrighted work as a whole; and 4. The effect of the use upon the potential market for or value of the copyrighted work.	No factor exactly what is fair dealing. This can only apply to use of copyright material. If the use is for one of the prescribed purposes. If a given user does not fall into one of the categories of use, then it cannot be found to be fair. For example: 1. For the purpose of non-commercial research or private study 2. Criticism or review 3. Reporting of current events 4. Parody, caricature, and pastiche

In order to create the balance between public interests and the rights of the rights holders, the author would like to study and analyze the rights balancing measures under intellectual property protection legal mechanisms, especially on the concept of exceptional use and its effects on reverse engineering practices. This approach will include the study of various points of view, from international legal perspectives to domestic legal application so that appropriate measures and solutions could be proposed and applied in the protection of products resulting from reverse engineering practices in developing countries.

Research Methodology

This article is qualitative research and methodology is divided into two categories:
1) Documentary research is the use of outside sources, documents, to support the viewpoint or argument of academic work.
2) Field research is tools and methods for collecting data. The researchers chose in-depth interviews from the key informants by using purposive sampling. This has been conducted with the central intellectual property and intellectual trade court, law firm, lawyers, and engineers. The questions are related to the content of the interview that accord to the objectives of this research.

Research Results and Recommendations

The hypothesis of the topic "Equilibrium of Intellectual Property Rights Under Fair Use: Case Study of Copyright Law and Trade Secrets Law Derivation of Reverse Engineering in Developing Countries" states that the practice of reverse engineering allowed under exceptional circumstances may lead to equilibrium to the rights under intellectual property legal mechanisms. The author has divided the notable points of the study into several aspects, specifically from the international standards founder under the Berne Convention and the TRIPS Agreement, to the application within the domestic jurisdictions. The study found that the problems and challenges faced by developing nations are different from those faced by developed nations; the differences point to domestic economic and societal factors, along with the difference in legal frameworks and implementation/application. This presents an interesting picture; while the practice of reverse engineering is recognized and accepted universally as a part of the international legal regime, it does not lead to the equilibrium between rights of developed and developing nations. Legislatively, the Author has decided to split the analyses and recommendations into two parts, firstly on the Copyrights Law, and secondly on Trade Secrets Law. It was found that,

The Practice Exception of Infringement of Reverse Engineering under the Copyright Laws in Developing Countries

Legal Implications and Implementation

Point 1: The interpretation of Article 32 (1) can be divided into two schools of thought. The first perspective stated that the Article is not applicable by itself, as it might contradict the stipulations under the Berne Convention and the TRIPS Agreement, which seek to encourage member states to unilaterally create legislatures and legal exceptions. However, the provisions do not have any stipulations on the definite interpretations of exceptions and/or exceptional circumstances. Therefore, the interpretation and application should be in accordance with Article 32 (1)-(9).

On the other hand, there are others who believe that Article 32 can be applied independently and unilaterally, even when those cases do not meet the defined conditions and criteria. This is because of the fact that it would be quite unlikely to list all the possible exceptional circumstances, as the ever-changing nature of the society and technological advancement make listing all the possible circumstances quite impractical.

Recommendations: The interpretation from the second school of thought will lead to the effective realization of introducing equilibrium to the benefits of rights holders and the general public, especially for countries that require access to technical knowledge and invention for national development. The distillation of knowledge from the practice of reverse engineering under exceptional infringement may lead to a higher level of development that can uplift the standard of living for the people, especially for developing countries.

Furthermore, the inability for the Article 32 Paragraph 1 to be applied unilaterally will lead to further complication in the interpretation. This is because the application of Article 32 (1) will allow Thai Courts to apply other nations' interpretations and definitions in the case, thus ensuring the equity and standards for the exceptions. In the case of developing countries, possible legal amendments in line with the 4 conditions provided in the United States' stipulation could be applied with the Thai Copyrights legislature. In this regard, the Author is of the opinion that this approach might create too many obligations and restrictions. Therefore, it might be better to allow to Courts to interpret and apply the 4 conditions as they see fit, based upon the reality and context of the situation on the case-by-case basis. Consequently, the Courts' interpretation should focus on the unilateral application of Article 32, which can give the Courts the freedom to choose appropriate legal mechanisms that will ensure equity and reflect the contexts and reality. The Author would like to suggest the interpretation process to focus on Article 32, which is the heart of exception of infringement, since it will be the foundation for lawful practices of reverse engineering, allowing for clearer and more efficient interpretation of definitions and application of the law.

The trend for interpretation under Article 32 Paragraph 1 should be looked at as a general provision on the exception of infringement, even when in certain criteria under Article 32 Paragraph 2 (1) – (9) are not met. This is because the law cannot entirely specify all the possible extenuating circumstances due to the ever-changing trend of the society and constant technological advancement. In this regard, the application of such measures must take into account the equilibrium between the interests of rights holders, and the benefits the general public would receive as a result of such lawful exceptions.

Principles in the consideration for the exception of infringement under Article 32 should consist of:

1) Any action upon the copyrighted work of others under this Provision can be considered definite in 2 circumstances:

1.1) Exceptions found under Article 32 Paragraph 1 or Article 32 Paragraph 2 (1)-(9); or

1.2) Other extenuating circumstances as the Court sees fit.

2) Do not conflict with a normal exploitation of the work; and

3) Do not unreasonably prejudice the legitimate interests of the right holder

Point 2: The study found that the practice of reverse engineering of computer programs in Thailand must always be in accordance with the stipulations under Article 32 Paragraph 1. Principally, such acts must not negatively affect the right of the right holders to benefit from their creations, and that such acts must not excessively affect the legal rights of the right holders. Furthermore, the lawful exception to practice of reverse engineering in the context of computer program will be considered from the aforementioned table in the consideration of the second category specifically under Article 35 of the Copyright Act B.E. 2537, which objectively prohibits the act of profiting from such action, in combination with the scope of application detailed under Article 35. The core principle of reverse engineering is to improve upon the aspects of the products, and not to simply merely imitate, which will lead to copyright infringement. The provision on the practice of reverse engineering of computer programs under Article 35 should include the phrase “develop”, along with the addition of the possibility of other measures, which will grant more freedom to conduct reverse engineering in the context of computer program when done under Article 32 Paragraph 1, and will allow for further development of the old products, which will result in further improvement of the work, corresponding with the core value of the Copyright Act B.E. 2537, which stipulates that:

"An act against a computer program which is a copyright work under this Act in the following cases shall not be deemed an infringement of copyright provided that the purpose is not for profit and the first paragraph of Section 32 is complied with…
(8) Adapting the computer program as necessary for use;"

Recommendations: Reverse engineering on computer programs under Article 35 allows for the practice of reverse engineering:

"An act against a computer program which is a copyright work under this Act in the following cases shall not be deemed an infringement of copyright provided that the purpose is not for profit and the first paragraph of Section 32 is complied with…
(8) developing or modifying the computer program as necessary for use;"

Point 3: Although the practice of reverse engineering on a computer program, the study found that the definition "as necessary for use" is unclear and can prove difficult to define, as it does not clearly state the meaning of necessity. The unclear definition of the law leads to unregulated use and abuse of the practice that will negatively affect the right holders. At the same time, the interested party might feel unsure about the reverse engineering of the computer program. This is due to the fact that those interested in such practices, especially those that do not seek to gain profits of any kind, may find the definition unsuitable as it is not clear what the scope of the term 'as necessary' actually means, leading to their fears that their actions might negatively affect the right holders and will not receive protection under Article 32 Paragraph 1. The issue of interpretation, specifically on the scope of necessity, is the also the very same problem faced by India, which likewise requires exceptional circumstances to allow for reverse engineering of computer programs so that they may be compatible with other computer programs. This is highlighted by Indian legal requirement on the languages and wordings to not be easily understandable. When one considers the aforementioned "Three Steps Test", one will see that the notion of specific circumstances is one of the principles that allow for the exception of infringement under both the TRIPS Agreement and Berne Convention. (Goold, 2017) However, in the context of computer programs, no such requirements are clearly and specifically defined. This means that the interpretation, under Thai doctrine, should follow the interpretation of Article 35 established by Chapter 32 Paragraph 1.

Recommendations:

Point 3: The TRIPS Agreement and Berne Convention clearly define specific circumstances as one of the exceptions. The consideration, in this context, should then follow the stipulation under Article 35, in accordance with Article 32 Paragraph 1. For the purpose of clarity, the Author believes that there should be clear definitions under Article 35 Paragraph 2, with the explicit allowance of reverse engineering in the following circumstances:

(1) The modification of computer program due to necessity should be accepted as an extenuating circumstance for the first-degree exception; if there is no modification, then there is no process of reverse engineering on that computer program. Therefore, it can be concluded that such exceptions must be considered on a case-by-case basis, depending on the necessity in the objection of such actions. Nevertheless, such acts must never excessively affect the rights, as stipulated under Article 32 Paragraph 1.

(2) The TRIPS Agreement and Berne Convention, together with Article 32 Paragraph 1; in essence, this means that such derivatives must not negatively affect the right of the right holders to benefit from their creations and that such results must not excessively affect the rights of the right holders.

Other than the issue of interpretation and amendments to the Thai copyright laws, it is also advisable to conduct further researches and foster mutual understanding between the lawmakers and IT practitioners; as such measures can lead to a more comprehensive view of the problems. This is because the issues of computer programs are not easily understood or accessible to most people. Furthermore, computer programs are highly valuable economic assets, yet also very vulnerable to copyrights infringements. The legislative process involving such matters should involve as many learned experts and practitioners from as many fields as possible, for the benefits of both the right holders and those interested in the practice of reverse engineering.

B. The Practice Exception of Infringement of Reverse Engineering under the Trade Secrets Laws in Developing Countries

Legal Implications and Implementation

Point 1: International agreements that deal with the infringement of the Trade secrets resulting from the practice of reverse engineering include the TRIPS Agreement, specifically under Article 39. The aforementioned Article establishes the scope of protection for information utilized as the Trade secrets from being unlawfully exploited or used without the consent of the right holders. The consideration states that if such practices are "in a manner contrary to honest commercial practices", which is further explained as "[F]or the purpose of this provision, "a manner contrary to honest commercial practices" shall mean at least practices such as breach of contract, breach of confidence and inducement to breach, and includes the acquisition of undisclosed information by third parties who knew, or were grossly negligent in failing to know, that such practices were involved in the acquisition." (Article 39 of the TRIPS Agreement, 1994) Furthermore, additional protection can be found under Article 10bis of the Paris Convention (1979), which states that "[A]ny act of competition contrary to honest practices" is a ground for a violation of The Trade secrets. Therefore, in order to prove such wrongdoings, one must look for unfair business practices. If such actions do not fall under the purview of Article 39 of the TRIPS Agreement, and the acquisition of such information is not illegal, then such actions can be considered lawful under the Trade secrets laws.

1) The unclear nature of the interpretations under international context, an acquisition of information that is not "in contrary to honest commercial practices" means that such acquisition of information must be based on the principle good faith, which lacks clear definition. (Buri, and Meitinger, 2014: 3).

2) Despite the same standard of protection afforded to the Trade secrets provided under the TRIPS Agreement, the disparity and lack of equilibrium in practice still exist between developed and developing nations.

The exception to the practice of reverse engineering in the context of the trade secrets under the Trade Secrets Act B.E. 2545 will be summarized in this section. In essence, the practice of reverse engineering, including the discovery of the Trade secrets that belong to others through the research and analysis of known products to discover the invention manufacturing, development processes can be accepted, as long as such information is acquired in good faith. Another example is the infringement on an Indian copyrighted work under the National Innovation Act B.E. 2551, which details the provision of the previously undisclosed information gained through independent discovery. An additional example is the exceptions to the practice of reverse engineering in the United States under Article 1 of UTSA, which was considered during the National Conference of Commissioners on Uniform State Laws Notes and Comments on Uniform Trade Secret Act with 1979 (amended in 1985) which stated that lawful of acquisition

of information, or the exception to the rule of trade secrets, can be considered lawful, through the practice of reverse engineering as well. (Liang, 2017)

Recommendations: From the frameworks of the TRIPS Agreement to the legislatures of developed and developing countries, it was found that the notion of reverse engineering is not clearly defined. When one considers the notion of being "[I]n a manner not contrary to honest commercial practices" refers to the acquisition of the Trade secrets through the independent and lawful practice of reverse engineering. Subsequently, by comparing the scopes of exceptions of infringement, one can see the nexus: good faith. In essence, the exception of infringement, under both the Trade secrets and copyright contexts, through reverse engineering, must be in good faith. For this reason, developing countries should apply the exceptional standards under copyright laws in the same context under the Trade secret laws, specifically basing such provisions on Article 9 (2) of Berne Convention, also known as Three Steps Test, and Article 13 of the TRIPS Agreement, which may complemented by interpretation rule of Article 4 of the Thai Trade Secret Act B.E. 2545.

The Author is of the opinion that, in order to create equilibrium in the utilization of information received from the practice of reverse engineering, developing countries should establish a clear legal application and understanding of the scope of exceptions for reverse engineering in the context of the Trade secrets laws. This can be achieved by consulting the principles found within the context of copyright law, such as:

Establish proper conditions and criteria for the consideration of the proper acquisition of the Trade secrets through exception of infringement in the context of reverse engineering:

1) The practice of reverse engineering must have happened.

2) The acquisition must not negatively affect the right of the right holders to obtain benefits from their rightfully copyrighted creations.

3) The acquisition must not disproportionately affect the rights of the right holders

Point 2: The provisions on the exception of infringement of reverse engineering in the context of the Trade secrets laws in the United States and Thailand focus on the term "well-known products" as a basis for the reverse engineering process, so as to establish the boundaries on the proper use of the goods, while at the same time preventing unfair trade practices. (Eilam, 2005: 17). However, in Thailand, the rules and scopes on the utilization of technology/ product/information derived from reverse engineering are not clear. Article 7 Paragraph 2 of the Trade Secrets Act B.E. 2545 provides no clear explanation for the terminology of "well-known product". Therefore, the Author decided to compare this provision with provisions from other sources, such as the term "well-known marks" from trademark protection law, and "well-known products" under the protection of reverse engineering.

Recommendations: Considering the term "widely known product", it is clear that there should be defined rules on the utilizing of a product as a subject of reverse engineering process, in order to prevent unlawful business practices. In the context of the Trade secrets law, this is similar to the concept of "well-known marks" under trademarks law. Nevertheless, both intellectual properties fall under the purview of the TRIPS Agreement and require the application of the principle of good faith. In this instance, the properties of well-known trademarks, as established by the declaration of the Ministry of Finance, could be used to compare and extrapolate the appropriate requirements, which are:

Firstly, products or services that utilize such marks must be for the purposes of selling, utilizing, and advertising such marks, which must be obtained in good faith, whether or not such actions

are the results from right holders, agents, or authorized persons, whether domestically or internationally, so that the public in Thailand become aware of such products or services.

Secondly, such marks must be well-known among consumers. Essentially, this means that the acts of selling, utilizing, or advertising of such marks must be known among the targeted consumers, not just the general consumers, also known as the "selection of the public". Therefore, the consideration of the term "widely known product" that resulted from the practice of reverse engineering must take into accounts the technical understanding and specialized knowledge of experts and targeted consumers from other fields. For instance, reverse engineering in the context of technology should not focus on the understanding of the general public, as technology is more accessible to experts and practitioners.

Consequently, the Author is of the opinion that the current interpretation of the term "well-known product" should be made clearer, as to properly allow the practice of reverse engineering. Therefore, it might be advisable to apply the Ministry of Finance's approach to the consideration well-known trademarks, which can prove to be a practical and beneficial solution.

Thirdly, In the case of employees who create products/information that receives protection under the Trade secrets laws, it is accepted that such products/information are obtained in good faith since they were achieved lawfully. However, should the employees waive their rights to their creations to the employers, who, then, would have a better claim? The Author found that the provision under Article 7 as "The act under (4) cannot be raised as a justification if the person who conducted reverse engineering expressly agreed otherwise with the owner of the Trade secrets or seller of the product." The Author found that the term provided, specifically the term "expressly agreed", is not clear enough, which will require the interpretation and application of general principles of law.

Recommendation: The interpretation of what precisely constitutes an express agreement under Clause (4) is not clear or practical. It is advisable to apply the general principles on public order and moral safety as they are the principles that can lead to a peaceful and prosperous society. Furthermore, such principles lead to the greater good of the general public and the nation as a whole, making them extremely important and inviolable, so as to ensure the equilibrium and equity for both the consumers and the right holders. To this end, the Courts should have to power to decide on certain aspects based upon the contextual factors and realistic understanding of the case.

Conclusion

In conclusion, according to Article 7 of the TRIPS Agreement, which requires the States Parties to implement the provisions of international law in the national legal system. The differences in social, economic, political, and cultural backgrounds lead to a significant difference in the use of intellectual property law in each country. The criterion of exception of infringement for reverse engineering varies from country to country. It does not lead to the equilibrium between rights of developed and developing nations, therefore, equilibrium of intellectual property rights under fair use derivation from reverse engineering in developing economy should be analyzed and revised through the legislative amendment into Acts.

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