Considering The Patentability of Computer Software in Thailand: A Comparative Study with the United States, European Union, Japan and South Korea for AI Technology Development

Panida Pornpattra[1,*]

Received: November 3, 2024 Revised: February 8, 2025 Accepted: February 10, 2025

Abstract

The patentability of software or computer programs is an ongoing issue within legal and technical communities worldwide, especially with the rise of artificial intelligence (AI) and machine learning (ML) technologies. AI, which has rapidly become a leading area in global patent filings, impacts various fields, including speech recognition and natural language processing. The shift from physical to digital distribution has reshaped software use, making software patents an evolving area of law, with eligibility becoming more consistent across jurisdictions. This paper examines software patentability in Thailand by analyzing its legal framework and comparing it with practices in the United States, European Union, Japan and South Korea. In Thailand, computer programs are protected as literary works under the Copyright Act B.E. 2537 (1994), where they are defined as "instructions, sets of instructions, or other components used in conjunction with a computer to produce results." In contrast, the Patents Act B.E. 2522 (1979) lacks a clear definition, referring only to "information systems for computer operation" in Section 9(3), leading to inconsistent interpretations and applications. The study addresses key questions, including how Thai laws might clarify the conditions under which software-related inventions are patentable, how the differences in legal definitions impact patent applications, and whether Thailand could benefit from adopting other countries' practices. This paper suggests that Thailand should adopt clearer legal definitions distinguishing software-related inventions from literary works, as seen in other jurisdictions, and consider requiring technical contributions or inventive processes to promote innovation and better protect emerging technologies such as AI and ML.

Keywords: Software patent, computer software computer program, patentability, Thailand

[1] Faculty of Law, Chulalongkorn University

* Corresponding author, E-mail: chaejin.pp@gmail.com

การพิจารณาประเด็นการจดสิทธิบัตรซอฟต์แวร์คอมพิวเตอร์ในประเทศไทย: ศึกษาเปรียบเทียบกับประเทศสหรัฐอเมริกา สหภาพยุโรป ญี่ปุ่น และเกาหลีใต้ สำหรับการพัฒนาเทคโนโลยีปัญญาประดิษฐ์

ปณิดา พรภัทรา[1,*]

วันรับบทความ: November 3, 2024 วันแก้ไขบทความ: February 8, 2025 วันตอบรับบทความ: February 10, 2025

บทคัดย่อ

การพิจารณารับจดสิทธิบัตรซอฟต์แวร์หรือโปรแกรมคอมพิวเตอร์นั้นเป็นประเด็นที่ยังคงถกเถียงกันในแวดวงกฎหมายและวิศวกรรมทั่วโลก โดยเฉพาะเมื่อมีการพัฒนาเทคโนโลยีอย่างต่อเนื่อง ซึ่งเทคโนโลยีปัญญาประดิษฐ์ (Artificial Intelligence) การเรียนรู้ของเครื่อง (Machine Learning) การรู้จำเสียงพูด (Speech Recognition) และการประมวลผลภาษาธรรมชาติ (Natural Language Processing) ได้กลายเป็นเทคโนโลยีที่มีการถูกยื่นขอสิทธิบัตรในปริมาณมาก อย่างไรก็ดี เมื่อมีการพัฒนาการใช้งานซอฟต์แวร์ จึงต้องพิจารณากฎหมายว่าด้วยการจดสิทธิบัตรซอฟต์แวร์ในปัจจุบัน โดยบทความนี้วิเคราะห์เรื่องการจดสิทธิบัตรซอฟต์แวร์ในประเทศไทย เปรียบเทียบกับแนวปฏิบัติในสหรัฐอเมริกา สหภาพยุโรป ญี่ปุ่น และเกาหลีใต้ ทั้งนี้ โปรแกรมคอมพิวเตอร์ในประเทศไทยได้รับความคุ้มครองในฐานะงานวรรณกรรมภายใต้พระราชบัญญัติลิขสิทธิ์ พ.ศ. 2537 ซึ่งนิยามว่าเป็น “คำสั่ง ชุดคำสั่ง หรือสิ่งอื่นใดที่นำไปใช้กับเครื่องคอมพิวเตอร์ เพื่อให้เครื่องคอมพิวเตอร์ทำงานหรือเพื่อให้ได้รับผลอย่างหนึ่งอย่างใด ทั้งนี้ ไม่ว่าจะเป็นภาษาโปรแกรมคอมพิวเตอร์ในลักษณะใด” หากแต่พระราชบัญญัติสิทธิบัตร พ.ศ. 2522 ไม่มีการใช้นิยามดังกล่าว เพียงแต่กล่าวถึง “ระบบข้อมูลสำหรับการทำงานของเครื่องคอมพิวเตอร์” ในมาตรา 9 (3) ซึ่งอาจทำให้เกิดการตีความนิยามที่แตกต่างและนำไปใช้อย่างไม่สอดคล้องกันในการพิจารณารับจดสิทธิบัตรซอฟต์แวร์ จึงมีความจำเป็นต้องศึกษาประเด็นสำคัญ กล่าวคือ หลักเกณฑ์ในการจดสิทธิบัตรซอฟต์แวร์ในกฎหมายไทย ผลกระทบของความแตกต่างในนิยามทางกฎหมายต่อการยื่นขอสิทธิบัตรซอฟต์แวร์ และการนำแนวปฏิบัติเรื่องการจดสิทธิบัตรของประเทศอื่นมาใช้กับประเทศไทย เพื่อเสนอแนะให้ประเทศไทยกำหนดนิยามทางกฎหมายที่ชัดเจนยิ่งขึ้น รวมถึงเกณฑ์การพิจารณาในทางปฏิบัติเพื่อส่งเสริมนวัตกรรมและปกป้องเทคโนโลยีใหม่ ๆ อย่างเทคโนโลยีปัญญาประดิษฐ์ได้ดียิ่งขึ้น

คำสำคัญ: สิทธิบัตรซอฟต์แวร์ ซอฟต์แวร์คอมพิวเตอร์ โปรแกรมคอมพิวเตอร์ สิทธิบัตร ประเทศไทย

[1] คณะนิติศาสตร์ จุฬาลกรณ์มหาวิทยาลัย

* Corresponding author, E-mail: chaejin.pp@gmail.com

Introduction

Patents were originally developed to promote innovation by protecting inventors' creations within their respective countries. Over time, their importance has grown, but legal systems worldwide still struggle to clearly define patentable subject matter, especially for software. Software patents, which cover computer programs and processes, remain contentious and complex due to difficulties in determining what qualifies as patentable innovation.

The difficulty in determining whether software programs are patentable arises from the fact that software is a set of instructions which can use complex systems to directly or indirectly emulate physical processes or machines to bring about a certain result. These instructions are set out in source code – a set of logical human–readable instructions coded into computer language. Although not comprehensible to the average person, source code is readable by individuals with expertise in the field and also by the machine itself. Once the source code is compiled, it becomes an object code, which is a set of machine–readable instructions (Guadamuz, 2010). Thus, it can be challenging to determine whether to classify a software program as a new invention or as an algorithm or design.

Thailand's Copyright Act B.E. 2537 (1994) views software as a literary work, protecting its source code. While copyright protects the literal expression of the software (i.e., the code), it fails to address the technical functionalities of software, which can be crucial for patent protection. In contrast, the Thai Patent Act B.E. 2522 (1979) does not clearly define software or computer programs, leading to inconsistencies in how software–related inventions are treated during patent applications.

Given the rapid advancement of technology and the increasing significance of software in innovation, this paper investigates whether Thailand's current legal framework is adequate for protecting software–related inventions. While software is covered under copyright law, other countries – the US, EU, Japan, and South Korea – offer patent protection for software demonstrating technical effects or practical applications. In contrast, Thailand's lack of clear guidelines in patent law has led to inconsistent applications on software–related patents. This paper aims to address this legal gap by comparing Thailand's approach to those of other countries and examining whether Thailand should consider reforms to align with other countries' practices, ensuring that the protection afforded to software aligns with global standards and reflects the technological advancements that shape modern innovation.

Relevant Laws and Guidelines for Software Protection in Thailand

1. Copyright Act B.E. 2537 (1994)

Software in Thailand is primarily protected as a literary work under the Copyright Act B.E. 2537 (1994). As provided in Section 4 of the Copyright Act, computer programs are defined as "instructions, sets of instructions, or any other components used in conjunction with a computer to make the computer work or to generate a result no matter what the computer language is", encompassing various types of instructions and instruction sets used in connection with computers. Therefore, the primary protection provided by this Act is for the source code (the human–readable part of software) but not the underlying functionality or processes, limiting the extent of protection (Evans et al., 2012).

2. Patent Act B.E. 2522 (1979)

Section 9(3) of the Patent Act B.E. 2522 (1979) states that "information systems for computer operation" inventions are not protected under this Act. When scrutinized closely, it can be seen that the term "information systems for computer operation" has a broader meaning than the term "computer program" under the Copyright Act. A strict interpretation would imply that anything falling under the definition of "information systems for computer operation" is thus prohibited from receiving patent protection.

3. Guidelines for Examining Patent and Petty Patent Applications (Examiner's Guidelines)

According to the Section 9(3) of the Patent Act, "information systems for computer operation" is not considered patentable subject matter, including the programs *per se* and storage mediums containing recorded programs, as well as business methods. However, in practice, if a computer–related invention or program demonstrates technical functions and effects that solve technical problems, it may still be patentable and not excluded by Section 9(3), though this interpretation is not explicitly stated in the Act.

To clarify this ambiguity, the Thai Department of Intellectual Property (DIP) has issued *Guidelines for Examining Patent and Petty Patent Applications* (hereinafter referred to as "the Guidelines"). The Guidelines provide illustrative examples for patent examiners to determine which inventions relating to computer programs are patentable and which are not under Section 9(3)

1) Non-Patentable Subject Matter

Application Number 0201000231: The given patent application is for a "System for Processing In/Out Transactions," where the main claims describe a transaction processing system that searches and compares transaction data with data in an existing database. However, the invention lacks any technical features and simply utilizes a computer program to perform the search and comparison. It does not reside in any device or hardware and is not supported by any independent device. As per Section 9(3) of the Thai Patent Act, this invention is considered non-patentable subject matter.

2) Patentable Subject Matter

Application Number 0001002586: The "Dynamic Currency Conversion for Card Payment System" example has technical aspects that can address technical issues, making it a possible candidate for patentable subject matter in Thailand. Moreover, its patentability may be bolstered by the involvement of various steps and systems, beyond the computer program itself, such as the identification of identifier codes and connection to currency data from a server/host.

These examples illustrate the current state of patent law in Thailand, where inventions related to computers or software must demonstrate a tangible connection or provide a technical effect to qualify for patent protection. The software itself, alone and without hardware components or related evaluating steps and functional systems, is not eligible for patent protection under current practice in Thailand.

With the latest update in 2019, the DIP in Thailand published a new edition of the Guidelines, offering standard terminology and definitions that are commonly used in computer-related industries. However, while the definition of "information systems for computer operation" is mentioned, a clear definition of patentable software that falls outside of Section 9(3) is not provided. Although the definition is not clearly outlined in the Patent Act, the Guidelines provide that the term "information systems for computer operation" refers to "a procedural system for computer operations that provides a clear sequence of instructions for a computer or electronic device to perform a specific task, or the computer program itself" (Department of Intellectual Property [DIP], 2019). This aligns with the Thai Patent Act, which primarily focuses on protecting the use of computer programs in a technical context. To obtain a patent, the applicant must clearly disclose how the system addresses specific problems, the sequence of operations it follows to produce results, its performance mechanisms, and the instruments it requires.

Software Patentability in Thailand: Current Practice

S. Maneerung, N. Chaisubanan and N. Sangwan (personal communication, September 18, 2023), three Thai patent examiners, clarified that under the Thai Patent Office's current practice, the characteristics of an invention can be divided into two categories:

(1) Essential technical features, which are prerequisites for the existence of the invention (for instance, a bicycle must include a frame, saddle, handlebars, wheels, pedals, a set of brake discs, a spinning disc set, and a chain); and

(2) Technical character, which denotes a feature that distinguishes the invention from existing ones, like a newly designed bicycle frame constructed from a novel and stronger material compared to the original type, and so forth.

In this context, the technical character of "information systems for computer operation" pertains to the methods employed to address issues related to computer programs. These systems take external technical data and establish a comprehensive, tangible, lucid, and practically achievable process for handling such technical data (it is then verified by officers with specialized knowledge in the field to ensure practical achievability). Hence, the Guidelines clarify certain attributes of "information systems for computer operation" that may be eligible for patents. To qualify, these systems must demonstrate specific characteristics:

The invention utilizes a cooperative measure between software and hardware to define the physical structure of the invention or the process carried out directly or indirectly by the computer.

- The invention involves computer-based operations in a procedural manner.
- The invention pertains to specific hardware, or both specific hardware and software.
- The invention relates to processes that involve the transformation of physical data or signals, or the control or management of outcomes resulting from control actions on hardware resources.
- The invention concerns processes related to the internal operations of a computer that are limited to practical applications in a specific technological field.

The examination of a patent application in Thailand must take into account the technical characteristics of the invention as outlined by the applicant in the claims. This involves assessing whether the claims differ from the disclosures found in prior art. Additionally, it considers whether these

differences result in predictable or easily achievable effects and whether these characteristics are practically achievable and reproducible in an industry application.

Moreover, the Application Number 1601006480 for "a set of machines, a system, a method for producing a specific program, and non-temporal computer-readable media" for invention related to software that has been granted patent protection and demonstrates that it does not fall under the provisions of Section 9(3) of the Patent Act (S. Maneerung et al., personal communication, September 18, 2023). When analyzing the key features presented in the patent claim for Application Number 1601006480, it becomes evident that there is no collaboration between hardware and software as described in the claim. Instead, the claim primarily consists of process characteristics that outline the steps and procedures executed directly by a computer.

Consequently, it is crucial to assess whether the claim possesses procedural or stepwise operational attributes. Next, consider whether it is an invention related to a process that is limited to practical use in a specific technical field within any one branch of technology. In this patent application, it has been explicitly claimed as a "specific task program" that is eligible for protection as stated in the Guidelines, Section 6, page 5. From this examination, it can be inferred that software itself is eligible for patent protection. However, it is not the source code in its entirety that is patentable. Rather, what is patentable are the process characteristics outlined in the claim, which delineate steps and procedures that are practically achievable through the use of physical hardware.

It can be concluded from the above information and examples of patentable and non-patentable applications that there are specific conditions under which a computer program may qualify for patent protection (Trossel, 2024). These include the following:

1. The software must collaborate closely with hardware in its technical functionality.
2. The program should contribute technically to the overall invention.
3. The computer should not merely act as a medium for processing or storing data.
4. The program's output or calculations should not be intended solely for standard business operations.

Software Protection in the United States, European Union, Japan and South Korea

Although legal frameworks for software patentability vary across Thailand, the US, EU, Japan and Korea, they share similarities. Each jurisdiction faces the challenge of defining patentable inventions, particularly for software, which often bridges abstract concepts and practical applications.

In the US, patent eligibility of AI and software is typically evaluated under Title 35 of the United States Code Section 101 ("35 U.S.C."). Novelty and inventiveness (e.g., non-obviousness) are separate inquiries from patent eligibility, where each has its own statutory basis, with novelty governed by 35 U.S.C. Section 102 and non-obviousness governed by 35 U.S.C. Section 103 (Title 35-Patents, 1952).

The landmark cases *Mayo Collaborative Services v. Prometheus Laboratories, Inc. [2012]* and *Alice Corp. v. CLS Bank International [2014]* significantly impacted software patentability. In this case, the Supreme Court introduced the "two-step Alice test." The test involves two steps: 1) whether the patent claims are directed to an abstract idea, and 2) whether the claims recite "significantly more" than the abstract idea. This is to determine whether a claimed invention is patent-eligible. The test asks whether the invention is directed to an abstract idea and, if so, whether it contains an "inventive concept" that transforms the abstract idea into a patent-eligible application. However, the Alice court did not provide a clear definition of what an abstract idea is or what constitutes significantly more, leaving lower courts and the United States Patent and Trademark Office (USPTO) to interpret the test's scope (Russavage, 2023). As a result, many software patents have been invalidated as too abstract, yet patents with novel technical applications remain viable. The Federal Circuit maintains a case-by-case approach using the two-step test from Mayo and Alice, which has not fundamentally altered the stance on software patents. While most software applications are deemed ineligible, some patents are still granted. US patent law remains relatively flexible, allowing a broad range of software-related inventions if they meet novelty, non-obviousness, and industrial application standards.

In the EU, software patents are governed by the European Patent Convention (EPC), which explicitly excludes "programs for computers" from patentability unless they make a technical contribution. This is a key concept in European patent law, meaning that software must solve a technical problem in a novel way or improve the functioning of a computer to qualify for patent protection. The European Patent Office (EPO) has issued detailed guidelines on how to apply for this test, which has led to a more restrictive approach compared to the US.

The evolving jurisprudence of the EPO in relation to computer-implemented inventions, particularly in light of Decision G1/19, highlights the importance of demonstrating a "technical effect" in order to obtain patent protection for software (Guede, 2022). This shift emphasizes that patentability in the EU still requires a clear technical contribution, even for abstract or conceptual simulations. Importantly, it suggests that computer-implemented inventions do not need to directly interact with the physical world to be patentable, so long as they solve a technical problem, which may reside entirely within the digital domain. This nuanced approach stands in contrast to jurisdictions such as the US. However, the USPTO and EPO similarly focus on the overall inventive step without arbitrarily separating inventive from non-inventive elements, even if the methodologies differ in detail.

In 2002, the Japanese Patent Act was modified with an addition to Article 2 that included "computer programs" and "any other set of information comparable to a program intended for computer processing" as potential subjects for "product patents." The purpose of the amendment was to offer greater protection for information technology products (Aita, 2005; Mizutani, 2003, as cited in Dragoni, 2021). Nevertheless, the official Examination Guidelines for Patent and Utility Model in Japan explains that when "information processing by software is concretely realized by using hardware resources, the said software is deemed to be a creation of technical ideas utilizing a law of nature" (Japan Patent Office [JPO], 2015).

In Japan, it is possible to patent software "*per se*", i.e. without making reference to the interaction with hardware components in the claims, provided that such computer program uses the laws of nature. In the patent-eligibility examination, the invention is considered "as a whole" (JPO, 2005). Therefore, if a careful claim drafting technique is adopted, a new and non-obvious process could be a patent-eligible invention in Japan (Dragoni, 2021). At this stage of assessment in Japan, an invention is evaluated "as a whole," meaning that the inventive aspects are not artificially separated from the non-inventive components, and importantly, there is no distinction made between technical and non-technical elements (JPO, 2005).

Starting from 2003, a number of rulings in Japan have reinforced and supplemented the existing guidelines of the JPO. Among the notable cases were Balance Sheet (2003), LSI Simulator (2004), Method to Generate Abbreviated Expression of Bit Group (2007), Dental Treatment (2008), Bilingual Dictionary (2008), Amusement Machine (2009), Energy Saving Action Sheet (2012), Knowledge Base System (2014), and Energy Saving Action Sheet II (2016) (Dragoni, 2021).

In the *LSI Simulator Case (2004)*, the Tokyo High Court reversed the Japan Patent Office's rejection, recognizing that even an algorithm could be patentable if it demonstrated a tangible application, such as simulating LSI circuits. Similarly, the *Dental Treatment Case (2008)* emphasized that inventions inherently linked to human mental activities may still be patentable if they leverage technical means to assist or replace those activities. The *Knowledge Base System Case (2014)* highlighted that patent eligibility requires meaningful technical interaction between hardware and software rather than merely listing generic components (Dragoni, 2021). These cases collectively demonstrate that Japan evaluates software inventions "as a whole," focusing on whether the invention delivers a novel and technical contribution, even without explicit hardware interactions. This suggests that, for example, merely altering the data processed by software may be deemed to lack an inventive step, as the underlying program and its interaction with the machine remain unchanged. However, if a new mathematical formula implemented through a computer process leads to a novel and non-obvious method, it could qualify as a patentable invention under Japanese law, provided that the overall process is determined to be both new and inventive. Japan's approach allows for a wide array of software-related patents, especially those that leverage specific hardware implementations to achieve technical results. In contrast, such an invention may face more stringent patentability requirements in the EPO system, as well as in the current US patent system.

South Korea's approach is less prescriptive than Japan's but similarly requires software to provide technical outcomes. Although there are no explicit legal guidelines, computer programs are patentable if they are stored on a recorded medium, according to patent examination standards. The Korean Intellectual Property Office (KIPO) Guidelines require information processing by software (including AI) to be concretely implemented by using hardware. For software inventions, claims should describe the involvement of concrete hardware-type components that enable information processing by software to be realized by using hardware (Lee et al., n.d.). The *Total Management System for Recycling Household Garbage* case *(2001Hu3149)* demonstrates this principle. The Supreme Court rejected the patent on grounds that it failed to utilize natural laws or technical principles, lacked a method for integrating hardware and software into a concrete system, and depended heavily on external regulations. This highlights the requirement for technical realization in patent eligibility. Similarly, though not directly involving software, the *Merck Patent GmbH and Sharp Corporation v. DIC Corporation (2014 Hu 1631)* case underscores the need for tangible technical contributions. The Supreme Court upheld a liquid crystal display patent after amendments demonstrated novel technical effects, illustrating South

Korea's emphasis on inventiveness, novelty, and specific technical contributions – principles equally relevant to software patents.

The upshot of all this is that the software must involve the manipulation of information or the use of unique arithmetic operations to serve a specific purpose, and this must be accomplished through a cooperative working of the software and hardware. Patent eligibility is satisfied as long as the unique arithmetical operation or manipulation of information is concretely claimed, and a general-purpose computer is sufficient as a hardware resource. However, the hardware resource does not necessarily have to be a special information-processing device specifically designed for a given use purpose.

There is a pressing need for Thailand to align its patent laws with those of other countries that recognize software as patentable, as seen in the US, EU, Japan, and Korea. Doing so would provide more robust legal protection and incentivize technological innovation within the country.

Conclusion and Recommendations

This paper explored the patentability of software in Thailand, highlighting key gaps in the legal framework. While the Copyright Act protects only the expression of software, it does not cover the underlying functionalities crucial to innovation. The Patent Act also lacks a clear definition for software, and the Guidelines provide direction only for examiners, not the public, leading to inconsistencies in patent applications. Although there is no specific law indicating that software outside Section 9(3) is patentable, certain software with detailed process claims may still qualify under current guidelines.

In contrast, jurisdictions such as the US, the EU, Japan, and South Korea have adopted varied approaches to software patentability, reflecting different legal traditions and including clear guidelines and practices known to the public regarding whether software constitutes patentable subject matter. For instance, while the US provides a flexible framework for software patents well-documented through court judgments, the EU emphasizes the necessity for a technical contribution in the EPO's detailed guidelines and renowned decisions. Japan's Patent Act clearly specifies whether computer programs or software are subject to patent protection. As the legal system of Thailand is fundamentally a civil law system, the Japanese model is one that Thailand may consider adopting in order to overcome confusion among applicants by clarifying whether software falling outside the scope of Section 9(3) is patentable subject matter and mentioning whether it provides a flexible framework for software patents as in the US or clearly restricts to the specific hardware implementation as in South Korea. In Thailand's case, based on the current practice, addressing these challenges requires legal amendments that more

comprehensively define patentable software outside the scope of Section 9(3) of the Patent Act, as well as amending the definition of software or computer programs to align with either the Copyright Act or the Guidelines.

Furthermore, analyzing specific case studies of software inventions in Thailand will provide insights into the practical implications of existing laws. The characteristics derived from these case studies should be concluded and included in legal guidelines to clarify attributes of "computer programs" or "information systems for computer operation" that do not fall under Section 9(3) of the Patent Act but may still be eligible for patent protection. The criteria for patentable software inventions should not only be included in the Examiner's Guidelines – intended solely for patent examiners –but should also be specified in subordinate legislation, such as ministerial regulations and departmental announcements. This approach will ensure that applicants are not confused and can promptly seek protection for their software or computer programs for subsequent commercial use.

Subsequent to this paper's findings, future studies could compare software patentability across jurisdictions such India, China, and other ASEAN countries, shedding light on how Thailand's system compares to regional counterparts and could be improved, especially considering that China is the largest contributor to global patent applications, with one of the highest patent registration rates in the world. Further research could also explore how the lack of clarity in patent laws impacts local tech entrepreneurs and businesses. Additionally, examining the intersection of copyright protection and patent law, and how these mechanisms complement each other, could help software developers better utilize both protections, improving legal certainty and decision–making.

By adopting successful practices from other countries and addressing ambiguities in its legal framework, Thailand can enhance its innovation landscape and better support technological advancements in an increasingly digital world. This alignment will not only protect innovations but also foster growth in Thailand's tech sector, ultimately contributing to a more robust economy.

References

Aita, Y. (2005). Current state and remaining issues of patent protection for computer programs. *Jurist*, 1303, 138–143.

Copyright Act B.E. 2537. (1994, December 21). *Royal Gazette*, Volume 111, Section 59a, pp. 1–22. https://www.ratchakitcha.soc.go.th/DATA/PDF/2537/A/059/1.PDF [in Thai]

Department of Intellectual Property. (2019). *Guidelines for examining patent and petty patent applications B.E. 2562*. https://www.ipthailand.go.th/images/3534/PATENT/Patent Document.pdf [in Thai]

Dragoni, M. (2021). *Software patent eligibility and patentability: An overview of the developments in Japan, Europe and the United States and an analysis of their impact on patenting trends. Stanford* (TTLF working papers no. 72). Stanford – Vienna Transatlantic Technology Law Forum. https://law.stanford.edu/wp-content/uploads/2021/01/dragoni_wp72.pdf

Evans, J., Taweepon, S., & Chira-aphakul, H. (2012, June). *Software protection in Thailand*. https://www.tilleke.com/wp-content/uploads/2012/06/2012_June_Software_Protection_in_ Thailand.pdf

Guadamuz, A. (2010, June 3). *Patentability of computer software and business methods* [Paper presentation]. SCRIPT Centre for IP and Technology Law, University of Edinburgh. https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=135735

Guede, M. A. (2022, October 26). *Patent protection for software inventions in Europe*. https://www.iam-media.com/guide/innovation-invention-yearbook/2023/article/patent-protection-software-inventions-in-europe

Japan Patent Office. (2015). Part vii foreign language written: Chapter 1 overview of foreign language written application system. In *Examination Guidelines for Patent and Utility Model in Japan (Provisional Translation)* (pp. 1–11). https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/ tukujitu_kijun/document/index/all_e.pdf

Lee, S. Y., Lee, H. Y., & Kwon, I. A. (n.d.). Patent litigation in South Korea: Overview. *Thomsonreuters*. https://uk.practicallaw.thomsonreuters.com/w-014-5857?transitionType= Default&contextData=(sc.Default)&firstPage=true

Patent Act B.E. 2522. (1979, March 16). *Royal Gazette*, Volume 96, Section 35, pp 1–40. https://www.ratchakitcha.soc.go.th/DATA/PDF/2522/A/035/1.PDF [in Thai]

Russavage, E. J. (2023). Software patents in the United States: Essential considerations and important trends. *The Journal of Robotics, Artificial Intelligence & Law, 6*(1), 45–52. https://454850.fs1.hubspotusercontent-na1.net/hubfs/454850/Software%20Patents%20Article%20Russavage%20November%202022.pdf

Title 35–Patents. (1952, July 19). https://www.govinfo.gov/content/pkg/USCODE-2011-title35/html/USCODE-2011-title35.htm

Trossel, W. S. (2024, January 15). A guide to protecting AI-related technologies in Thailand. *IP Experts.* https://www.iplink-asia.com/article-detail.php?id=1087