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Clarifying the Patentability of Cryptocurrency Inventions for Jurisdictions

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CLARIFYING THE PATENTABILITY OF CRYPTOCURRENCY INVENTIONS FOR A JURISDICTION

Cryptocurrency, currency secured by software encryption, has become a global phenomenon nowadays. It relies on an internet-based medium of exchange using cryptographical functions to conduct financial transactions and is implemented via blockchain technology to gain decentralization, transparency, and immutability.[1] Among blockchain's numerous applications, cryptocurrency is considered as the first and most popular use of this technology. The first cryptocurrency, *Bitcoin*, was invented by a person under the pseudonym *Satoshi Nakamoto* in late 2008.[2] Since then, more and more cryptocurrencies have been established, such as Ethereum, LiteCoin, ZCash, Ripple.

According to a study by Franklin & Gaudry[3], cryptocurrency-related FinTech applications account for most blockchain patent filings in the U.S.. In specific, they consisted of more than half of the total blockchain patent applications filed in the U.S. from 2008 to 2018. The study also reveals that Accenture, IBM, Id m Global, Intel, Mastercard, PayPal, VISA were the top U.S. applicants for such patents. Until July 2018, major filers for patents in the blockchain and cryptocurrency areas globally are Mastercard, Visa, Bank of America and Nasdaq, and the top locations are the U.S., China, Japan, Europe and South Korea.[4] In another study, the valuation of blockchain technology was forecasted to rise in an annual rate of 27%-128% between 2020-2030[5], with predictions that the race to patent cryptocurrency-related inventions will become more heated.

Although Bitcoin was built on an open-source software,[6] in many jurisdictions, non-obvious improvements on existing blockchain techniques could be patented (provided that they have novelty) to exclude others from using the claimed techniques. In this article, we offer a regulatory approach by providing four basic questions patent applicants should raise when deciding where to file their patent(s). A roadmap for the Vietnam jurisdiction is provided below.

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[1] Ameer Rosic, *"What is Cryptocurrency? [Everything You Need To Know!]"*. Available at: https://blockgeeks.com/guides/what-is-cryptocurrency/#:~:text=Satoshi%20Nakamoto%2C%20the%20unknown%20inventor,to%2DPeer%20Electronic%20Cash%20System.

[2] Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, Bitcoin.org (Nov. 2008). Available at: https://bitcoin.org/bitcoin.pdf

[3] Thomas Franklin & Kate Gaudry, "Patent Trend Study Part Nine: Blockchain, https://www.kilpatricktownsend.com/-/media/Feature/Insights/Publication/2019-Patent-Trends-Study_Blockchain.ashx?la=en&hash=4E735DF72581CA986B860747389502256C1AA867

[4] https://www.jdsupra.com/legalnews/overview-of-the-patent-landscape-in-the-40312/

[5] Rajesh Kandaswamy and David Furlonger, *"Blockchain-Based Transformation: A Gartner Trend Insights Report,"* Stamford (CN): Garner, 27 March 2018. Available at: https://www.gartner.com/doc/3869696?ref=unauthreader &srcId=1-4730952011.

[6] Aahit Gaba and Heather Meeker, *"Open source money: Bitcoin, blockchain, and free software,"* Opensource.com, 04 July 2018, https://opensource.com/article/18/7/bitcoin-blockchain-and-open-source#:~:text=Bitcoin%20is%2C%20in%20fact%2C%20built,its%20technology%20is%20consensus%2Ddriven.&text=Blockchain%20may%20or%20may%20not,gaining%20traction%20for%20many%20applications.https://www.forbes.com/sites/bernardmarr/2018/02/16/a-very-brief-history-of-blockchain-technology-everyone-should-read/#3489e79c7bc4.
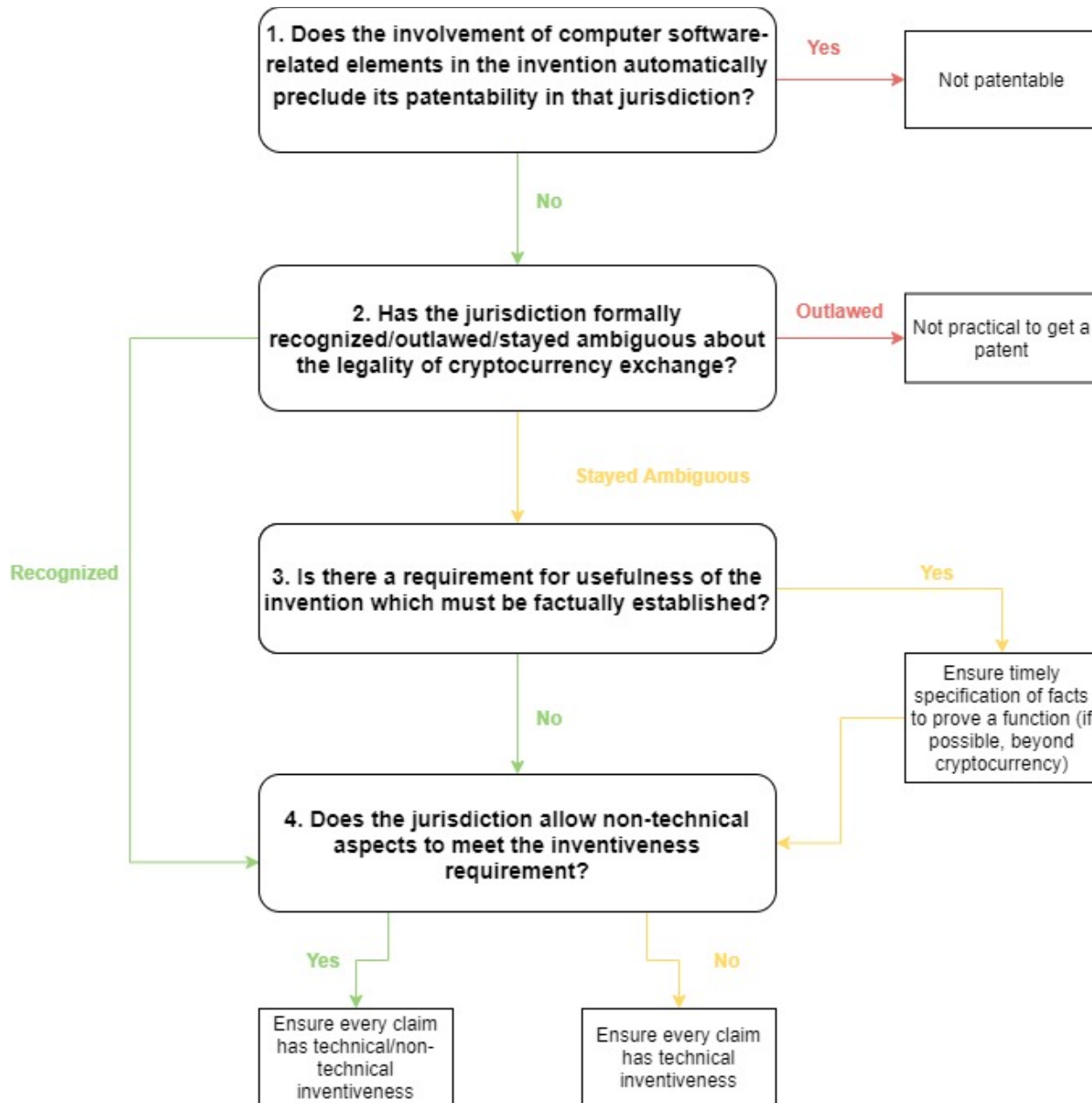
Figure 1. Regulatory approach block scheme ("green" refers to 'proceed with patent consideration', "yellow" refers to 'move forward with caution', and "red" refers to 'withdraw from that jurisdiction')

1. Does the involvement of computer software-related elements in the invention automatically preclude its patentability in that jurisdiction?

As cryptocurrency is based on a distributed ledger run by computer programs, a question on the patentability of cryptocurrency-related inventions is that whether the software is a patentable subject-matter in the first place. A brief review on international treaties such as the Trade-Related Aspects of Intellectual Property Rights ("TRIPS Agreement") and Patent Cooperation Treaty ("PCT"), shows that both agreements do not exclude software as a

patentable subject matter. Rule 39.1(vi) of the Regulations under the PCT waives the duty of International Searching Authorities to search computer programs, along with other subject matters such as mathematical theories or animal varieties. However, a closer look on Rule 39.1(vi) shows that the lack of search is only justified if the International Searching Authority is not equipped to perform such searches, and not by unpatentability.[7] This misunderstanding may originate from Article 10(1), Section 1 of the TRIPS Agreement where the wording "computer programs ... shall be protected as literary works" may be interpreted to mean that patent protection is inapplicable. However, it is common for rights-holders to seek complementary (and not mutually exclusive) sources of protection, such as patent and copyright, for the same invention, which could be the case for software as it is neither against public order nor explicitly listed as unpatentable subjects.

The European Patent Convention (EPC) goes one step further than most major IP jurisdictions by explicitly outlawing the patentability of computer programs "as such".[8] This wording was later adopted by many countries, such as South Africa[9] and New Zealand[10]. In the case T 1173/97, the EPO Board of Appeal defined the "as such" detriment to be "lacking in technical character", meaning that software patent claims are protectable if they can show a "further technical effect" that goes beyond 'normal' physical interactions between program (software) and computer (hardware). This effect-based interpretation was emphasized in New Zealand as demonstrated in their Supplementary Order Paper (SOP) in May 2013, which took into consideration "what problem or other issue is to be solved or addressed [by the software claim]" and "the advantages or benefits of solving or addressing the problem or other issue in that manner".

There is currently no international binding limit on the patentability of software claims for cryptographic inventions and even in markets that exclude computer programs "as such". There is often a fine line between unpatentable and patentable claims that are not primarily based on the subject matter of the claims but on other patentability criteria such as industrial applicability or inventiveness, which will be discussed in upcoming questions. The *de facto* answer to the first question in this approach is therefore usually "No".

2. Has the jurisdiction formally recognized/outlawed/stayed ambiguous about the exchange of cryptocurrency?

This concern is more practical than legal. If a country has already outlawed (i.e. "declared as illegal") transactions using open-source cryptocurrency (e.g. China and their strict ban on Initial Coin Offerings),[11] the costs of filing and maintaining patent validity for an invention aimed primarily at enhancing the security or efficiency of cryptocurrency transactions may not be justified. However, there may still be exceptions if those technologies could later prove to be useful for government-backed cryptocurrency. For example, China has been working on a centralized Digital Currency Electronic Payment (DC/EP) since 2014 that is predicted to be launched

7 WIPO, "Regulations under the Patent Cooperation Treaty," July 1, 2020. Available at:
https://www.wipo.int/export/sites/www/pct/en/texts/pdf/pct_regs.pdf.
8 EPO, " Article 52(2)(c) and 52(3) - European Patent Convention 16th edition," June 2016. Available at: https://www.epo.org/law-practice/legal-texts/epc.html.
9 Smit & Van Wyk, "Software Patents in South Africa," accessed July 2020, https://www.svw.co.za/patents/software/.
10 Kelly Buchanan, "Patents Bill Passed, Includes Ban on Software Patents," The Library of Congress, August 31, 2013. Available at:
https://www.loc.gov/law/foreign-news/article/new-zealand-patents-bill-passed-includes-ban-on-software-patents/.
11 The People's Bank of China, "Announcement of the People's Bank of China, Central Cyberspace Administration, Ministry of Industry and Information Technology, State Administration for Industry and Commerce, China Banking Regulatory Commission, China Securities Regulatory Commission, and China Insurance Regulatory Commission on Preventing Token Issuance Financing Risks," 04 September 2017. Available at:
www.pbc.gov.cn/goutongjiaoliu/113456/113469/3374222/index.html.

in mid-2021.[12] Patents from the private sector, if identified as useful by state-owned enterprises and not rigidly tied to mass peer-to-peer verification, may bring substantial licensing fees for their holders.

If a jurisdiction has neither introduced a clear regulation framework for open-source cryptocurrency nor officially denounced it, patenting relevant inventions could still be a viable economic investment if another alternative use of that invention is to enhance a similar blockchain-driven area, such as smart contract (i.e. an invention concerning security of the private key for Ethereum might be claimed subtly as to improve smart contract in general). This could meet the industrial applicability requirement for patentability as well as providing a back-up source of revenue in case a more restrictive approach is adopted by that government in the future. In pro-cryptocurrency countries like Switzerland where wealth tax has been levied on bitcoin as a recognized foreign currency,[13] patents shall be the key to secure market share. The very function of enhancement of cryptocurrency transactions would suffice for the industrial applicability requirement.

3. Is there a requirement for usefulness of the invention which must be factually established?

As the Economic Incentive Theory behind granting a temporary monopoly for patent holders is to secure long-term societal benefits,[14] most jurisdictions require the criteria of 'usefulness' for patentable inventions - which is often known as the "useful" criterion in Article I(8)(8) of the U.S. Constitution[15]. This requirement is often not a major obstacle in patent application. In Europe with the European Patent Convention[16], a similar but stricter requirement is "industrial applicability".

For inventions designed to enhance cryptocurrency storage or transactions, their usefulness or industrial applicability may be self-evident in countries where cryptocurrency has been recognized and regulated. In a country where cryptocurrency is still legally ambiguous, patent offices might be hesitant to accept explicit cryptocurrency-related functions as fulfilling the industrial applicability requirement. Therefore, a more subtle phrasing of patent claims to demonstrate the potential application of inventions in blockchain sub-fields other than cryptocurrency could increase the success rate. However, complications may arise in the timely use of facts to substantiate the claim. For instance, the Canadian IP Office has incorporated an additional doctrine of "sound prediction" into its general criteria for usefulness, requiring claimed functions of an invention to be supported by factual specifications at the time of the first (priority) application. For foreign applicants who seek patent protection in countries like Canada, their priority should be to ensure that the factual specifications in their application are sufficient to show a practical use[17]. For instance, a more efficient hash-generating algorithm invention from Japan may only be "useful" in a Canadian application if the priority application in Japan/via PCT has explained what and how helpful a hash function is for cryptocurrency transactions.

12 Sergey Baloyan, "How China's New National Cryptocurrency Changes Everything," Hackernoon, April 24, 2020. Available at: https://hackernoon.com/how-chinas-new-national-cryptocurrency-changes-everything-sc4032eq.

13 Canton of Zug - Finance Directorate Tax Administration, "Cryptocurrencies (Bitcoin, Ethereum, Tokens etc.) Tax information sheet for individuals," November 30, 2017. Available at: https://www.zg.ch/behoerden/finanzdirektion/steuerverwaltung/krypto waehrungen/download/Kryptowaehrungen%20-%20Merkblatt%20def.%20-%2030.11.2017.pdf/download.

14 Jeffrey Schox, "Not so obvious: An Introduction to Patent Law and Strategy," 2011.

15 US Constitution, September 17, 1787. Available at: https://constitutionus.com/.

16 EPO, "Article 57 - European Patent Convention," accessed July 2020. Available at: https://www.epo.org/law-practice/legal-texts/html/epc/2016/e/ar57.html.

17 Erica L. Lowthers, 'Canadian Patent Appeal Board Adopts a New Approach to Attack Patents for Lack of Utility', Jan 24, 2018. Available at: https://www.airdberlis.com/insights/blogs/thespotlight/post/ts-item/canadian-patent-appeal-board-adopts-a-new-approach-to-attack-patents-for-lack-of-utility.

4. Does the jurisdiction allow non-technical aspects to meet the inventiveness requirement?

"An inventive step" or "non-obviousness" is often the final and most laborious-to-check criterion in the substantive examination of a patent. Major jurisdictions also hold different views on whether only technical aspects of an invention may satisfy this requirement, or non-technical aspects can also contribute (although there is still a blurred line between technical and non-technical aspects, especially for software-based inventions).

For instance, Japan has adopted a lenient stance by recognizing the inventiveness of both technical differences and a non-technical differences.[18] Meanwhile, Section 101 – Title 35 of the U.S. Code requires patentable subject matters to be 'new and useful' and not necessarily technical in nature.[19] This interpretation was confirmed by the USPTO in 2005, in which patent protection is supported "regardless of whether there is a technical aspect".[20] On the other hand, in Europe, the EPO would first separate technical and non-technical elements in each claim and then evaluate if there is sufficient inventiveness in the technical elements. It also specified that automating a non-technical method with technical devices will not make that method inventive.[21]

18 EPO, "Talking about a new revolution: blockchain - Conference Report," 04 December 2018, http://documents.epo.org/projects/babylon/eponet.nsf/0/FB134B001751B1FAC12583BD00317B47/$File/Talking_about_a_new_revolution_blockchain_conference_report_en.pdf.

19 Cornell Legal Information Institute. Title 35 U.S. Code § 101 - Inventions patentable. Available at https://www.law.cornell.edu/uscode/text/35/101.

20 USPTO, "Interim Guidelines for the Examination of Patent Applications for Patent Subject Matter Eligibility," p.45, 22 November 2005. Available at: https://www.bitlaw.com/source/uspto/StatutoryGuidelines.pdf.

21 EPO, "Case Law of the Boards of Appeal - Non-technical features and technical contribution," accessed July 2020, https://www.epo.org/law-practice/legal-texts/html/caselaw/2019/e/clr_i_d_9_1_3_c.htm.
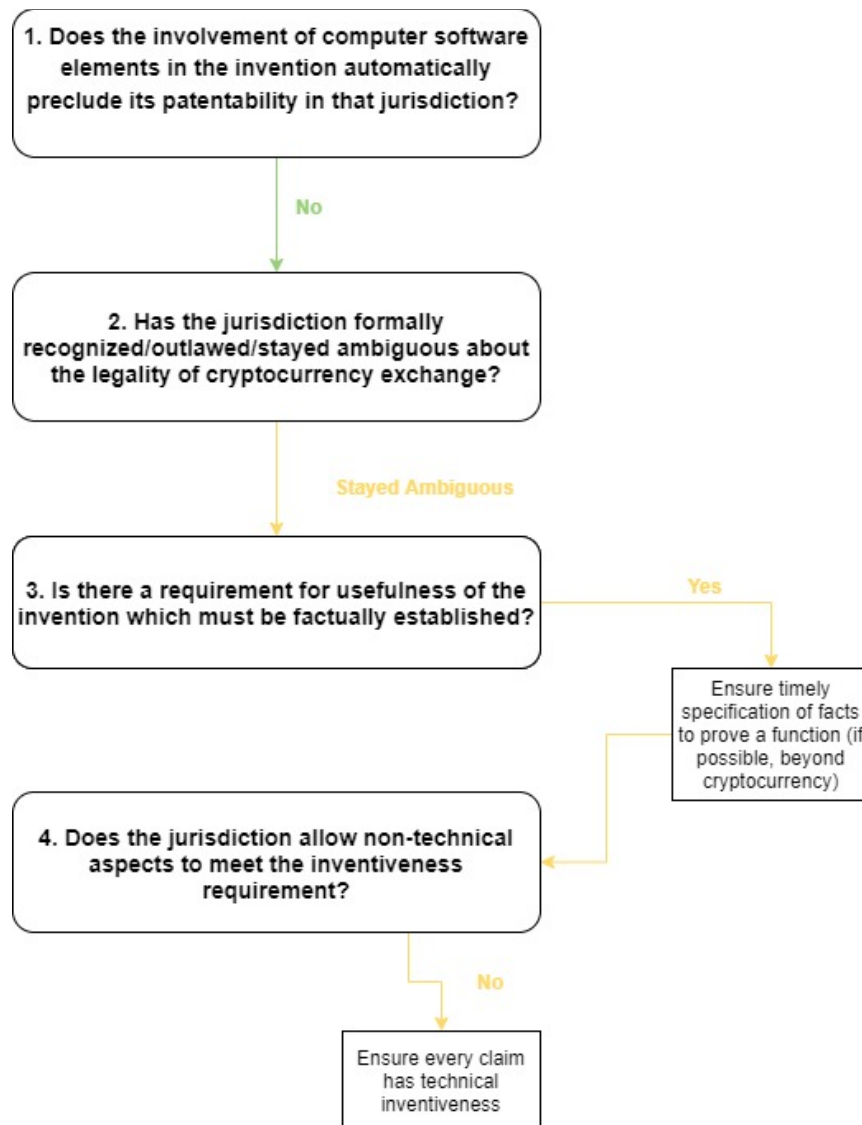
SAMPLE ROADMAP OF VIETNAM

Figure 2. Applying the regulatory approach to Vietnam

Although Article 59 of the Vietnam IP Law excludes the patentability of "computer programs", IP Vietnam has followed a similar approach to the EPO by protecting software-related claims that are "technical solutions to technical problem using technical means to obtain technical effects," subject to additional wording requirements to avoid direct reference to "software" or "computer programs". Accordingly, a computer program, when it is run on a computer that can attain a technical effect beyond 'normal' physical interactions between the program (software) and the computer (hardware), can be patentable.[22]

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[22] Article 5.8.2.5 of of the Guidelines on examination of patent application issued by the IP Vietnam on 31 March 2010. This is an examination manual (handbook) for patent examiners. It is not a legal document; however, it provides specific guidance and sets examples for examiners to follow

Vietnam is planning to develop legal regulations regarding the management of cryptocurrencies and crypto-assets[23]. However, Vietnam's legal position on cryptocurrency is still ambiguous. In particular, the Vietnamese Government considers that cryptocurrencies are not "legitimate means of payment" since activities of investment and trading cryptocurrencies may impact the stability of financial markets, social order and safety, and cause big risks to participating organizations and individuals. Bitcoin and other cryptocurrencies are neither considered as a type of currency nor a legitimate means of payment. Therefore, the illegal issuance, supply and use of cryptocurrencies for payment may be subject to administrative and criminal sanctions.[24] Nonetheless, what constitutes the 'illegal(ity)' of such actions has not been systematized into official law.[25] It is hoped that the patentability of inventions relating to "Bitcoin" or other "cryptocurrencies" will be clarified when the legal framework for such matters is established.

Regarding the requirement of usefulness, Vietnam follows a strict approach similar to that of the EPO by requiring the consistent proof of industrial applicability. The key here with cryptocurrency-related inventions is that because the legislation is still ambiguous about what constitutes as legal/illegal cryptocurrency transactions, IP Vietnam has adopted a de facto 'wait-and-see' approach for cryptocurrency-related applications. For example, a quick search of the term "cryptocurrency" on Vietnam Intellectual Property Research Institute's IP Platform database shows that up to 25 September 2020, only five relevant applications were found (VN applications Nos. 1-2017-04389, 1-2017-04458, 1-2018-00785 1-2018-01806, and 1-2019-04378). However, none of the applications have been granted or rejected. Therefore, it is likely that applications relating to cryptocurrency will be kept pending until more detailed legislations are adopted in Vietnam. Once a legitimate function is proved, the last task is to check the inventiveness in technical aspects of their invention with the closest prior art.

As a general remark for local legislators, since Vietnam is one of the three countries with the highest number of cryptocurrency transactions[26], the prompt issuing of regulations relating to cryptocurrency will provide a legal framework for the protection of cryptocurrency inventions and attract more applicants to file cryptocurrency patent applications in Vietnam.

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23 Decision No. 242/QD-TTg on approving the scheme for "restructuring securities and insurance markets by 2020 and vision to 2025", dated 28 February 2019 and Resolution No. 39/NQ-CP on periodical government meeting of May 2019, dated 11 June 2019

24 Instruction No. 10/CT-TTg on enhancement of management of the activity of Bitcoin or other similar cryptocurrencies, issued by Prime Minister, dated 11 April 2018 and Letter No. 5747/NHNN-PC providing opinion on design of computer centers for Bitcoin, Litecoin and cryptocurrencies by State Bank of Vietnam, dated 21 July 2017

25 Doan Thi Ngoc Hai, "Completing a legal framework on cryptocurrencies in industrial era 4.0". Available at: https://moj.gov.vn/qt/tintuc/Pages/nghien-cuu-trao-doi.aspx?ItemID=2507

26 Pham Minh Oanh, "Vietnam in industrial revolution 4.0 flow: legal challenge for cryptocurrencies". Available at: http://tapchitaichinh.vn/ngan-hang/viet-nam-trong-dong-chay-40-thach-thuc-phap-ly-doi-voi-tien-ao-308346.html

CONCLUSION

The regulatory framework may have missed local particularities in patentability requirements, especially in non-major markets where English is not an official language. Furthermore, as cryptocurrency regulations must adapt quickly to the changes in blockchain technology (especially in common-law countries like the US) as along with the capacity for technological management and geopolitical needs of each country, market classifications may change over time. For example, when Vietnam has gained more experience in managing non-cryptocurrency, blockchain-driven areas like energy distribution or healthcare, its State Bank may one day legitimize cryptocurrency as an example of "other transaction means as stipulated by the State Bank". Therefore, constructive criticism and updates from patent practitioners or blockchain/cryptocurrency enthusiasts around the world are more than appreciated.

Overall, the framework is a non-exhaustive arrangement of four questions concerning the legal technicalities and practical implications of pursuing a patent for an invention designed to enhance the security or efficiency of cryptocurrency transactions. The placement of a jurisdiction on the framework may provide a useful guide for foreign patent applicants of such inventions in deciding whether they should file in that country or region and if yes, what steps they should pay special attention to. The information provided using the framework may not be comparable to individualized advice from legal services.