Visiting Fellow Program

Role of Patents in Promoting E-commerce Technology Transfer in CAREC FTAs

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Under the Visiting Fellow Program, the CAREC Institute issued research grants in 2023 to support scholars and researchers to produce targeted knowledge products that would add to the body of knowledge on regional cooperation in the CAREC region.

Scholars were encouraged to conduct research on CAREC integration topics and carry out comparative analyses between (sub)regions to obtain insights for promoting and deepening regional integration among CAREC member countries particularly, as anticipated in the CAREC 2030 strategy and stated operational priorities.

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Abstract

This paper explores the substantive rules of patent protection in the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and free trade agreements (FTAs) to promote e-commerce technology transfer. Specifically, the patents act as both direct and indirect sources of technology transfer in light of the patentability and disclosure requirements. FTAs featuring electronic commerce (e-commerce) or digital trade-related provisions are rising to advance the development of norms and rules for regional digital cooperation. The Central Asia Regional Economic Cooperation (CAREC) Digital Strategy 2030 also recognized regional digital cooperation in policy design, capacity building, and digital technologies to accelerate digital transformation. After providing an overview of how patentability and disclosure requirements affect e-commerce technology transfer, it aims to explore the *status quo* and the way out for CAREC FTAs in unleashing the potential of patents to advance the transfer of e-commerce technology. It proposes a pan-CAREC FTA framework to integrate intra- and extra-bloc cooperation, with reference to the Association of Southeast Asian Nations (ASEAN) practice, incorporating rules of patentability and disclosure requirements regarding e-commerce technology.

Keywords: Technology transfer, e-commerce, patent, CAREC, FTAs, ASEAN

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1. Introduction

An increasingly necessary component of business strategy and a strong catalyst for overall economic development, e-commerce[1] embodies the magnified potential to solve socioeconomic challenges, especially during the COVID-19 pandemic (Goyal et al, 2022). Yet, the digital divide—typically the knowledge and technology gap—contributes to the uneven distribution of the benefits derived from e-commerce between developing and developed countries (UNCTAD, 2019; Schwab, 2017).[2] Preferential trade agreements (PTAs)[3] incorporating e-commerce provisions is a rising approach to regional digital cooperation in response to the fragmentation of the national legal system and the weakness of multilateral agreements (Mitchell & Chin, 2023).

With the commitment to digital transformation by reducing the digital divide gap, CAREC member states promote e-commerce as a longstanding priority to support their integration into global value chains and adopt economic diversification (CAREC Institute, 2022).[4] Both opportunities for harvesting more benefits from e-commerce and challenges from insufficient policy design and the digital divide underscore the Central Asia Regional Economic Cooperation (CAREC)[5] Program digital regional cooperation in light of the FTA e-commerce framework. The United Nations Conference on Trade and Development (UNCTAD) proposed to enhance the capacities of developing countries to harness the evolving digital economy for more inclusive development (United Nations, 2022). It also highlights the role of e-commerce and technology transfer in sustaining economic growth (Banga et al, 2021). For example, South Africa proposed a technology transfer to realize the equitable distribution of the benefits from e-commerce (South Africa Proposal, 2023).

To date, e-commerce provisions in multilateral and regional FTAs pay more attention to more extensive regulatory issues, such as data localization, than issues of Internet protocol (IP). Accordingly, scholars promote the regulations or justify the policy choice to promote e-commerce development. Empirical studies witness the imperative role of FTAs in promoting access to information and technology. Scholars are also concerned about the implication of IP on technology transfer under the TRIPS-plus and international investment system (Hoekman et al, 2005). Under the CAREC project, existing literature explores the CAREC countries' policy design to promote e-commerce development. Even recognizing the critical role of technology transfer, scholars are inclined to focus on e-commerce infrastructure development. While the role of patents in access to technology lacks systematic evidence, the question of how substantive patent rules in TRIPS and FTAs impact e-commerce technology transfer is a shortcoming in available research.

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[1] While there is no single agreed-upon definition of these terms, 'e-commerce' and 'digital trade' are often used interchangeably, as they are in this article.

[2] The UNCTAD report (2019) points out the geographic concentration in the digital economy and digital infrastructure. The United States and China play leading roles in digital technological developments in the world, while Africa and Latin America, in particular, trail far behind.

[3] PTAs in this article are referred to as FTAs, including bilateral and regional free trade agreements. Around two-thirds of WTO members are party to a PTA with e-commerce-related provisions.

[4] The CAREC program and UNCTAD proposed the 'e-Trade for All' initiative. To contribute to building a more inclusive and sustainable future for all economies, it intends to turn digital opportunities into development gains and help developing countries harness e-commerce and digital trade for development.

[5] CAREC is a partnership of 11 countries in Central Asia and neighboring regions aimed at promoting regional economic integration and development.

As the patent makes certain intangible assets tradable, the role of the patent in technology transfer has been increasingly recognized at national and international levels with the proliferation of transnational trade flow (Eisenberg, 1996). The patent licensing agreement is increasingly critical in technology transfer, incorporating technical assistance clauses and ancillary know-how transfer (Report on the International Patent System WIPO, 2009). Early on, managing patent protection in e-commerce attracted critical attention in academia and practice. This paper aims to analyze how CAREC members, based on pan-CAREC integration, implement the substantive patent rules, and patentability and disclosure requirements to promote e-commerce technology transfer, promoting IP and e-commerce cooperation.

To assess the role of patents in promoting e-commerce technology transfer, first, it unfolds the 'covered technology' regarding e-commerce. This paper sheds light on the patent rules of patentability and disclosure requirements concerning e-commerce technology. Furthermore, it follows the analysis of the *status quo* of FTAs regulating e-commerce and technology transfer rules. Against the background of CAREC countries putting FTA negotiation into its agenda, it concludes by envisioning a 'pan-CAREC' regional cooperation framework, implementing patent flexibilities to promote technology transfer related to e-commerce in the new round of negotiations.

2. Patents and Technology Transfer Concerning E-commerce

2.1. Technology Related to E-commerce

The UNCTAD draft International Code on the Transfer of Technology terms 'technology' as 'systematic knowledge for the manufacture of a product, for the application of a process or for the rendering of a service and does not extend to the transactions involving the mere sale or mere lease of goods' (UNCTAD, 1985). More particularly, the technology covers all forms of industrial property, know-how, and technological knowledge for equipment operation and personnel training. It also includes tacit knowledge, intangible knowledge, such as rules of thumb, heuristics, and other 'tricks of the trade' (Arora, 1996). Accordingly, technology transfer refers to the physical movement of assets or persons and the movement of a specific set of capabilities, such as entrepreneurial experience and professional secrets of production (Maskus, 2003; UNCTAD, 2014).

In practice, states specify that software-related technology includes systems, data, and skills (Boon, 2013). While the modern digital revolution equips technology transfer with new features and ways to disseminate technical innovation, the connotation of 'technology' is broad enough to include the new spheres (UNCTAD, 2021). Scholars have defined e-commerce as the way and process of conducting business transactions through the Internet, nationally or internationally (WTO NEWS, 1998). The WTO Work Programme pointed out that e-commerce means the 'production, distribution, marketing, sale or delivery of goods and services by electronic means' (Work Programme on Electronic Commerce, 1998). It will also consider issues relating to developing the infrastructure for e-commerce. Thus, information technology infrastructure became a formal element in the e-commerce development strategy, further subject to the technology transfer system (Gilbert, 1989).[6]

Technologies related to e-commerce embody technical methods of performing commercial functions, generally achieved in computer programs, including hardware infrastructure and software

[6] Developed countries also asked for the transfer of scientific infrastructure, specific skills, and access to high-technology services and supplies at the early development stage in the telecommunications-related industry.

technologies (Maskus & Wong, 2002). E-commerce operations started simply uploading products on a website and have now diversified with technologies, such as personalization, AI-based customer support, image search, and click checkout (Khandelwal, 2020). Therefore, the e-commerce technology transfer process covers the ancillary sharing of data and knowledge in addition to physical equipment transfer. Yet, currently, the filed patents related to digital technologies and the digital economy are mainly under the control of the United States and China (UNCTAD, 2021).[7]

2.2. Patents in E-commerce Technology Transfer

International technology transfer is a comprehensive process covering the embodiment of information, global technology marketing, and subsequent absorption, imitation, and development (Maskus, 2004). Patent licensing agreements can be a direct source of technology transfer, taking place with purchasing production or distribution of rights, technical information, and required know-how (Markusen & Maskus, 2003; Arora, Fosfuri, & Gambardella, 2004). In addition, as the indirect source of technology transfer, a patent discloses certain information during the patent application process (Maskus & Reichman, 2004). Indeed, 'trade in ideas' is a significant factor in global economic growth. And developing countries could gain more access to foreign technologies as international firms are granted patents in their locations.

In this sense, patentability determines whether the technology can be subject to a patent licensing agreement.[8] Furthermore, the extent to which developing countries can benefit from the technology transfer process remains dependent on the local absorptive capability and diffusing strategies of technology-exporting firms (Maskus & Reichman, 2004). Putting licensed rights or technology into practice requires supporting know-how and technological information. Accordingly, the disclosure requirement in the patent application not only acts as the indirect source of technology transfer but also matters in practicing the transferred technology. In a word, the patentability and disclosure requirements of patents are critical in promoting and practicing the technology transfer related to e-commerce.

2.2.1. Patentability

TRIPS Article 27.1 requires member countries 'to make patents available for any inventions, whether products or processes, in all fields of technology without discrimination … as to the place of invention and whether products are imported or locally produced.' Article 28 grants the patent right to process, not only over the use of the process but also over products obtained directly by the process, as long as it is new, involves an inventive step, and is capable of industrial application. The United States adopted a positive definition under the statute,[9] from which courts have fashioned exclusions for laws of nature, physical phenomena, and abstract ideas (*Diamond v Diehr*, 1981).

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[7] The UNCTAD report pointed out that these two economies account for 75 percent of all patents related to blockchain technologies, 50 percent of global spending on IoT, at least 75 percent of the cloud computing market, and 90 percent of the market capitalization value of the world's 70 largest digital platform companies.

[8] It is subject to the IP legal framework, which endows exclusive rights to digital products, services, and covered technologies.

[9] See Patent Act, 35 USC §101 (1952): 'Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.'

Then, the mathematical algorithms and business methods were incorporated into the expanded exclusion list in judicial practices, despite not being statutorily excluded.[10] It is argued that excluding computer programs and algorithms from patentable subjects can be attributed to two characteristics. First, as 'basically methods of mathematical calculation or sets of instructions for carrying out such calculation,' the computer algorithm is woefully inept at sorting itself from abstract ideas, laws of nature, and natural phenomena (Landis, 2001). Furthermore, many software techniques are transparent. Thus, assessing their novelty and inventive steps would be challenging.

Along with the prevalence of the Internet and digital technology, the surge of the patent application of e-commerce business methods and incidental disputes challenge the 'one size fits all' approach or 'bright line rule' of unpatentability of business methods and algorithms (Rizzo, 2000). The State Street Bank case holds no absolute exclusion for business methods or mathematical algorithms from patentable statutory subject matters. A business method containing mathematical algorithms could be patented on the grounds of its practical application and producing a useful, concrete, and tangible result (*State Street Bank & Trust Co v Signature Financial Group, Inc,* 1998).

In addition, software and related technology patents explode with the loosening standards of patentability of software and business method inventions over the last decade (Gleick, 2000). The judicial practice is diverging in determining whether business methods can be patentable, even worse when combined with software-related technology. Critics of the surge of e-commerce patents argue that these patents may stifle the development of e-commerce (Durant, 2000). Business method patents award exclusive rights for novel techniques that perform commercial functions and are frequently expressed in computer programs achieving a particular business application (Maskus & Wong, 2002). Then, business methods appear to be applied to e-commerce simply by their incorporation into computer programs.

Amazon.com sued BarnesandNoble.com in 1999, alleging infringement of its business method patent of the 'one click' technology by which Internet customers buy products with a single mouse click (*Amazon.com Inc v Barnesandnoble.com Inc*, 1999). It is based more on the grounds of the substantive requirements for patent validity, especially the 'obviousness' and 'novelty' requirement, than the patentable subject matter (Maskus & Wong, 2002). Critics of the patented technology argued that it gives the company an unfair monopoly, making other shopping systems deliberately less efficient to avoid patent infringement and then stifling e-commerce and upcoming new commercial methods (Amazon.com and Barnesandnoble.com settle 1-click patent lawsuit, 2002; Boyle, 2008). The value of the patent system lies primarily in the disclosure of technologies that might otherwise be hoarded as trade secrets. However, many software techniques are transparent. Any Internet company with a decent programmer could imitate the computer system without breaking and copying its code (Gleick, 2000). Therefore, Barnes & Noble programmers did not need to spy on Amazon's patent to adopt one-click ordering technology.

2.2.2. Disclosure Requirement

Software and business methods traditionally relied on copyrights and trade secrets protection. However, neither requires formal disclosure of their technical information or data (Maskus, 2000).

[10] Mathematical algorithms were originally excluded from patentability as a form of abstract ideas. See *Diamond v Diehr*, 450 US 175 (1981); Business method has been excluded from patentable subject matter, see *Hotel Sec Checking Co v Lorraine Co*, 160 F 467 (2d Cir 1908).

Patents are exclusive rights granted for a limited period to inventors in exchange for the disclosure of inventions, including how to make and use the invention (Murphy, Stramiello, Lewis, & Irving, 2015). Even playing a critical role in the patent system, patent disclosure is limited in several ways (Seymore, 2010; Fromer, 2016). In light of the disclosure requirements in the US patent system, both courts and scholars have prioritized the 'enablement' requirement, which requires that an inventor disclose the newly created innovation to a sufficient degree that one skilled in the art can make and use it.[11] Enablement requirement, as the minimum standard, is incorporated into TRIPS Article 29.1.[12] In this sense, the patent disclosure requirement guarantees that others can practice the invention freely and effectively once the patent term expires (*United States v Dubilier Condenser Corp*, 1933).

The modern patent system might be criticized for being deeply flawed in its ability to deliver on the promise of the disclosure requirement. In practice, industries would like to afford that information and knowledge another layer of protection as trade secrets, even in a *sui generis* system. Therefore, while more empirical study is needed to explore the role of patents in technology transfer, affording a new IPR in databases was adopted in the European Union (EC Database Directive, 1993). It further undermines that scientists, universities, and entrepreneurs retain control of data and technical information even after publishing research results in articles or after public disclosure for the purposes of filing patent applications on such results (Reichman & Uhlir, 2003; Esanu & Uhlir, 2003). While know-how and trade secrets are critical for practicing and commercializing patented technologies, the information disclosed by patent applicants is insufficient for practicing the technology and further inventions (Lee, 2022). Developing countries should adopt the best mode provision to ensure that the patent applicant does not withhold information useful to third parties (Commission on Intellectual Property Rights, 2002). Accordingly, reframing the disclosure requirement is warranted for better practicing the transferred technology, especially for the technology involving advanced and specialized knowledge and information. However, one scholar maintained that the disclosure requirement should not require intensive tacit knowledge transfer as part of the patent *quid pro quo* but rather direct interaction between technology generators and adopters (Lee, 2022).

The European Economic Community has recognized the significance of ancillary trade secrets and know-how in transferring technology. The preamble to the Commission's 1976 proposal recognized that:

> It is appropriate to extend this Regulation to patent licensing agreements containing ancillary provisions concerning the assignment or the right of use of secret manufacturing processes or know-how relating to the use or application of industrial technology, as in practice patent licensing agreements with such ancillary provisions are very frequent (Commission of the European Communities, 1979).

Enterprises in developing countries normally lack the technical skills and infrastructure needed to

[11] More specifically, it is one of three primary disclosure requirements in the US patent system – 'enablement', 'written description' and 'best mode'. See Patent Act, 35 U.S.C. §112 (1952): "The specification shall contain…and of the manner and process of making and using it, in such full, clear, concise, and exact terms 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."

[12] See TRIPS Article 29.1: "Members shall require that an applicant for a patent disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art..."

practice new processes or products under the patent licensing agreement. Know-how can be described as the method of manufacture or the technical knowledge relating to using and applying industrial technologies (Correa, 1981). Know-how agreements ensure the disclosure of inventions to third parties through legal channels, and thus will not infringe upon the patent system. Technology transfer license in this context should involve soft technology, such as technical information, training at supplying parties' plants, technical assistance, and quality control methods, in addition to a set of supplies and services (Correa, 1981). Furthermore, know-how and technical information transfer can be ancillary to a patent licensing contract.

3. Patent and E-commerce Technology Transfer in CAREC FTAs

3.1. Patent Protection for E-commerce Technology in CAREC Countries

CAREC members, such as Kazakstan, have realized the challenges of digitization in the IP sector and technology transfer.[13] Article 13.2 of the Vietnam–Eurasian Economic Union FTA states that e-commerce means 'trade with the use of electronic technologies' and electronic technologies means 'a combination of software and hardware that provides interaction between the persons of the parties using an electronic document.' Six CAREC members participated in the Eurasian Patent Convention: Azerbaijan, Georgia, Kazakhstan, the Kyrgyz Republic, Tajikistan, and Turkmenistan. Article 14 of the Convention clarifies that disclosures of the invention will not affect the patentability (Eurasian Patent Convention, 1995). Rule 3 in chapter 2 of the Patent Regulations under the Eurasian Patent Convention list excluded the listed subject matter, as such, from patentability, including 'discoveries; scientific theories and mathematical methods; presentation of information; methods of economic organization and management; algorithms and computer programs' (Patent Regulations under the Eurasian Patent Convention, 2013). Accordingly, all six countries implement patentability standards in their national patent law. For example, Kazakhstan Patent Law excludes computer software, algorithms, and methods of doing business from patentability.[14]

Chinese Patent law adopts a more flexible approach. Even though it does not explicitly rule out patentability for computer programs in Patent Law, China does not allow computer programs as such to be patented.[15] Article 2.2 establishes that an invention must be a technical solution relating to a product, a process, or an improvement thereof. Section 2 in Part 2, Chapter 1 of the Guidelines for

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[13] Boyan Konstantinov, 'Promoting Innovation and Technology Transfer That Leaves No One Behind,' 28 APRIL 2020. https://www.undp.org/kazakhstan/blog/promoting-innovation-and-technology-transfer-leaves-no-one-behind

[14] See Chapter 2, Article 6.3 of the Republic of Kazakhstan Patent Law (as amended up to Law of No. 378-V of 31 October 2015, came into force on 1 January 2016.). Some countries use 'methods of organisation and management of the economy' (such as Kazakstan), while others use 'methods of organisation and performing for intellectual activity and for business activity' (such as Azerbaijan) or 'schemes, rules or methods for doing business' (such as Mongolia). Some use 'computer software and algorithms' (such as Kazakstan), while others use 'algorithms and computer programs' (such as Azerbaijan, Georgia, and the Kyrgyz Republic). Even though there are some differences in terminology, this article does not differentiate them and collectively refers to them as computer software and algorithms (or computer programs) and business methods.

[15] See Article 25 of The Fourth Amendment of Chinese Patent Law (2021): 'For any of the following items, no patent right shall be granted: (1) scientific discoveries; (2) rules and methods for mental activities; (3) methods for the diagnosis or treatment of diseases; (4) animal and plant varieties; (5) nuclear transformation and substances obtained by means of nuclear transformation; and (6) designs for the pattern or/and color on printed matters mainly used as marks.'

Patent Examination[16] recognizes Article 2.2 of Patent Law considering the technical solution provided by an invention and further defines technical solution as 'collection of technical means employing natural law to solve technical problems.' Section 4 claims that a business model containing both business rules and methods as well as technical solutions should not be excluded from the possibility of obtaining patent rights. Yet, the business method is not listed in the non-patentable subject matters under Article 25(1) of Chinese Patent Law. Section 2 in Part 2, Chapter 9 clarifies the examination standards for patent applications involving computer programs and admits the possibility of affording patents for computer programs with technical solutions. Guideline Section 6 in Part 2, Chapter 9 covers specific rules on patents for business methods implemented by computer programs. It instructs that the examiners should take all the contents as a whole and evaluate the technical contributions involved, the technical problems solved, and the technical effects obtained, rather than simply separating the technical features from the algorithms or business rules and methods. Therefore, the e-commerce method inventions contain a mixture of technical and non-technical features. The 'non-technical features' are intrinsic features that are not eligible for patent protection—for example, scientific discoveries, mathematical models, and business methods (Lee, 2022).

Pakistan adopts a similar approach of not explicitly excluding computer software and business methods from the patentability, but instead considering the technical or scientific advancement (PakPat World Intellectual Property Service, 2017). The 'mere discovery of any new property or new use for a known product or process' is not the patentable subject matter in Pakistan (IPR Toolkit—Pakistan: Patents, 2016). Patent law has not come into force in Afghanistan so far, but it is expected to do so soon. The Law of the Republic of Tajikistan 'On inventions' (Article 6 Conditions for Patentability of an Invention) proposed that a technical solution shall be recognized as an invention and granted legal protection if it is new, involves an inventive step and is industrially applicable.[17] Therefore, the patentability of an invention should be assessed by applying the substantive patent protection standards.

3.2. E-commerce and Technology Transfer Provisions in FTAs

Empirical studies show that preferential trade agreements have largely shaped the regulatory environment for digital trade (Banga et al, 2021). Against this backdrop, economies interested in digital trade have turned to bilateral and regional agreements to advance the development of norms and rules (Burri & Polanco, 2020; Monteiro et al, 2017).[18] While several FTAs, particularly those led by the United States, have a separate chapter for e-commerce rules (Willemyns, 2020), others

[16] 专利审查指南［2021 Guidelines on Examination of Patents］ (promulgated by Order No. 55 of the State Intellectual Property Office, came into force on 15 January 2021). https://www.zhycip.com/wp-content/uploads/2022/11/%E4%B8%93%E5%88%A9%E5%AE%A1%E6%9F%A5%E6%8C%87%E5%8D%97%EF%BC%882021%EF%BC%89.pdf

[17] Tajikistan, https://www.wipo.int/export/sites/www/scp/en/exceptions/replies/tajikistan.pdf; also Azerbaijan, Questionnaire on Exceptions and Limitations to Patent Rights, see https://www.wipo.int/export/sites/www/scp/en/exceptions/submissions/azerbaijan.pdf

[18] More specifically, out of 346 in-forced FTAs in the period 2000-2019 analysed by Mori and Rodgrigo, 184 contain provisions relevant to e-commerce, with 108 FTAs having specific e-commerce provisions and 78 having dedicated e-commerce chapters.

include e-commerce provisions under other relevant chapters on goods and services.[19] Furthermore, later FTAs are inclined to have supplemented provisions in addition to a separate e-commerce chapter.[20] These chapters directly or indirectly address many questions of the WTO Electronic Commerce Programme that have been discussed but remain open (Wunsch-Vincent, 2006). Thus, in this sense, they represent an attempt to compensate for the stagnation and ensuing uncertainties in the WTO framework. For instance, most chapters recognize the applicability of WTO rules to electronic commerce.[21]

CAREC countries also recognize that FTAs increasingly include e-commerce provisions, enhancing cooperation among parties in e-commerce development (Burri et al, 2020). For example, Article 13.6 of the Vietnam–Eurasian Economic Union FTA emphasizes the 'Cooperation on Electronic Technologies in Trade,' recognizing the 'necessity of participation in bilateral, regional, and multilateral fora on establishing legal frameworks regulating electronic commerce.' More specifically, out of in-forced CAREC FTAs, 20 incorporate specific e-commerce or IP in a separate chapter or article, occupying a small segment (see Figure 1).[22] In addition, China and Georgia lead the way in terms of the number of FTAs with IP or e-commerce provisions (see Figure 2). Other CAREC countries—except Mongolia—are engaging in FTAs with IP or e-commerce provisions as members of the Eurasian Economic Union (EAEU)[23] or Economic Cooperation Organization.[24] Thus, it warrants improving the negotiation capability of the CAREC countries with extra-bloc based on intra-bloc integration.

On the other hand, 75 percent of the FTAs with e-commerce or IP provisions were negotiated between developed and developing countries, including CAREC countries, and only 25 percent between CAREC countries and other developing countries (see Figure 3). This gap demonstrates that developed countries have FTA as a tool to promote developing countries improving policy design on e-commerce. However, the e-commerce provision in CAREC FTA does not directly tie the parties' commitments to technical assistance in e-commerce, despite endorsing a policy principle that would enhance cooperation and foster the growth of e-commerce between the parties (ESCAP, 2018).[25]

FTAs extend the TRIPS IP standards and incorporate e-commerce provisions, which are more likely to intrude on trade or regulatory issues rather than the substantive IP rules concerning technology transfer and e-commerce (Maskus, 2018). Within the 'forced localization' framework, 'forced'

[19] The US–Jordan FTA is the first trade agreement with e-commerce provisions signed in October 2000. The 2003 Australia–Singapore FTA is the first to include a separate 'chapter' regulating e-commerce.
[20] The US–Mexico–Canada Agreement largely follows agendas set by the Comprehensive and Progressive Agreement for the Trans-Pacific Partnership, and it includes rules in a chapter on 'digital trade' that goes beyond issues on e-commerce to cover related aspects of digital and data.
[21] For example, US–Singapore FTA Article 14.1; US–Australia FTA Article 16.1.
[22] China–Australia FTA, RCEP, China–Korea FTA, China–Switzerland FTA, China–Costa Rica FTA, China–Iceland FTA, China–Peru FTA, China–Singapore FTA, China–New Zealand FTA, China–Chile FTA, China–US FTA, Vietnam–EAEU FTA, Treaty in EAEU, EAEU–Serbia FTA, Economic Cooperation Organization Trade Agreement, Mongolia–Japan FTAs, Georgia–UK FTA, Georgia–Hong Kong FTA, Georgia–EFTA FTA, and Georgia–EU Deep and Comprehensive FTA.
[23] Member states include Armenia, Belarus, Kazakhstan, the Kyrgyz Republic, and Russia.
[24] Member states include Afghanistan, Azerbaijan, Iran, Kazakhstan, the Kyrgyz Republic, Pakistan, Tajikistan, Turkey, Turkmenistan, and Uzbekistan.
[25] The principles and legislation generally include prohibiting unnecessary restrictions on e-commerce, consumer protection, data and privacy protection, cybercrime, and industry self-regulation.

technology transfer comes along with e-commerce, arousing the concerns of the technology information industry (Kelsey & Kilic, 2014). In light of non-discrimination and trade freedom, it prohibits measures imposing unnecessary regulations or restrictions on electronic commerce, typically 'data localization.'[26] Most notably, FTAs, especially the one led by the United States, are inclined to incorporate the rule prohibiting forced technology transfer requirements (Gao, 2018). Accordingly, it developed into the prohibition rules of source code transfer or disclosure requirements in e-commerce-related chapters (Dorobantu, Ostmann, & Hitrova, 2021). Article 9.11 of Mongolia–Japan FTAs provides that 'Neither party shall require the transfer, or access to, source code of software owned by a person of the other party, as a condition of import, distribution, sale, or use of such software, or of products containing such software, in its area.' The anti-unfair competition law prohibits requiring 'any party to provide confidential information, the disclosure of which would impede law enforcement, or otherwise be contrary to the public interest, or which would prejudice legitimate commercial interests of particular enterprises, public or private.'[27]

It is concerning that most CAREC FTAs neglect to address critical issues related to IP and e-commerce. Even those including IP provisions often fail to adequately address patent protection for e-commerce technologies. Most CAREC FTAs are inclined to reiterate the TRIPS principles and rules. As for the patent rules, they propose to be in line with TRIPS Articles 27 to 34.[28] Therefore, they are more likely to keep silent on the patentability and exceptions to patent protection for computer programs and business methods.[29] Only one in-forced CAREC FTA, the Mongolia–Japan FTA, Article 12.7, mentions that 'each party shall ensure that any patent application is not rejected solely on the ground that the subject matter claimed in the application is related to a computer program. Nevertheless, the provision of this article shall not prejudice the autonomy of each party to exclude from the patentability computer programs as such in accordance with the laws and regulations of each party.' Article 8.8 of EAEU–Singapore FTA further clarifies that: 'Patent applications for invention relating to computer programmes, which forms a technical solution, may be included to the patentable subject matter according to a party's laws and regulations.' Yet, this FTA was signed but is not yet in effect.

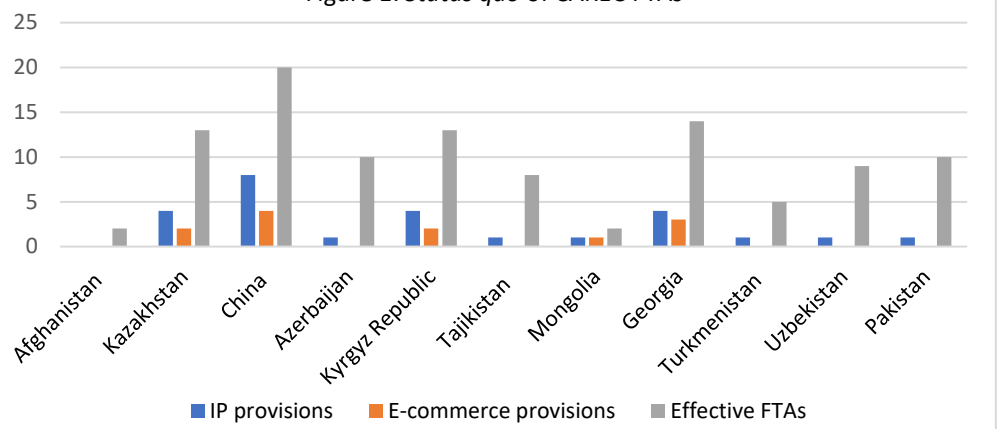
[26] For example, Article 122.1 of the UK–Georgia strategic partnership and cooperation agreement: 'The Parties shall maintain a dialog on regulatory issues raised by electronic commerce, which will *inter alia* address the following issues: (c) the treatment of unsolicited electronic commercial communications; (d) the protection of consumers in the ambit of electronic commerce, and (e) any other issue relevant for the development of electronic commerce.'

[27] See Article 97.2 of Georgia–EU Deep and Comprehensive Free Trade Area and Article 26 of Eurasian Economic Union–Serbia Free Trade Agreement.

[28] ARTICLE 9.9.1 of the Vietnam–Eurasian Economic Union Free Trade Agreement: 'Each party shall provide adequate and effective protection of inventions in accordance with its respective laws and regulations, the international agreements to which it is party and the TRIPS Agreement, in particular Articles 27 through 34.'

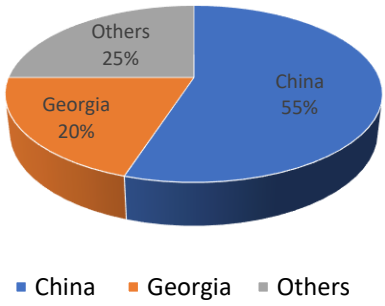
[29] Article 15.15 of the China–Korea FTA: 'Patents protection each party may also exclude from patentability:
(a) diagnostic, therapeutic, and surgical methods for the treatment of humans or animals; and
(b) plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes.

Figure 1: *Status quo* of CAREC FTAs



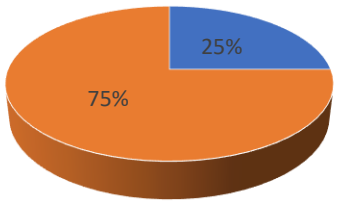
Source: Asia Regional Integration Center, https://aric.adb.org/fta-country; WIPO database, https://www.wipo.int/wipolex/en/text/228813

Figure 2: CAREC countries' share in FTAs with IP or e-commerce provisions



Source: Asia Regional Integration Center, https://aric.adb.org/fta-country; WIPO database, https://www.wipo.int/wipolex/en/text/228813

Figure 3: Parties to CAREC FTAs with IP or e-commerce provisions



Source: Asia Regional Integration Center, https://aric.adb.org/fta-country; WIPO database, https://www.wipo.int/wipolex/en/text/228813

4. Way Out for CAREC Countries: Lessons from ASEAN

4.1. Pan-CAREC FTAs

There is an imbalance in digital development across the CAREC region. Accordingly, the CAREC 2030 Digital Strategy proposes regional digital cooperation on digital transformation (CAREC Digital Strategy 2030, 2022). FTA would be an ideal tool for boosting the adoption of digital technologies to leverage existing ties and create new ones and investment in regional interoperable digital infrastructure (CAREC Digital Strategy 2030, 2022). FTA could complement the WTO framework on e-commerce with different substantive rules and exceptions to account for policy interests.

The Association of Southeast Asian Nations (ASEAN)[30] has taken giant leaps in harnessing technology to deepen economic and technology cooperation in digital trade, presenting numerous policy lessons to CAREC countries. It provides an intra-ASEAN cooperation platform and promotes extra communication between ASEAN members and other countries through regional free trade agreements. The ASEAN Plus Three Cooperation upgraded the regional economic cooperation on technology-based trade facilitation with ASEAN-plus Three Agreements: the ASEAN–China FTA, ASEAN–Korea FTA, and the ASEAN–Japan Comprehensive Economic Partnership Agreement (ASEAN, 2023). The three agreements underscore the cooperation in IP and technology transfer related to e-commerce.[31] The successful signing of the Regional Comprehensive Economic Partnership (RCEP)[32] marks a historic milestone in ASEAN countries' economic integration and development. RCEP has separate chapters for 'IP,' 'e-commerce,' and 'economic and technical cooperation.' RCEP Article 12.2.2 clarifies that the objectives of the e-commerce chapter are to enhance cooperation among the parties regarding the development of e-commerce. The historical origins and ongoing negotiations reflect that RCEP attaches great attention to the need of developing countries to acquire technical information, eliminating the barrier to practicing the transferred technology.

The significant diversity in economic resources and legal environment challenges the crafting of an integrated trade policy for the CAREC region (Samad et al, 2023). Strengthening CAREC regional economic integration and cooperation requires both intra-CAREC and extra-CAREC cooperation. Accordingly, scholars propose a 'pan CAREC' trade agreement, offering a 'promising solution for intra-bloc integration, replacing the current complex network of bilateral and multilateral agreements among CAREC members' (Samad et al, 2023). Furthermore—except for China, Georgia, and Mongolia—other CAREC members participate in the FTAs with IP or e-commerce provisions as members of the EAEU or Economic Cooperation Organization. Therefore, it warrants strengthening the intra-CAREC cooperation, then extending the cooperation model to extra-bloc regional integration with other countries by establishing a coherent regional policy framework analogical to other regional models, typically the ASEAN Free Trade Agreement and the South Asian Free Trade Agreement (Samad et al, 2023). More specifically, the pan-CAREC FTAs should also include a separate chapter to emphasize technology cooperation in addition to IP and e-commerce provisions. For example, RCEP has an individual chapter for 'economic and technical cooperation,' promoting capacity building and technical assistance on IP and e-commerce.[33] The ASEAN–Korea FTA includes

[30] ASEAN is a regional association of Southeast Asian countries. Members include Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.
[31] See Article 7.1 and Article 7.3 of ASEAN–China FTA.
[32] The RCEP is the world's largest trade bloc backed by China and a group of 15 Asia-Pacific economies, including Australia, Japan, New Zealand, and ten member states of the ASEAN.
[33] See RCEP Article 15.3.2.

an annex for 'information and communication technology' (ICT) and 'intellectual property' in addition to an 'economic cooperation' chapter.[34] Article 8 in the Annex of 'ICT' recognized the significance of cooperation in promoting e-commerce in the context of the rapid development of ICT.[35] Article 10 in the Annex of 'intellectual property' outlines how to gain economic competitiveness in the knowledge-based economy; measures enhancing IP cooperation include 'exchanging information and sharing experiences, providing assistance in facilitating the enhancement and modernization of IP databases including patents and trademarks in the territories of the ASEAN Member Countries; and strengthening mutually beneficial cooperation in the protection of IP.'

The initiative to transfer technology is proposed under 'How can countries in Asia and the Pacific best embrace frontier/emerging technologies to support trade facilitation?' (Wang, 2022). It suggests that the regional trade agreement might be an approach to better leverage technology for trade facilitation reform for least developed and small economies in knowledge transfer initiatives (United Nations Economic and Social Council, 2016). As part of the Belt and Road agenda, the Digital Silk Road was announced to build a community with a shared future in cyberspace (Kassenova & Duprey, 2021). The existing empirical study revealed that digital infrastructure and internet access are top-performing indicators of digital development in the CAREC region (Razzaq, Babayev, Ahmed, Avazov, Abbas, & Dulambazar, 2022). For CAREC economies, control of digital infrastructure technology ensures the sustainability of e-commerce and is concerned about national security in light of 'digital sovereignty.' While prohibiting requests for source code disclosure is increasingly incorporated as a hard commitment in recent trade agreements, it is a soft commitment in RCEP (Umezaki, 2021). This point is listed only as a consideration of 'recognizing the importance of dialog' in Article 12.16 of the RCEP. CAREC members should insist on TRIPS flexibility by providing more inclusive and balanced IP rules applied at all stages of development with less overall protection like RCEP (He, 2023). Like RCEP, the pan-CAREC FTAs might also assume the provision of TRIPS will prevail in case of a conflict between the provisions of the IP chapter and TRIPS.[36]

The pan-CAREC FTAs should prohibit the IP as a barrier to technology by reserving national policy space for promoting e-commerce technology transfer. In practice, the typical strategy of Chinese e-commerce companies is to form local partnerships, leverage the existing digital ecosystem to enter a market, adapt to local realities, and establish their own presence. AliExpress is an example of the flexible nature of the Chinese ICT industry's outward expansion both within and outside the Digital Silk Road framework (Kassenova et al, 2021). For example, AliExpress deploys diverse strategies and creates partnerships with different countries. In this sense, a patent license could be approached by joint ventures or technology licensing, whether a patent is a kind of investment or a licensed subject.

More significantly, the proposed FTA negotiation shall recognize the obligation of developed countries to provide technical assistance and capacity building in digital trade or e-commerce

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[34] See Annex of the Framework Agreement on Comprehensive Economic Cooperation Among the Governments of the Member Countries of the Association of Southeast Asian Nations and the Republic of Korea Kuala Lumpur, 13 December 2005, https://asean.org/annex-of-the-framework-agreement-on-comprehensive-economic-cooperation-among-the-governments-of-the-member-countries-of-the-association-of-southeast-asian-nations-and-the-republic-of-korea-kuala-lumpu/

[35] The forms of cooperation may include exchanging information and expertise, undertaking technical cooperation in areas such as network infrastructure, and providing technical assistance in the development of ICT-related projects.

[36] See RCEP Article 11.3: Relation to Other Agreements.

infrastructure and services. For example, Article 11 of the Agreement on the South Asian Free Trade Area provides special and differential treatment for the least developed contracting states, including 'greater flexibility in continuation of quantitative or other restrictions provisionally' and mandates technical assistance obligations, including negotiating a list of possible areas for such technical assistance.

4.2. Flexibility of Patent and Technology Transfer

The globalized or regional IP regime for information, technology, and creative activity will affect prospects for technology transfer, and then might be a roadblock to national and global provisions of such public goods, including scientific advances (Maskus & Reichman, 2004). Typically, FTAs, especially the ones between developed and developing countries, set even stricter rules than TRIPS (Reichman, 1995; Drahos, 2002). Since e-commerce has been an indispensable part of daily life, sharing technology in digital space might be proposed considering ideas of the 'fundamental right to technology' (Sun, 2022). The new fundamental right to technology benefits both societal and group interests, as well as global and regional interests, preventing technology from harming the common good (Sun, 2022). The concept of 'public goods' or 'common good' has been emphasized in the expanding knowledge economy (Maskus et al, 2004). The Supreme Court in *Packingham v North Carolina* considered the societal interests and public benefits generated by the contemporary Internet (*Packingham v North Carolina*, 2017). It suggested the 'commercial social networking website' is 'the modern public square,' providing the opportunity to access and share information 'on any subject' (*Packingham v North Carolina*, 2017).

Since the scope of e-commerce-related technology is broad enough to cover information, know-how, and data, the technology transfer rule is subject to different mechanisms. Foremost, CAREC FTA should afford TRIPS-consistent patent protection for e-commerce technology, as well as providing regulatory measures. A functioning IP regime facilitates access to technology by transferring ICT through foreign direct investment, joint ventures, and licensing (Park & Lippoldt, 2014). Some scholars criticized the 'bad' policies, including IP theft, forced joint ventures, and technology transfer that unfairly seek advantage (Ezell & Atkinson, 2010). Efficient licensing of protected inventions could support the development of electronic markets, both domestically and internationally. CAREC FTAs should incorporate detailed patent rules regarding e-commerce technology. Meanwhile, while taking a patent license agreement that is a direct source of technology transfer, most CAREC countries lack the core technical information for practicing the transferred technology and face the risk of trade secrets infringement. CAREC countries might propose that a patent license incorporates an ancillary know-how or undisclosed information license to facilitate its subsequent practice of the transferred technology.

Moreover, CAREC FTA negotiations should take advantage of the TRIPS patent flexibility—typically the patentability and disclosure requirements—to promote e-commerce technology transfer. The South Africa Proposal emphasizes the urgent need for reform of the governance of trade and IP to 'regulate technology patents more effectively, increase limitations on patentability criteria to avoid privatization and enable distribution to those in need, and create incentives and disincentives to generate transparency and knowledge sharing' (South Africa Proposal, 2023). Accordingly, limitation on the patentability and disclosure requirement in the patent application is critical in facilitating the technology transfer from export countries and improving the absorptive capability of the import countries.

RCEP aligns with the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)—its precedent is Trans-Pacific Partnership (TPP)—patent protection standards (He, 2023; Zhang, 2021). Since CPTPP suspends Article 18.37.2 of TPP, patents will no longer be required to be made available for 'either new uses of a known product, new methods of using a known product, or new processes of using a known product,' although Japan initially called for the protection of new uses for or new forms of known substances in RCEP negotiations (Japan RCEP Proposal, 2014). Neither RCEP nor CPTPP incorporate the new method or process of using a known product into patentable subjects. The final draft of RCEP protects undisclosed information in line with Article 39.2 of the TRIPS Agreement. It further provides limitations on protecting undisclosed information according to the objectives specified in paragraph 2 of Article 11.1,[37] including the objective to promote technology transfer.

On the one hand, considering the public good and fundamental right to technology, excluding basic technical and commercial knowledge from patentability can ensure sustainable innovation. It further requires a critical consideration of the patent protection for e-commerce-related technology and moves it towards a more balanced set of incentives. While excluding the business method, computer program, and algorithm *per se* from patentability, CAREC countries could render e-commerce business method patents in the form of novelty, non-obviousness, and practical contributions. Moreover, much research on software is forthcoming based on the relatively routine development of existing technologies. Meanwhile, the technical solution is a supplementary standard to assess the patentability of software-related technology in the e-commerce industry.

Furthermore, one of the primary objectives of the patent system is to facilitate the dissemination of technological knowledge by encouraging inventors to disclose new technology rather than keeping it secret. CAREC members should incorporate and detail disclosure requirements in FTA negotiation to facilitate access to information stored and classified in patent documentation. In addition, regional cooperation might involve a 'communication network' between national, regional, and international IP offices. It will facilitate access to valuable and extensive technological information in patent documents and constitute a comprehensive source of available technology (Skyrme, 2007).

5. Conclusion

The advancement of information technology has accelerated the digitalization of economic activity worldwide, fueling a surge in e-commerce. With the digital gap and regional economic and policy system fragmentation, FTA is critical for establishing regional digital cooperation in e-commerce outside the WTO system (Burri et al, 2020). In line with the CAREC Digital Strategy 2030 regional cooperation, the e-commerce technology transfer scheme is critical in catalyzing regional cooperation on policy design, capacity building, and digital technology cooperation.

While patents—especially rules concerning patentability and disclosure requirements—already challenge access to e-commerce-related technology, CAREC FTAs do not feature specific rules accordingly. Furthermore, the added complexity of software and computer-related technology in business models confront the patentability and the tradeoff between exclusive patent rights and the

[37] See RCEP Article 11.1.2: 'The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.'

obligation to disclose the invention as a compelling incentive to boost technology and knowledge sharing. CAREC countries face both opportunities and threats in tailoring a national and regional patent system to respond to technology transfer policy objectives while simultaneously meeting international obligations.

Regarding ASEAN's practice, it proposes a pan-CAREC FTA framework to integrate intra- and extra-bloc economic and technical cooperation. In addition, CAREC countries should keep their national patent rules consistent with the TRIPS Agreement. Patent protection could make the patented e-commerce technology subject to a patent licensing agreement as a direct source of technology transfer. Meanwhile, ancillary to a patent license agreement, a know-how agreement can complement the 'disclosure requirement,' promoting information sharing in view of the 'public good' concerns and theory of the 'fundamental right to technology.' CAREC countries should adequately consider the exclusion and limitations of patents and incorporate them into the future FTA framework. More specifically, while excluding computer programs and business methods *per se* from patentability, these can be patentable subjects on the grounds of specific technical solutions and improvements.

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