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A COMPARATIVE STUDY OF THE COPYRIGHT LAWS FOR ARTIFICIAL INTELLIGENCE IN THE UK AND KOREA

Abstract

In the new paradigm in which artificial intelligence plays a critical role in operating a social and technological system, copyright laws have many legal issues. In this paper, the copyright laws of two countries (the UK and Korea) are compared to distinguish the characteristics of major developed and emerging countries. In general, whereas major developed countries such as the US and the UK are favourable to the protection of new technology, emerging and developing countries have tried to lower the level of regulation of new technology in order to promote the business related to the new paradigm. In the case of artificial intelligence, the UK has a legal system that can cover work created by means of artificial intelligence, but in contrast, Korea has no copyright law on artificial intelligence, including computer-generated work. Thus, the emerging countries have mitigated the regulations on copyright in order to support the catch-up strategies of their companies. The copyright law on artificial intelligence in emerging and developing countries needs to be designed for fair competition and fair trade. In addition, the duration of protecting work created by means of artificial intelligence should be shortened, because artificial intelligence can produce a lot of work in a very short time. This paper compares several legal precedents in order to compare the cases of copyrights related to artificial intelligence or computer-generated works.

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Keywords

copyright – artificial intelligence – computer-generated works – major developed countries – emerging and developing countries – catch-up strategy

Introduction

Since new forms of creative work, such as music, drawing, and literature, have been continuously introduced in a creative economy, the importance of copyright has been increasingly emphasized around the world. In particular, the growth of artificial intelligence has enabled the proliferation of newer forms of works that are created by machines rather than humans.[1] If enough data is provided, artificial intelligence can generate sophisticated works of images, songs, novels, poetry, and so on, without the intervention of a human. For example, if we have a speech script, but no real video of a person, in order to deceive people, we can make a video clip in which the person talks. An artificial intelligence algorithm can create a drawing that mimics the style of Picasso by learning many of his works. Thus, the issue on the possibility of copyright of works that artificial intelligence creates is controversial among stakeholders.[2] Thus, while AI-generated outputs have actively emerged, the copyright legislation in various jurisdictions lags behind the development of technology.[3]

This research deals with copyright in the era of artificial intelligence. I found several research papers that tackle the subject, because the topic of artificial intelligence has been very fascinating recently. They mostly discussed the protectability of works which are developed by an artificial intelligence algorithm and the possibility that artificial intelligence can be a copyright holder.[4] The author is usually the starting point and

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[1] D. Ferrucci, A. Levas, S. Bagchi, D. Gondek, E. Muellerat, "Watson: Beyond Jeopardy!", *Artificial Intelligence*, 2013, 199-200, pp. 93–105.

[2] K. Hristov, "Artificial Intelligence and the Copyright Dilemma", *IDEA*, 2016, 57(3), pp. 431–454.

[3] H. Wu, "Rethinking the Copyright of Works Generated by Artificial Intelligence", *Peking University Law Journal*, 2020, 653, p. 671.

[4] D. Colin, "An evolutionary step in intellectual property rights – Artificial intelligence and intellectual property", *Computer Law & Security Review*, 2011, 27(6), pp. 601–619.

central focus when it comes to the discussion in copryright law.[5] In addition, some studies discussed whether permitting the copyright of AI-generated works would promote innovation.[6] However, most studies focus on the issues of major developed countries, such as the UK, EU, and US. It is natural to consider the importance of the issue in such countries, because their technology is more advanced than that in newly industrialized and emerging countries such as Korea and China. In Korea, after the match of AlphaGo and a Korean master in the game Go, the interest in the development of artificial intelligence technology has been exploding.[7] Even though many researchers and policymakers have an increasing interest in the technology, they have not invested their efforts and research budgets in developing artificial intelligence. Thus, the level of technology is in the embryonic stage, allowing emerging and developing countries, such as Korea and China, to follow the technology trends of developed countries. In addition, several researchers are studying the potential copyright issues of artificial intelligence, including protection and authorship. However, we saw many cases in which the catch-up strategies of the emerging and developing countries often have a critical problem with copyright, because they try to exploit the technology rather than explore it. Thus, this paper aims to define the differences in the copyright laws on artefacts that are created by artificial intelligence between major developed and emerging countries.[8]

For this purpose, this research will first analyse the copyright laws on artificial intelligence of both major developed countries and emerging countries, including the UK and Korea. The UK has been included in the major developed countries together with the US, Japan, Germany, and so on according to the IMF and the UN.[9] Since the criteria for country classifications are somewhat different and subjective, Korea has been

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[5] A. Chakraborty, "Authorship of AI Generated Works under the Copyright Act, 1957: An Analytical Study", *Nirma University Law Journal*, 2019, 8(2), pp. 37–53.

[6] M. Robles Carrillo, "Artificial intelligence: From ethics to law", *Telecommunications Policy*, 2020, 44(6), 101937.

[7] T. Sorjamaa, *I, Author – Authorship and Copyright in the Age of Artificial Intelligence*, Hanken School of Economics, Helsinki, July 2016.

[8] M. Scherer, "Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies", *Harvard Journal of Law & Technology*, 2015, 29(2), pp. 353–400.

[9] International Monetary Fund (IMF), *World Economic Outlook: Managing Divergent Recoveries*, IMF, April, 2021.

categorized as being in both developed and developing countries. However, in a recent report of the United Nations, Korea was still classified among the developing countries[10] and, according to the human development report of the United Nations Development Programme (UNDP), Korea was also classified as in the developing regions category. Thus, since the issue of whether Korea can be classified as among the developed or developing country categories is very controversial, Korea will be considered as a representative country of newly industrialized and emerging countries in this paper.[11] Therefore, The UK and Korea were chosen as among the major developed countries and emerging countries, respectively.[12] Although the perspectives on the copyright law for artificial intelligence differ according to the legal circumstances of each country, the point is that a systemic regulation in law has not been constructed in the same way in all countries. Therefore, it is critical that the differences in the perspectives and circumstances of this matter across countries be investigated. In particular, this research will examine how differently each country judges whether the creative work of artificial intelligence can be copyrighted, focusing on protectable works, originality, and authorship/ownership. This paper will analyse the differences between major developed countries and emerging countries in terms of the legal regulation and case law. Second, when it comes to the protection of work created by artificial intelligence, this research will compare favourable and opposing opinions on this issue in each country. In addition, it is interesting and important to decide who should have the copyright of the creative works. The candidates can be a developer (programmer), an owner of artificial intelligence, and artificial intelligence itself. My insight is that such arguments will depend on the perspectives of major developed and emerging countries. In general,

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[10] United Nations, *World Economic Situation and Prospects*, UN, 2021.

[11] Korea was recognized as one of newly industrialized countries (NIC) in late 20th century and newly developed countries, recently. In addition, Korea has been included as an emerging country in the MSCI index, Next eleven and Emerging Market Global Players (EMGP) of Columbia University.

[12] The country classification uses major developed economies for the UK and developing economies for Korea. In addition, IMF uses major advanced economies, and emerging markets and developing economies. Thus, I use major developed countries and emerging countries for the comparison of copyright laws in this paper to help readers intuitively understand the differences between countries.

the catch-up strategy of emerging and developing countries is aggressive in developing and applying new technology.[13] Thus, they might weaken the regulation of copyright law on this issue. Finally, I will suggest a direction to protect the work created by artificial intelligence in the UK and Korea. Various issues, such as fair dealing and registration systems, will be discussed.

Therefore, the main contribution of this research is to investigate the differences between major developed countries and emerging countries on the copyright law for artificial intelligence. In addition, this research will analyse various issues on the legal protection of work created by artificial intelligence, considering the unique characteristics of the new technology strategy that each country has. The results of this research can support the enactment of copyright law in each country. In particular, since the discussion on the copyright law of artificial intelligence has been weak in Korea, this research will be helpful to lawmakers.

This paper consists of several parts as follows: first, a literature review on the importance and technology of artificial intelligence in Section 2; then various issues on copyright law on artificial intelligence in Section 3. Sections 4 and 5 present the current status of copyright law and case law in the UK and Korea based on the copyright issues discussed in Section 3. Section 6 elaborates the discussion on the copyright laws of artificial intelligence by comparing major developed and emerging countries. Finally, Section 7 presents the limitations of this paper and offers suggestions for future research.

I. Artificial Intelligence (AI)

Since artificial intelligence has become able to solve various problems by learning without the intervention of users, its performance is almost similar to that of humans or sometimes outperforms humans in a particular area.[14] In general, artificial intelligence has worked well in pat-

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[13] M. Abramovitz, "Catching Up, Forging Ahead, and Falling Behind", *Journal of Economic History*, 1986, 46(2), pp. 385–406.

[14] E. Yudkowsky, "Artificial Intelligence as a Positive and Negative Factor in Global Risk", in Nick Bostrom and Milan M. Ćirković (eds), *Global Catastrophic Risks*, Oxford University Press, 2008.

tern recognition and mathematical calculation, judging from much existing data. In addition, as the technology of artificial intelligence has grown, the concept of artificial intelligence has expanded, including intelligence that is similar to human intelligence.

In general, the criteria to distinguish between human and artificial intelligence are three-fold.[15] First, the human mind is a critical factor to distinguish them. Having a human mind means behaving with a specific intention to a specific object. If artificial intelligence has a human mind, such artificial intelligence can be a strong type. Many researchers think that advanced artificial intelligence can recognize reality as humans do. They insist that humans can make computers that can recognize as humans can. It does not mean that artificial intelligence simply talks and acts like humans.

Second, the issue of whether artificial intelligence can think comprehensively and in an integrating way or not should be discussed. Thinking in a comprehensive and integrating way means that artificial intelligence thinks about a situation in various ways as humans do, not acting according to predefined patterns and formats. In general, computers and robots can work better than humans do in a specific area. However, comprehensive and integrating thoughts are not easy to achieve given the current level of technology. Although the functional ability of artificial intelligence can outperform humans in specific areas, such as car driving and chess games, where patterns and rules exist, it is limited to cases where mathematical computation or pattern recognition can be done.

Third, we have to evaluate whether artificial intelligence can outperform humans. If it has superior intellectual and cognitive abilities, it can conduct and replace the works of humans. In this perspective, weak and strong artificial intelligence can be classified. When artificial intelligence can work like, or better than, humans in a specific area, we call it weak artificial intelligence. If it can think comprehensively and integratively like humans, we can call it strong artificial intelligence.

Currently, the existing artificial intelligence is mostly weak artificial intelligence. Although strong artificial intelligence can be hardly implemented at the present level of technology, it is not impossible to develop it, because of the steep growth of technology and industry.

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[15] K. Hristov, *supra* note 2, pp. 431–454.

II. Issues on Copyright Laws for Artificial Intelligence

1. Protectability of Work Created by Artificial Intelligence

Authorship is one of the biggest impediments to copyright protection for outputs that are generated by artificial intelligence.[16] Traditionally, it is agreed that there is no author or need to determine authorship or ownership because AI-generated outputs are not works.[17] Thus, the issue of who are the authors of works created by artificial intelligence should be critically important in copyright law. The authors might be the programmer, the artificial intelligence itself, joint authorship of human and artificial intelligence, and/or a fictional human author.[18] In order to discuss this issue in detail, we have to investigate the definition of copyright, because it is strongly related to the definition of authors in the copyright laws.

Theoretically, drawings and music that are generated both by animals, such as chimpanzees and elephants, and by computers and software are not accepted for copyright, because the works do not include the thoughts and feelings of humans. The objective of copyright is to promote the creativity of humans by protecting their work. Thus, works that are not related to the mental efforts of humans are not an expression of thoughts and feelings that can be protected by copyright law. However, the works that artificial intelligence generates can be results of works that humans design because it learns a large amount of their works. In addition, the degree of work that is generated by artificial intelligence may be higher than that of works that animals and previous computers can make. Thus, although the existing legal system is mostly not favourable to the copyright of artificial intelligence, it should be discussed in terms of the protectability of such works.

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[16] N. Brown, "Artificial Authors: A Case for Copyright in Computer-Generated Works", Columbia Science & Technology, 2018, 20(1), p. 27.

[17] W. Qian, "Qualitative Research on the Content Generated by Artificial Intelligence in Copyright Law", (2017) 35 Legal Science (Northwest University of Political Science & Law), 2017, 35(5), pp. 148–155.

[18] T. Sorjamaa, *supra* note 7.

2. Can Work Created by Artificial Intelligence Be Works for Hire?

Works that are created as employment works by employees can belong to companies that creators are working in if a case satisfies a specific criterion. In order to apply this to copyright law, we have to check whether the works are made by a person who is employed by a company. Thus, the person in the definition means an employee, and a company that has the right to direct and control itsemployees. 'Employee' refers to a person who is subordinate to a company, and includes workers and government officials. Consequently, the concept of a work for hire in copyright law is generally associated with a human as a creator. However, if a work is generated by artificial intelligence and is designed by an employee at work, it can be admitted as a work for hire. In this case, it is controversial that even if the artificial intelligence is not a human, its work can be accepted as a work for hire.

3. Issues on Copyright Infringement

In terms of copyright infringement, we have to discuss the substantial similarity and whether a work is based on existing works or not. The claimer of a right should possess the copyright on corresponding works. In addition, the suspect who might infringe a work should make a work based on the existing works, and the imitated works should be substantially similar. Although it is difficult to validate whether a work is based on existing works or not, the 'substantial similarity' can be strong evidence for checking it. In the case of artificial intelligence, since artificial intelligence generally uses a lot of existing works to learn data, the work can be based on previous works. However, it might or might not generate a new work that is based on a specific work, because artificial intelligence uses a pattern to create a work by learning many existing works. The possibility that the output of artificial intelligence is substantially similar is not high. However, we have to check the similarity between an original work and the artificial intelligence work.

4. Issues on the Protection of Big Data that Artificial Intelligence Generates

In a big-data era, the issue of the protection of a database has been critical in copyright law. In particular, a *sui generis* right protects the database that is produced by a substantial investment from its extraction or re-use. An important issue will be the point that a non-creative database will be protected as a right of the database producer by the *sui generis* right. Thus, we should check if big data that is created by strong AI is classified as such a database.

If the works that artificial intelligence creates are creative, it is irrelevant that the *sui generis* concept that deals with non-creative works is applied to the artificial intelligence case under the logic of the protection of database investors. Thus, the *sui generis* right has different targets that can be distinguished from the work created by artificial intelligence in terms that they might be creative. It is very critical to discuss the protection of databases, because artificial intelligence should use a large database and then create even more data as a result of learning. The database that the artificial intelligence generates can be creative, because it can make new drawings and music based on the existing works. Thus, it cannot be explained by the *sui generis* right and a different aspect should be employed to tackle this issue.

5. Legal Issue of Crawling

In order to apply artificial intelligence to developing a work, a database should become ready by collecting data from many websites and databases. An artificial intelligence system normally includes the data-crawling module to collect the analysis data. When a weak AI that is directed by people carries out the crawling of data from web pages without permission to generate a database, the issue of copyright law can be on the table. If artificial intelligence performs a crawling exercise on the contents of data against the will of the database creators, the operators or managers of the artificial intelligence could be breaking the copyright law. Since it must be a person who infringes the copyright

law, 'invisible' artificial intelligence cannot be an object that infringes the copyright of existing works. Thus, if a weak AI collects data without permission by crawling, the agent who infringes the copyright is the operator or manager who orders the data collection rather than 'invisible' artificial intelligence. However, we cannot clarify who infringes the copyright in a case of the strong AI in this stage. The issue should be dealt with when such cases happen in the future.

III. AI Copyright Laws of the UK and Korea

1. The UK

1.1. The Possibility of Copyright of Work Created by Artificial Intelligence

In the UK, Article 178 of CDPA 1988 presents that a computer-generated work can be defined as a work that is created without the intervention of humans. Thus, a work created by artificial intelligence can be affected by this Article:*"computer-generated, in relation to a work, means that the work is generated by computer in circumstances such that there is no human author of the work"*. The Article can be applicable to the protection of work created by artificial intelligence, because the word 'computer-generated' means that there was no involvement of humans in the process of creating the work. This provision regulates the copyright of work in which a computer is used and provides the opportunity that the coverage of copyright can be extended by the advancement of technology. When the CDPA 1988 was regulated, the computer technology used was a simple tool for which the control and intervention of humans were very involved. Thus, the right should be conferred on the humans who created the technology. However, current artificial intelligence creates many works by self-learning without the intervention of humans. Thus, if artificial intelligence can create a work autonomously, the provision cannot be intactly applied to the case of artificial intelligence. Since the CDPA was made in 1988 and the deep learning technology appeared in the late 2000s, the

Article was not inserted to regulate the copyright law for computer-generated works, considering the artificial intelligence technology.

1.2. The Possibility That Artificial Intelligence Can Be a Copyright Holder

The authorship should be clarified in order to analyse the perspective on the works created by artificial intelligence. In Article 9–3 of CDPA 1988, the author of the computer-generated works can be a person who arranges for the creation of works:"*In the case of a literary, dramatic, musical or artistic work which is computer-generated, the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken*." Therefore, artificial intelligence cannot be a copyright holder under Article 9–3 of CDPA 1988, which seems to be clear, because a person should tackle an infringement problem when the infringement of a work is suspected. Since artificial intelligence is nonphysical, it is impossible for it to be a plaintiff or defendant.

1.3. Different Treatment of AI Works in Comparison with Other Works

In the UK, the Articles about computer-generated works provide for exceptions. In the copyright law, the right to be identified as author or director has been restrained in several cases. Article 79-2 (exceptions to right) in the CDPA 1988 describes that the right conferred by section 77 (a right to be identified as author or director) is subject to the following exceptions:"*The right does not apply in relation to the following descriptions of work (a) a computer program; (b) the design of a typeface; (c) any computer-generated work*." In addition, the right conferred by section 80 (right to object to derogatory treatment of work) is subject to the following exceptions by Article 81-2 of CDPA 1988: "*The right does not apply to a computer program or to any computer-generated work*."

Even though the definition of computer-generated works provides the possibility that work created by artificial intelligence can be protected by

copyright law, the aforementioned exceptions explain that copyright law does not permit authorship by computers and artificial intelligence.

Finally, the period of copyright protection is different between regular works and works created by artificial intelligence. Although the period of protection of regular works in the copyright cases is 70 years in Article 12 of CDPA 1988, the computer-generated work can have 50 years. Thus, although the UK copyright law opens the possibility of copyrighting works created by artificial intelligence, the level of protection is relatively lower and less stable than for regular works:

> In Article 12, (2) copyright expires at the end of the period of 70 years from the end of the calendar year in which the author dies, subject as follows. (7) if the work is computer-generated, the above provisions do not apply and copyright expires at the end of the period of 50 years from the end of the calendar year in which the work was made.

2. Korea

2.1. The Possibility of Copyrighting Works Created by Artificial Intelligence

Under Article 2, subparagraph 1 of the Korean Copyright Act, a copyrightable work can be defined as "a creative work that expresses the ideas and emotions of human beings". The creative works that the copyright law of Korea defines include the nature and personality of human beings. Since humans possess autonomy and free will, humans have a right to carry out their wills with a unique personality. Thus, Korea has not discussed the perspectives of artificial intelligence in the copyright law. Although Korea has shown steep growth in high-end technology, this country has only slowly accepted the protection of copyright for artificial intelligence technology in general. In order to promote the growth of its innovation-oriented economy, the emerging and developing countries also need to protect the works created by artificial intelligence.

2.2. The Possibility of Artificial Intelligence as the Copyright Holder

Article 2, subparagraph 1 of the Korean Copyright Act defines an author as a person who creates the copyrighted works. In addition, the author can have moral and economic rights by Article 10 (1) of the copyright law of Korea. Moreover, under Article 10 (2), the copyright can automatically occur without any processes and formats after a work is created. It means that only a human can be a copyright holder, because no one and nothing except a human can get a right to the output by creative behaviour under the current copyright law of Korea. Consequently, even if an artificial intelligence creatively makes a work, it cannot be a copyright holder in Korea.

2.3. The Possibility of Work Made for Hire by Artificial Intelligence

Under Article 2, subparagraph 31 of the Korean copyright law, a work made for hire is defined as a work made professionally by a person engaged in the duty of a juristic person, organization, or other employer according to the plan of the person. Article 9 of the copyright law prescribes that when a work made for hire is made public in the name of a juristic person, its author shall be the relevant person, unless otherwise stipulated in the contract or work regulation, etc. Although patent rights can be given to employees who invent the technology, the work made for hire originally gives the rights to a person who is a user. This is an exception to the creator principle which means that the ownership of copyright belongs to the creator, because a work can be created by the collaboration of people, and the relationship of work to owner needs to be simplified in order to facilitate the use of copyrighted works.

The relationship between a juristic person and an employee is similar to that of artificial intelligence and its owner. However, this Article cannot be applied to a work created by artificial intelligence under the current copyright law, because the Article was made for humans. If the work that artificial intelligence creates can be a work made for hire, the juristic person can have the copyright to the work for which an artifi-

cial-intelligence owner presents the direction of the work and artificial intelligence makes a real work.

IV. Legal Precedents Relating to Artificial Intelligence

1. The UK

The case law that artificial intelligence technology is involved in is very unusual, because the level of technology is not perfect and the business use of the technology is immature. However, the case law related to computers (including databases and software) can be extended to artificial intelligence cases. Thus, in this paper, the computer-related case law is analysed to investigate the cases of copyright law relating to artificial intelligence technology.

1.1. Nova Productions v. Mazooma Games

The idea/expression dichotomy has been an important issue for a long time. The case of Nova v. Mazooma is a Court of Appeals decision about the idea/expression dichotomy.[19] This legal precedent is very important, because it provides a clear judgment by the Court of Appeals on the application of the idea/expression dichotomy to computer programs.[20] Moreover, we can judge whether the copyright law can be applied to computer games or artificial intelligence.

As Judge Learned Hand in the US case of Nichols v. Universal Pictures noted, the dichotomy between ideas and expressions is difficult: many patterns of increasing generality will fit equally well, as more and more of an incident is left out. The last may be no more than the most

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[19] *Nova production LTD v. Mazooma games LTD*, [2007] EWCA Civ 219, Judgment of 14.3.2007.

[20] J. Harrington, "The games people play: Nova Productions v Mazooma [2007] EWCA Civ 219 in the Court of the Appeal", *Computer Law & Security Review*, 2007, 23(5), pp. 471–475.

general statement of what the work is about, and at times might consist only of its title; but there is a point in this series of abstractions where they are no longer protected, since otherwise the author could prevent the use of his ideas to which, apart from their expression, his property is never extended.

When it comes to computer programs, the software directive is related to the idea/expression dichotomy. Recital 13 of the software directive indicates that for the avoidance of doubt, it has to be made clear that only the expression of a computer program is protected, and that ideas and principles that underlie any element of a program, including those which underlie its interfaces, are not protected by copyright under this Directive. In addition, Article 1(2) of the software directive said that protection in accordance with this directive shall apply to the expression in any form of a computer program. Ideas and principles that underlie any element of a computer program, including those which underlie its interfaces, are not protected by copyright under this Directive.

In the first decision in January 2006 of Kitchin J, this case can be summarized as follows. Nova developed computer games and produced a pool game called 'Pocket Money'. Then, Nova claimed that the defendants, Mazzoma Games and Bell Fruit Games, copied Pocket Money, infringing its games. The textual copying of the code was not alleged. Instead, Nova claimed that the defendants copied many features of Pocket Money. Kitchin J decided that, although the two games had considerable similarities, the games of the defendants were played differently from Nova's game. Most of the similarities were commonplace, being classified into Lord Hoffman's second category of non-protectable ideas. In addition, uncommon similarities that were inspired by the game of Nova included the general concept of the pool theme. The judge found that there had been no infringement, because the items alleged to be copied fell on the wrong side of the idea/expression dichotomy, as follows:

> The similarities found to have been derived are cast at such a level of abstraction and are so general that I am quite unable to conclude that they amount to a substantial part of the computer program. They are ideas which have little to do with the skill and effort expended by the programmer and do not constitute the form of expression of the literary work relied upon.

In the Court of Appeals, Jacob LJ held that the idea/expression dichotomy was intended to apply to software as to other literary works. Since the idea of Nova's computer game was very generalised, it could not form its substantial part. From the Software Directive, the expression can be protected, allowing this to be applied to all the range of computer systems. Jacob LJ commented that Pumfry J was quite right to say that merely making a program that will emulate another, but which in no way involves copying the program code or any of the program's graphics, is legitimate.

1.2. Express Newspapers Plc. v. Liverpool Daily Post & Echo Plc

In 1981, the UK government announced a Green Paper about the copyright of computer-generated works. The paper insisted that the computer was analogous to a tool by which a work can be created and that a person who is responsible for operating the computer to create a new work should be an author. In the case of Express Newspaper plc. v. Liverpool Daily Post & Echo Plc., the plaintiff ran a competition called 'Millionaire of the Month' that involved the distribution of 22 million cards to the public having a cash code of five letters in sequence.[21] People could find out whether they had won or not by checking the number of their cards in the plaintiff's newspapers. Anyone who had a card could participate in the competition, and buying a newspaper was not a requisite for entry into the competition.

The winning sequences of five rows of five letters were generated by computer. The defendants who published the winning sequences in their newspapers claimed that the sequences of letters that were created by a computer had no copyright. They thought that there was no human author in the process of generating the sequences of letters. However, Whitford J. rejected the claims of the defendants, saying that the computer was no more than a tool in generating the winning sequences of letters. Most importantly, a person who writes a computer program does not control the computer and decide which data is entered in

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[21] *Express Newspapers plc v. Liverpool Daily Post & Echo Plc and Others*, [1985] 1 WLR 1089.

a computer system. A computer program that works by using random numbers generated by the program requires a number that is entered as a seed number for the random number generator. Since a computer is useless itself, a programmed computer can operate various functions according to the objectives of programs, such as a word processor, a game machine, or a scheduler.

After that, the UK parliament created section 9(3) of the Copyright Designs and Patents Act 1988: "*In the case of a literary, dramatic, musical or artistic work which is computer-generated, the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken.*"

1.3. The Newspaper Licensing Agency Limited v. Meltwater Holding BV

The Newspaper Licensing Agency licenced the newspaper contents on behalf of the copyright owners of news under the Copyright Designs & Patents Act 1988. The issue was whether users of a news aggregator service can copy and distribute the news contents without a licence.[22] The plaintiffs claimed that the defendants trawled the websites of newspapers and redistributed the news to the subscribers. The defendants denied that they required a licence from the plaintiffs.

The judge held that the defendants should get a licence from the claimants to lawfully receive and use the news from Meltwater news service. The headlines that the Meltwater News reproduced from various articles can be literary works independently from the original articles. Thus, the copies of Meltwater News and the article itself that the end-user's computer made are an infringement of the publisher's copyright.

Proudman J said as follows:

> The effect of Infopaq is that even a very small part of the original may be protected by copyright if it demonstrates the stamp of individuality reflective of the creation of the author or authors of the article. Whether it does so remains a question of fact and degree in each case. It is often a matter of im-

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[22] *The Newspaper Licensing Agency Limited v. Meltwater Holding BV,* [2011] EWCA Civ 890.

> pression whether use has been made of those features of the article which, by reason of the skill and labour employed in its production, constitute it an original copyright work. Is there merely a commonplace arrangement of unoriginal words (see Ladbroke at 276) as Mr Silverleaf submitted? Or has substantial use been made of the skill and labour which went into the creation of the original work?

Although Infopaq International v. Dankse Dagblades Forening is a case from Denmark, it has provided a critical foundation for computer-generated works to the UK cases.[23] The Danish copyright case on the automated summary production of news articles was referred to the European Court of Justice (ECJ). Infopaq scanned the publications, converted the scanned images into texts, and retrieved searching words in the texts. The 11 words that came before and after a searching word were extracted to improve the process of searching words in texts. The ECJ held that 11 words of a sentence could be considered to be a creative work and protected by copyright law. Dankse Dagblades Forening insisted that the extract of 11 words was a reproduction that was protected under Article 2(a) of the Infosoc Directive No. 2001/29 and not exempted from protection under Article 5(1) of the Infosoc Directive. The Court considered important issues on the interpretation of the exclusive rights to control the reproduction of a work and the scope of the mandatory exception for temporary acts of reproduction.

From three cases related to UK copyright laws, we can understand that the UK has an advanced legal system where computer-generated works can be protected by copyright law. In addition, the copyright of computer-generated works is conferred on a human who creates them in the UK. Thus, the UK already established a scalable system that the works of artificial intelligence can be allowed to be copyright.

2. Korea

In Korea, although the technology on artificial intelligence is in the early stage of growth, various products or services have not been introduced in practice. Thus, the legal wrangle on the copyright of artificial intelli-

[23] *Infopaq International v. Dankse Dagblades Forening,* (C-5/08) EU:C:2009:465.

gence has not been reported in records of Korean legal cases. However, a lot of potential trials in court will be held in the era of the fourth-generation industry. In this chapter, several cases related to the copyright of artificial intelligence will be presented to investigate the past and current status of legal discussion on the copyright of artificial intelligence.

2.1. Rigveda Wiki Mirroring Case

Rigveda Wiki is a Wiki site that came from an internet community, Angelhalo. This service ranked fifth in terms of the number of registered documents in 2016, which was more than 220 thousand. This site is very distinctive in collecting cultural information on movies, music, game, animation, and so on. In general, Wiki sites hardly provide updated and accurate information on content which is not popular and recent, because internet users directly write and modify the information in the process of implementing a database. In spite of that, Rigveda Wiki has become popular by implementing the database of cultural information and enabling users to participate in actively adding and modifying the information. This characteristic has a limitation, in that it is easy to describe an object, but the site does not request the source of all the sentences, making the information less reliable or worse and the source of information unclear, particularly when an author writes an article based on subjectivity.

In 2009, an Internet site operator called 'Enhawiki Mirror' that mirrored the contents of Rigveda Wiki was launched. The Enhawiki Mirror website mirrored and provided the contents of Rigveda Wiki to users when they felt inconvenienced because of the unstable service of the Rigveda Wiki. The site was operated by presenting copied contents of Rigveda Wiki when new contents were updated on the site of Rigveda Wiki. In addition, the 'Enhawiki Mirror' earned revenue from advertising on its website and did not share that revenue with Rigveda Wiki. The plaintiff alleged violations of licence agreements, copyright infringement (rights to post, editorial work, and database producers), and violations of the Unfair Competition Prevention Act. The court accepted the violations of the Unfair Competition Prevention Act for the online encyclopedia site operation business. However, the court does not ac-

cept the plaintiff's claim that it was the copyright holder of the post, the copyright owner of the edited work, and the database producer. Since the post of the Rigveda Wiki had been freely created and modified without any charge to the general public, 'donation of the post' according to the terms of the Rigveda Wiki is free. In addition, the plaintiff's claim was judged to be invalid because it was a contract that had lost fairness against the principle of good faith even when viewed as a copyright transfer contract. Since the plaintiff did not perform the work of collecting, judging, arranging, or linking the posts directly, it was difficult to judge that they had made a considerable effort over the edited work or database. This ruling confirms the principle that the author of the post is the copyright holder and that the transfer of the copyright must have an explicit or equivalent statement of intent. In addition, the site operator cannot claim to be the copyright owner of the postings on the internet site based solely on one-sided terms. The judge's judgment was based on the principle of copyright law that it is difficult for the operator of the Internet site to claim the copyright of the post.

2.2. Job Korea Case

The plaintiff, Job Korea, is a company that has an online recruiting service and an information-providing service. The defendant, SaramIn, is a similar company that runs a similar business, having a website. The plaintiff claimed that the defendant posted recruiting information of the plaintiff without its consent. The court judged that the defendant visited a lot of websites, copied a large amount of information automatically by the crawling process, and then posted the copied information on its website.

In terms of the database of recruiting information, the plaintiff had invested time and money in collecting, classifying, and updating the information. On the website, the plaintiff announced that the information was edited and modified from the data that was provided by companies. Thus, since the plaintiff had made a considerable human and physical investment to make its website, the generator was the plaintiff. The defendant repeatedly collected information by crawling the website of the plaintiff for the purpose of business, copying the recruiting

information and storing it on the website service. The defendant would unduly undermine the benefit of the plaintiff, the database creator, by repeatedly and systematically replicating the job information of the plaintiff's database for the purpose of use in the defendant's business without the expenditure of marketing expenses. Therefore, it is reasonable that the plaintiff's rights to the database as its maker was infringed through the posting activity of the defendant in terms of Article 93 (2) and (1) of the copyright law of Korea. Thus, the defendant cannot reproduce, produce, distribute, sell, or post it on the defendant's website, and has the obligation to dispose of the HTML source of the website posted and kept on the defendant's website.

2.3. Samsung SDS Case

In 2005, the supreme court held in the case of Samsung SDS that the copyright belonged to a person who had a responsibility. We can infer who had the copyright on the computer program using artificial intelligence robots. In this case, the court explained that the defendant got a subcontract on a project that was just a system implementation from the plaintiff. Since the contract was not about the change of blueprint and the drawing of approved blueprints, the copyright of the blueprint change still belonged to the plaintiff. In the process of the project, when the change of blueprint was necessary, the defendant suggested the change to the plaintiff who had the right of making and changing the blueprint. Even if sometimes the defendant interacted with the client and substantially changed the blueprint, the change of facilities, the selection of layouts, and the change of blueprint were decided by the plaintiff. The defendant just revised the blueprint according to the decision of the plaintiff. Thus, the court announced that the defendant supported the blueprint change and the copyright owner was still the plaintiff.

From this case, we can infer who can get the copyright of work created by artificial intelligence according to the ruling of this case that considered a person who has the authority for writing and changing the blueprint to be an author. Since the ruling presented that an author can be identified by considering the criteria of copyrights (who decided on the change of facilities, the selection of layouts, and the change of blue-

prints), we can understand that a person who has real rights on work created by artificial intelligence will be an author. For example, in a media company, the company may possess artificial intelligence systems. Thus, in this case, the copyrights can be offered to a user rather than a producer of the artificial intelligence systems.

Three representative Korean cases related to artificial intelligence are presented and discussed in this section. In Korea, a work generated by artificial intelligence cannot be protected by copyright law because in the copyright law of Korea a creative work can be made only by a human. It is clear that the copyright owner should be a person who makes a creative work in Korea. Thus, the Korean legal system still seems to be conservative in allowing the copyright of works generated by artificial intelligence.

V. Comparison of AI Copyright Laws of Major Developed and Emerging Countries

1. Technological Innovation of Major Developed Countries and Emerging Countries

Although technological innovation has been regarded as a critical factor for economic growth, traditional economists did not appreciate its value. For example, the neo-classic school that Solow had advocated since the late 1950s held that if capital investment is done over the steady-state, the ratio of capital and labour decreases and companies restrain their investment because of the diminishing returns. Based on the Solow model, a lot of studies dealt with long-term economic growth, showing the empirical results of influential factors for long-term economic growth. They believed that labour productivity is increased by capital accumulation, and technological advance is a residual that is not explained by the increase of capital intensity. However, when, in 1980, the low economic growth and high unemployment rate could not be explained by the economic growth theory of the neo-classic school, a new growth theory was proposed: that technological innovation depends on the invest-

ment of physical and human resources.[24] In this theory, the investment of the physical and human resources amounts to advancing technology by 'learning by doing', emphasizing the fact that economic growth depends on the amount of resources to be used for R&D activities, the degree of the application of new technology to the industry, and so on.

Since 1960, many researchers have had an increasing interest in the gaps of growth rate between developed countries and emerging and developing countries. The neo-classic model estimated that GDP per capita of all countries will grow ultimately at the same rate under the assumption that technology has a characteristic of being a public good. Thus, a country that has a low capital-labour ratio can achieve high capital accumulation and economic growth, narrowing the gap of productivity and income between developed countries and developing countries. Gerschenkron suggested a late-industrialization theory based on the historical experience that developing countries in Europe had achieved a fast catch-up in the 19th century[25]. In other words, insofar as the industrial structure of a country is more underdeveloped and it lacks the institutional and organizational needed for industrialization, its possibility for rapid industrialization is increased by introducing the technology and capital of developed countries.

When the tension between obstacles and expected benefits disappears, the emerging and developing countries can achieve rapid industrialization. The emerging and developing countries can use the latecomer advantages that reduce the costs for technological development and capital accumulation by introducing technology and capital from developed countries.

The late industrialization theory of Gerschenkron emphasizes that the developing countries should successfully operate organizational methods, institutional innovations, and industrialization ideology for rapid catch-up and growth. Since the emerging and developing countries do not have enough resources and advanced organization and institutions, they generally pursue a 'top-down' approach in collecting resources and organizing industries.

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[24] P. Romer, "Crazy Explanations for the Productivity Slowdown", *NBER Macroeconomics Annual 1987*, 1987; R. Lucas, "On the Mechanics of Economic Development", *Journal of Monetary Economics*, 1988, 22, pp. 3–42.

[25] A. Gerschenkron, *supra* note 26.

Abramovitz presented natural resources, technological congruence, and social capability to explain the catch-up of developing countries, among which the social capability means a social and institutional ability to introduce, assimilate, and use the advanced technology of developed countries.[26] In particular, he highlighted the gap of social capability that includes the concept of political and industrial institutions and social perception.

In the catch-up and convergence hypothesis, developing countries have strong potential for productivity increase in three characteristics.[27] First, the technology embodied in the capital stock of developing countries deteriorates more than the technology embodied in the capital stock of developed countries. Thus, developing countries can achieve a technological leap by implementing new capital facilities in which the best-practice technology of developed countries is embodied, in the process of replacing and expanding capital facilities. Second, developing countries have a high profit ratio because they have an opportunity to achieve the technological leap and lower capital intensity than do developed countries. Therefore, if other conditions are the same, the ratio of capital accumulation per capita will increase more rapidly than in developed countries. Third, developing countries have a larger scale of agricultural areas that require a high ratio of labour than do developed countries. As modernised industries expand, the excess labour moves to the industries that have high productivity; therefore, the productivity of the emerging industries begins to increase.

Assuming that developed countries and developing countries implement the same capital stock in which the same cutting-edge technology is embodied, the knowledge advance of developing countries is larger than that of developed countries, showing a high productivity increase. For developed countries, since the technology embodied in capital stock is already sophisticated, they should invest much in their R&D budget in order to keep their own growth sustainable. In contrast, if developing countries can use the advanced technology of developed countries, they can reduce the development time for the technology. Thus, because the technological gap between developing countries and devel-

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[26] M. Abramovitz, *The Element of Social Capability*, presented in the 20th anniversary Symposium, Korea Development Institute, 1991.

[27] *Ibid*.

oped countries is big, the developing countries have a high potential for rapid productivity growth.

However, this simple catch-up and convergence hypothesis has failed to properly explain the historical experience of economic growth for the last century. If we exclude several newly industrialized economies (NIEs), most countries could not narrow the gap with developed countries. In addition, unlike the assumption of the simple catch-up and convergence hypothesis, that the relative positions of countries are not changed in the levels of productivity, the degree of convergence of productivity is different for each country, reflecting the characteristics of society, economics, and institutions.

To explain the catch-up and convergence hypothesis in reality, Abramovitz presented three factors: natural resources, congruence, and social capability. First, natural resources are an important factor that decides the level of productivity of a country. In the early stage of industrialization in which the importance of natural resources was huge, the availability of natural resources affected the level of productivity. A low level of productivity that is caused by a lack of natural resources constraints developing countries' growth. These days, the development of lands and mineral resources has been effective, intensive, and inexpensive because of the increase of global trade and the growth of transportation technology. Thus, the availability of natural resources has been less important because of the advance of science and technology, and rapid globalization. Although the lack of natural resources is still an obstacle for catch-up and convergence in the poorest countries, the importance of natural resources in deciding the level of productivity has been reduced in the developing and developed countries.

Second, the simple catch-up and convergence hypothesis is based on the premise that the technology transferred by developed countries is definitely appropriate for developing countries. Thus, the lack of congruence reduces the explanatory power of the simple catch-up and convergence hypothesis. The lack of congruence can appear for several reasons; the differences of the factors between developed and developing countries are the main reason. For example, whereas the advanced technology of developed countries is capital-intensive, it may be inefficient in relation to developingcountries that have low labour prices and expensive capital prices. In addition, the scale of manufacturing and

markets is different between developed and developing countries. The scale-intensive technology of developed countries is inappropriate and inefficient for developing countries. In particular, because of the institutional factor, the scale-intensive technology of developed countries can be inefficient for developing countries. The industrial structure of developing countries is inappropriate for scale-intensive technology, and the demographic, political, and cultural factors can create resistance to technology transfer. Moreover, the backwardness of a country is caused by the social characteristics of the country rather than being an accidental phenomenon. In general, the generic social characteristics of a country can be displayed by the interaction of various social factors, such as politics, economics, society, culture, and education. Thus, the social characteristics can operate as either a constraint or a facilitator in introducing and using the advanced technology of developed countries. The social capability can make a difference in assimilating the technological advances; it includes politics, industries, and financial institutions as well as technical competence.[28] Thus, the social capability should be understood by considering both economic and non-economic factors.[29]

When the copyrights of major developed and emerging countries are compared, the social capacity can be discussed to investigate the catch-up strategy of emerging and developing countries. If an emerging country fails to achieve productivity as high as that of major developed countries, the country can suffer from the lack of social capacity. The social capacity consists of (1) social attitudes and political institutions and (2) economic features related to the introduction and use of advanced technology. In particular, education is an important constituent of social capability. Education and training can reinforce the increase of productivity and income. The experience of newly industrialised entities, such as Korea and Singapore, shows that their high level of education plays a critical role in the catch-up and economic growth. Barro presented that poor countries that have weak human capital did not succeed in catching up.[30] In addition, the experience in the organization and oper-

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[28] M. Abramovitz, Catching Up, *supra* note 13, pp. 385–406.

[29] K. Ohkawa, H. Kohama, *Lecture on Developing Economies: Japanese Experience and its Relevance*, University of Tokyo Press, 1989.

[30] R. Barro, "Economic Growth in a Cross Section of Countries," *Quarterly Journal of economics*, CVI(2), 1991, pp. 407–444.

ation of large companies is an important social capability. In emerging countries, the size of management is generally large, and monopolising companies are generated earlier than in developed countries.[31]

In the discussion of social capability, additional views have catalysed the concept of social capability. Since the education systems and industrial systems were designed to fit the existing knowledge and technology, they might resist the introduction of the advanced technology of developed countries. In fact, the adaptability to change differs according to countries and it may change over time. The contents of education and training that are embodied in the people of a country, and its social and institutional structure, are a constraint in introducing the advanced technology of developed countries. In addition, the endogeneity of social capability is a critical issue of the catch-up theory. If the social capability is endogenous, it can be reinforced or weakened as the gap of technology and productivity becomes narrower between developed countries and developing countries. If the social capability evolves in the process of catch-up, the developing countries can outperform the developed countries or the catch-up speed of developing countries can become slow. In particular, as the income per capita of developing countries becomes close to that of developed countries, the structure of consumption and production will converge to that of the developed countries. The convergence of both consumption and production makes the introduction of advanced technology into developing countries easier. Therefore, although the catch-up process has endogenously self-limiting characteristics, they can be overcome by extending the social capability.

2. Copyright in Emerging and Developing Countries

In general, emerging and developing countries apply the technological innovations of major developed countries in order to compete in an international market. If a country (mostly, a major developed country) is an innovator and another country (mostly, an emerging and developing country) is a user, the issue of protecting IPR becomes a problem in an

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[31] A. Gerschenkron, *Economic Backward in Historical Perspective*, Harvard University Press, Cambridge, Massachusetts, 1962.

innovation trade. The growth of an emerging and developing country is driven by using the innovations of a developed country. Normally, the emerging and developing countries have access to innovation by copying the materials, ideas, and contents of developed countries. If the level of copyright protection is high, the growth of developing countries can be delayed.

Since innovation and technology have a cumulative characteristic, emerging and developing countries need to have a base for subsequent innovation. In general, since they have no fundamental technology, it is very hard for them to achieve cumulative innovation. Thus, they have a weak intellectual property right scheme in order to promote the application of innovation and technology rather than develop a fundamental and basic technology.

Emerging and developing countries are normally reluctant to implement strict copyright laws. In Korea, although technological innovation is very important, most researchers still promote incremental innovation rather than radical innovation. Korea, like other emerging and developing countries, has been lately involved in developing artificial intelligence. It is too late for this country to have hegemony in the competition of technological development for artificial intelligence. Thus, Korea can be negative about implementing copyright laws that protect the technology of artificial intelligence.

3. Differences of AI Copyright Laws in Major Developed and Emerging Countries

In general, emerging and developing countries are late in promulgating a law related to a new paradigm and a new circumstance. Although they use existing technology to develop a new product, they are weak in creating new technology and systemizing legal support and regulation. In contrast, the laws of major developed countries take a flexible and pre-emptive legal stance to promote the growth of new technology and concepts. In this paper, the differences in dealing with artificial intelligence copyright law will be discussed in terms of three perspectives.

First, the most important issue is whether work created by artificial intelligence can be a copyrightable work or not. In the UK, computer-

generated works can be protected by copyright law. Basically, the computer-generated works in the copyright law of the UK refer to a work generated without human intervention. However, in the copyright law of Korea, a creative work should be generated by a human. If a work is created by artificial intelligence, it cannot be protected by copyright law in Korea under the current copyright law. When a work created by artificial intelligence is regarded as a work done for hire, it can get a copyright in order to confer the right to a juristic person of the company. Even if this case is included in the copyright, it is not applied for a strong artificial intelligence.

Second, with regard to the authorship of AI works, the copyright laws of two countries show the same stand. In the UK, copyright on all works, including computer-generated works, is conferred on the human who creates the work. This is the same as in Korea. The copyright law of Korea says that the copyright owner should be a person who makes a work. Thus, even if an artificial intelligence creates something creative, the work cannot be copyrighted unless a person who is related to the process of generating the work is its author. This perspective comes from the situation that identifying the author of a work created by artificial intelligence has been very controversial until now. Although a work created by artificial intelligence can be protected by the copyright law, the issue about who is the author is unclear. Thus, discussion of this issue should be elaborated by a lot of stakeholders, such as researchers, artificial-intelligence technicians, and companies.

Third, in terms of copyright period, the computer-generated works can be protected for 50 years in the UK. Although the regular copyright period is 70 years, the computer-generated works have a shorter copyright period, which proves that even in the UK, the level of protection of artificial intelligence is lower than that for the regular copyright. However, since work created by artificial intelligence in Korea cannot be protected under the current copyright law, the copyright period does not exist.

Emerging and developing countries are not generally proactive in protecting works by copyright law, because they need to catch up with the advanced technology and innovations of major developed countries. They want to gain economic benefits by imitating and modifying the technology. Thus, they tend to reduce the level of copyright regula-

tion. For works created by artificial intelligence, Korea, a representative of the emerging countries, has no clear and concrete articles of copyright law. Since the work created by artificial intelligence is hardly protected, emerging countries might want to promote the use of the work created by artificial intelligence for business.

4. Directions of AI Copyright Laws

Although the copyright law of the UK (a developed country) might copyright artificial intelligence by defining the computer-generated works, it limits the scope of the copyright holder. In other words, even if artificial intelligence creates a work without the intervention of humans, the process of creation is controlled by humans. When the CDPA 1988 was made, the computer could do only limited work, being operated by humans. However, artificial intelligence will be able to think by itself, produce creative work by itself, and collect necessary data by itself in the future. Thus, since the definition of computer-generated work is broad under the CDPA 1988, it needs to be modified by reflecting the characteristics of artificial intelligence that can outperform past computers by collecting, analysing, learning data, and providing solutions.

Korea, as a representative emerging country, needs to create a law regulating the copyrighting of artificial intelligence. Although most emerging and developing countries weigh the user's right rather than that of the copyright holder to boost the economy, they need to protect the creative activity of artificial intelligence in order to promote creative work and aggressive investment in artificial intelligence technology. These days, since many trade conflicts come from copyright issues, emerging and developing countries need to provide a copyright law for artificial intelligence. Recently, the Korean government announced a roadmap for legislating AI-related copyrights in 2020. According to the roadmap, it planned to pursue the legislation of AI-related copyrights in 2023.[32] In addition, the amendment of copyright act was proposed to reflect the change of copyright in the information revolution

[32] Available at: https://pandemic-times.news/2020/12/24/government-prepares-a-roadmap-for-artificial-intelligence-laws-systems-and-regulations/ [last accessed: 12.1.2022].

era in December, 2020.[33] The main part of the amendment proposal is to newly define the work created by artificial intelligence creation and its authorship.[34] Korea has tried to reflect such a disruptive change that artificial intelligence accelerates in order, as a newly industrialized country, to support industrial innovation. In general, emerging countries cannot help following the economic and legal structure of major developed countries over time in an open economy era. However, since there are many influential factors in creating legislation, we cannot be sure when Korea could enact the laws in the near future. Thus, we have investigated the current status of copyright laws in Korea to compare the differences between Korea and the UK in this paper. If Korea, that has strong competitiveness in developing AI technology, legislates the copyright laws of artificial intelligence, impactful innovation based on AI technology will be stimulated.

Even if a copyright law for artificial intelligence is created and elaborated, the level of protection of the copyright of artificial intelligence is not high enough to mitigate the monopoly of works created by artificial intelligence. Thus, the thin copyright protection theory should be considered. If the work created by artificial intelligence is not virtually identical, we should not force the infringement of copyright. For this, we need to distinguish between human works and works created by artificial intelligence. Under the copyright law, no procedure and form is requested for the copyright of a work. However, in order to apply the thin copyright protection to the artificial intelligence case, it needs to be registered, because we should distinguish the works created by humans from those by artificial intelligence.

In terms of copyright holders, since the exclusive right to a non-creative database is conferred on a producer who invested considerable hu-

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[33] The amendment of the copyright law was initiated by a lawmaker, Joo Ho-Young on December 21, 2020 (No. 6785).

[34] The amendment of the copyright act includes four main parts. First, the definition of work and authorship that is created by artificial intelligence is newly inserted in Article 2-1(2) and Article 2-2(2). Second, the authors of work that artificial intelligence creates should be determined by the presidential decree by considering the contribution for work creation and so on (Article 10-3). Third, the term of copyright will be 5 years from the publication date (Article 39-3). Finally, the authors should register the work created by artificial intelligence and declare that the work is created by artificial intelligence (Article 53-1 and 53-2).

man effort, technological resources, and money in creating it, the person who invested considerable money can be a copyright holder. In order to prevent chaos in the copyright law system, the copyright needs to be conferred on a human rather than on artificial intelligence. A developer who develops artificial intelligence can be a copyright holder, because he/she contributes to the creation of works. However, it is a case similar to that of inventor and assignee in patent law. The development of technology and the selection of the right holder is a different problem. We should consider who contributes to generating the works created by artificial intelligence. In contrast, there is an opinion that the right can be conferred on artificial intelligence if the artificial intelligence creates a work without the intervention of humans and, for strong AI, it can independently think and act. However, the discussion is very early, because we do not know when that will be possible. Thus, it should be discussed after such technology is realised.

For the duration of protection, a work created by artificial intelligence should be protected for a shorter period than are a human's works. The current duration of copyright protection is 70 years after the copyright holder dies. In the UK, the duration of protection by copyright of computer-generated works is 50 years. Artificial intelligence can produce a lot of work vastly faster than a human could. Thus, the duration of protection should be much shorter than that for human works. For example, since the right for a database is five years in the copyright law of Korea, the period can be a good reference for artificial intelligence.

Conclusions

Emerging and developing countries such as Korea and China have characteristics very different from those of major developed countries such as the UK and the US. The catch-up strategy of emerging and developing countries can be explained by their social capability. Most emerging and developing countries have unique characteristics for catching up with developed countries. In general, natural factors, congruence, and social capability affect the catching up of emerging and developing countries. In order to facilitate the catch-up of emerging countries, they

integrate a variety of resources, including human resources, education systems, and legal systems.

The protection of intellectual property rights in emerging and developing countries is normally weaker than in major developed countries, because emerging and developing countries need to concentrate their resources on catching up. Trade conflicts on copyrights between developing and developed countries often occur. Most developed countries ask developing countries to keep rigorous copyright laws about creating literary and art works. On the contrary, the emerging and developing countries intentionally lower the level of protection by copyright in order to facilitate the use of literary works for the formation and expansion of markets.

Thus, the copyright law of emerging countries does not normally include the contents of computer-generated works or works created by artificial intelligence. Copyright law in Korea has not defined the computer-generated works, and thus the work created by artificial intelligence has not been covered under the current copyright law. However, the UK, a representative major developed country, already included the notion of computer-generated works in CDPA 1988, opening the possibility that it could extend the area of artificial intelligence. Therefore, the major developed countries lead the regulation of new technology and paradigms by enabling their protection. However, both major developed and emerging countries agree that the copyright holder should be a person rather than artificial intelligence or computers. Under the current level of technology, this opinion is absolutely right, but if strong AI can create a work autonomously in the future, the argument about the copyright holder needs to be pursued. Whereas the duration of copyright protection is generally 70 years after the creator dies, the protection of the copyright of work created by artificial intelligence should be shortened. Artificial intelligence can produce a lot of work in a very short working time. Thus, the level of protection of artificial intelligence needs to be lowered to promote the motivation for humans to create copyrightable works.

Even though this paper contributes to comparing the characteristics of copyright law in major developed and emerging countries, it has compared the cases only of Korea and the UK. Thus, in order to cover many cases, a variety of countries should be included in the comparison. For example, more countries, such as the US, Japan, and China, and

also the EU, can be analysed to generalize the results from this paper. In addition, case law that is related to artificial intelligence should be investigated to examine the stance of copyright law in relation to artificial intelligence. In this paper, most case law is about computer-generated works or databases, because there are few cases of laws about artificial intelligence. Thus, when legal precedents relating to artificial intelligence are accumulated, the comparison between the two types of countries will be more significant. Therefore, future research can tackle these issues by extending the number of major developed and emerging countries and including more legal precedents relating to artificial intelligence.