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Rights and Interaction between Property Owner and Copyright Owner: A Case Study of the Polish Trains

ธนัชพร กังสังข์*

รองศาสตราจารย์ประจำสาขาวิชานิติศาสตร์ มหาวิทยาลัยสุโขทัยธรรมาธิราช

Thanadchapon Kungsung

Associate Professor in School of Law, Sukhothai Thammathirat Open University

พอเพียง มณีสวัสดิ์**

วิศวกรคอมพิวเตอร์, นักวิชาการคอมพิวเตอร์

กรมป้องกันและบรรเทาสาธารณภัย กระทรวงมหาดไทย

Porpieng Manesawat

Computer Engineering, Computer Technical Officer,

The Department of Disaster and Mitigation, Ministry of Interior

วันที่รับบทความ 8 เมษายน 2567; วันที่แก้ไขบทความ 20 มิถุนายน 2567; วันที่ตอบรับบทความ 27 มิถุนายน 2567

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* นิติศาสตรบัณฑิต (เกียรตินิยมอันดับหนึ่ง) จุฬาลงกรณ์มหาวิทยาลัย; วิทยาศาสตรบัณฑิต (เกียรตินิยมอันดับสอง) มหาวิทยาลัยเกษตรศาสตร์; Master of Laws (Merit) in Intellectual Property Law, University of London, United Kingdom; Master of Laws (Merit), International Trade and Commercial Law, Durham University, United Kingdom; อีเมลติดต่อ kanomjib_27@hotmail.com

** วิศวกรรมศาสตรบัณฑิต วิศวกรรมกรรมคอมพิวเตอร์ (เกียรตินิยมอันดับสอง) มหาวิทยาลัยเกษตรศาสตร์; อยู่ระหว่างศึกษาต่อวิศวกรรมศาสตรมหาบัณฑิต มหาวิทยาลัยเกษตรศาสตร์; อีเมลติดต่อ 25porpeang.p52@gmail.com

บทคัดย่อ

บทความนี้มีวัตถุประสงค์เพื่อศึกษาวิเคราะห์ถึงสิทธิและอำนาจของเจ้าของกรรมสิทธิ์ในทรัพย์สิน และปฏิสัมพันธ์ระหว่างสิทธิของเจ้าของกรรมสิทธิ์กับผู้ทรงลิขสิทธิ์ที่มีอยู่ในบางส่วนของทรัพย์สินเพื่อที่จะใช้สอยทรัพย์สินนั้น โดยอาศัยกรณีที่พิพาทระหว่างการรถไฟฟ้าของประเทศโปแลนด์ และบริษัทผู้ผลิตและขายรถไฟฟ้าให้แก่การรถไฟฟ้าของโปแลนด์ รวมทั้งบริษัทผู้รับทำการซ่อมบำรุงรถไฟฟ้าให้แก่การรถไฟฟ้าของโปแลนด์ด้วย นอกจากนี้ บทความนี้จะวิเคราะห์ถึงความจำเป็นทางวิศวกรรมและสิทธิตามกฎหมาย โดยอาศัยหลักกฎหมายที่ยอมรับกันเป็นสากลและเทียบเคียงประกอบกับประมวลกฎหมายแพ่งและพาณิชย์และกฎหมายลิขสิทธิ์ของประเทศไทยเท่าที่จำเป็น

ผลการศึกษาวิเคราะห์พบว่า แม้ว่าโปรแกรมคอมพิวเตอร์จะเป็นงานสร้างสรรค์อันมีลิขสิทธิ์โดยจัดอยู่ในประเภทวรรณกรรมที่ได้รับการรับรองและคุ้มครองโดยกฎหมาย อย่างไรก็ตาม การใช้สิทธิเช่นนั้นก็ต้องอยู่ภายใต้หลักความสุจริตที่เป็นหลักการสากลด้วย การใช้สิทธิที่มีแต่จะก่อให้เกิดความเสียหายแก่ผู้อื่นย่อมเป็นการอันมิชอบด้วยกฎหมาย รวมทั้งการกำหนดเงื่อนไขที่ทำให้เกิดการแข่งขันทางการค้าอย่างไม่เป็นธรรมที่ทำให้เกิดการผูกขาด ย่อมเป็นการอันมิชอบด้วยกฎหมาย นอกจากนั้น ในส่วนของเจ้าของกรรมสิทธิ์ในทรัพย์ที่มีสิทธิในการใช้สอยลิขสิทธิ์ ไม่ว่าโดยข้อตกลงชัดแจ้งหรือโดยปริยาย ซึ่งเมื่อปรากฏว่างานอันมีลิขสิทธิ์ที่ตกติดมากับตัวทรัพย์เพื่อการใช้สอยทรัพย์นั้นเป็นการขัดขวางการใช้สอยทรัพย์ตามปกติอย่างร้ายแรงผิดปกติวิสัย เจ้าของกรรมสิทธิ์ในทรัพย์ย่อมมีความชอบธรรมที่จะใช้สิทธิในการป้องกันตนเองเพียงเท่าที่จำเป็นเพื่อคุ้มครองสิทธิของตน ซึ่งหากไม่ดำเนินการเช่นนั้น สิทธิของตนเองจะถูกกระทบอย่างรุนแรงหรือถึงขั้นสาบสูญได้ อย่างไรก็ตาม เจ้าของกรรมสิทธิ์ต้องได้กระทำเพียงเท่าที่จำเป็นอย่างจำกัดเคร่งครัดเท่านั้น จึงมีความชอบธรรมที่จะกระทำได้ และไม่ถือเป็นการละเมิดลิขสิทธิ์ของเจ้าของลิขสิทธิ์นั้น

คำสำคัญ: กรรมสิทธิ์; ลิขสิทธิ์; หลักสุจริต; โปรแกรมคอมพิวเตอร์; วิศวกรรมย้อนกลับ

Abstract

This article aims to study and analyze rights and authorities of property owners and interactions between property owners and copyright holders for partial use of the properties. This article is based on a dispute between Polish State Railways, the manufacturer and seller of electric trains, and the company providing electric train maintenance for Polish State Railways. In addition, this article analyzes engineering necessity and legal rights based on internationally accepted and comparable legal principles, together with Thailand's Civil and Commercial Code and copyright laws as necessary.

Analysis results showed that even though computer programs were copyrighted creative works, they were classified as literary works that are recognized and protected by laws. However, exercising such rights must also be governed by the universal principle of good faith. Exercising rights while causing damage to others is unlawful. In regard to property owners who have the exclusive right, explicitly or implicitly, when it appears that the copyrighted work attached to the property for use seriously impedes normal use of the property, the property owners have the right to protect themselves to a necessary extent. Failure to do so may severely impact or even result in the loss of their rights. Thus, when exercised strictly as necessary, such actions are lawful and do not constitute copyright infringement.

Keywords: Ownership; Copyright; Principle of Good Faith; Computer Program; Reverse Engineering

1. Introduction

In the past, goods traded and exchanged in the market and used by the public were mostly primary products such as crockery, boats, rafts, furniture or daily utensils. They were products with no complicated technology. Buyers could easily discern usability or defects, such as chipped bowls, leaking water jars, defective houseware, clothes that were not neatly sewn, etc. Later, products with more advanced technology came into the market, such as electrical appliances, engines, mechanisms, cars, motorcycles. However, it was the technology and mechanism that people with general technical knowledge could understand. Therefore, owners or buyers of products could use them. When there were problems with the products, any technician could fix them.[1] The products did not need to be fixed by the original manufacturer or seller. The owner or the purchaser was, therefore, the owner of the property who had full rights to use, sell, transfer, repair, or even destroy their property.

However, with today's advanced technologies, engines and machines are controlled by computer programs. Examples are the Pink Line and Yellow Line trains in Thailand that run without conductors but use program computer to control the trains. They are entirely operated by a computer program written by the manufacturer. The computer program is lawfully accepted as copyrighted property protected under copyright laws that protect intellectual property. It is considered intangible property. It is a program that controls the mechanism of property of all shapes. This computer program or software is different from other assets in one significant way. That is, mechanical property

[1] Viman Kritpolviman, **Consumer Protection Law**, in Lagal Seminar for Provincial Government Administrators, (Nonthaburi: Sukhothai Thammathirat Open University Press, 2021), p. 10-8.

in the past such as gears, pulleys, bearings, injectors and pump heads that were put in the machines were in the same state when they needed fixing. It is a different case with computer programs. Command sets written by programmers in a computer program are in one language (high-level programming language). When the program is applied, it is converted into a machine language (0 and 1), which is a language that can only be read by computers.[2] The program may be difficult for the user or owner who purchased it to read and understand. The program is, therefore, a secret. In other words, while the manufacturer puts a set of commands into a program (that the programmer can understand), that set of commands is difficult to read and understand in a computer program. The legal recognition of rights in computer programs creates a factual situation that is different from traditional types of property. Traditional property was owned by the owner of property who obtained it by purchasing it or through other means. The owner had absolute rights in that property. The latter type of property run by computer program has an owner and is physical property such as electric trains. Meanwhile, there is another person with a copyright in the computer program that is in the electric train system. That person has certain rights in the same piece of property. The owner of electric trains has the right to use that computer program to control the vehicle for normal use.

Such situation creates an interaction between the owner of the property (the owner of the electric train) and the owner of the intellectual property, which is the copyright or patent in the program that controls the operation of the property (the electric train) in various aspects. For example:

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[2] Alfred V. Aho and et al, **Compilers Principles, Techniques, & Tools**, 2 Ed. (New York: Pearson Education Limited, 2007), p. 14.

1) What content can be written in a computer program? 2) How much will the content affect the exercise of the owner's rights? 3) Can it be written in a way that restricts the owner's rights? 4) Which part of the copyright in this computer program is protected and to what extent? 5) How much rights do property owners have in computer programs? Within what period? Under what limitations? And 6) In the event that the computer program affects the exercise of the owner's rights in that property, to what extent does he have the right to take steps to enable himself to continue exercising that right?

Therefore, this article aims to analyze the above issues based on facts arising from a dispute between Polish Railways and the Polish train manufacturer. However, in analyzing the various rights and responsibilities, it is necessary to look at the contract terms as an important component. However, some of the facts arising from the dispute between Polish Railways and the Polish train manufacturer are secrets that the parties will use to fight against each other in court. Moreover, although this case occurred in Poland, we cannot know whether arbitration has been agreed upon. This may have implications for the use of laws to adjust the case. Therefore, the analysis in this article focuses on an educational analysis based on a comparison with general principals of law that are universally accepted without focusing on the analysis in detail of the specific laws of any one country. However, in some cases some Thai laws may be mentioned only to provide a clear comparison. Furthermore, this article will be useful for Thailand where at present some electric trains are operated without drivers. Such trains are driven by a computer program in the system. The analysis in this article may be useful in disputes between the Electric Railway of Thailand and electric vehicle manufacturers that may occur in the future in Thailand.

2. Facts

In 2016, Koleje Dolnośląskie (Polish State Railways operator) purchased an Impuls train (45WE) from Newag Company. In 2021, Koleje Dolnośląskie opened a tender to hire a company that would inspect the train condition. The winner of the bidding was SPS mieczkowski. The first electric train was imported for inspection in the first quarter of 2022. The electric train was disassembled and sent back to the manufacturer for inspection. When the train was reassembled, it would not run. Koleje Dolnośląskie hired the group of hackers called "Dragon Sector" to fix this problem.

The "Dragon Sector" group checked the program in the PLC (Programmable Logic Control) by reverse engineering the RAM inside the PCL. It was then found that electricity was not sent to the inverter, which supplied electricity to the motor. In the program, "suspicious" bits of information were found. The train that ran and the train that did not run had different readings. During this time, a number of electric trains were not operating causing train service issues. If SPS Mieczkowski was unable to resolve the problem in time, the electric train operator will cancel the contract and sign a new contract with the electric train manufacturer (Koleje Dolnośląskie), which claimed that it could definitely solve this problem.[3]

The "Dragon Sector" group solved this problem by reversing the "suspicious" bit. The train then resumed its service. The group tried to find

[3] Harvey Randall, **They' re Putting DRM in Trains, Now: Hired Hackers Dragon Sector Take to the Chaos Communication Congress Stage and Explain How They Caught a Manufacturer red-handed** [Online], 10 June 2024. Source: https://www.pcgamer.com/theyre-putting-drm-in-trains-now-hired-hackers-dragon-sector-take-to-the-chaos-communication-congress-stage-and-explain-how-they-caught-a-manufacturer-red-handed/.

out the reason why the data in that bit became the type of data that disabled the train. The following conditions were discovered.[4]

"1) The electric train did not travel at a speed of 60 km/h for at least 3 minutes during a 10-day period. An event that met this condition occurred under the warranty because the service provider parked the train and did not let it run."

This condition was, therefore, amended to read: "1) The electric train did not travel at a speed of 60 km/h for at least three minutes during a 20/21-day period and was parked in a geofencing designated area."

The area specified in the condition was the location of various maintenance and manufacturing companies participating in the bidding. However, in the case of the manufacturer, additional conditions were set to allow the vehicle to be stopped. In addition, there were other additional conditions such as:

1) Serial number of the device changed.

2) Version of inverter firmware

3) A complete distance of 1,000,000 km.

4) The value of the odometer compared to other devices varies by more than 100 km.

5) The value of day, month, year was date >= 21 && month >= 11 && year_lo >= 21. This means that if the date is greater than 21, the month is greater than 11, and the year is greater than 20 (21), this condition is met.

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[4] The Chaos Computer Club (CCC) and Volunteers, **Breaking "DRM" in Polish Trains**, The 37th Chaos Communication Congress (37C3) takes place in Hamburg, 27-30 December 2023. [Online], 27 April 2024. Source: https://media.ccc.de/v/37c3-12142-breaking_drm_in_polish_trains#t=3269.

According to five conditions were mentioned above, the condition is true only on 21-30 November and 21-31 December. On 21 December 2023, the train could not actually resume service.

In addition, the group checked the history of program updates. It was found that there were at least 4-5 cars that had program updates 2-3 days before they were due for maintenance.

Reverse engineering is reversing the way an existing product was made in order to understand principles and working processes of that product. On the software side, reverse engineering often involves converting machine codes back into assembly codes, which are not yet a commonly used programming language, but a language that directly describes working principles of hardware for example, adding values from registers (memories in RAM) to another register, increasing the register's value by various constants, etc. In addition, there are other devices or programs that make this process easier, such as the Debugger that helps show how the program works step by step and, as a result, show the performance of specific sections of the codes.[5] Factually, the Dragon Sector group hacked data from the electric train control equipment to reverse engineer the program so that it could understand the system, the working process of the train control system and find the reason why electricity was not supplied to the train.

From the legal point of view and from the above facts, the contract terms are a main component in an analysis of rights and responsibilities. However, such information is a secret that the parties use to win over each other in legal cases. Therefore, the analysis in this article does not focus on the win or loss in the case. It is an educational analysis based on a comparison

[5] Eldad Eilam, Reversing: **Secrets of Reverse Engineering**, (Canada: Willey Publishing. Inc., 2005), p. 3-4.

with internationally accepted legal principles. It does not go into details of the laws of any one country because even though this case happened in Poland, the article does not know whether an arbitration took place, which might have affected the use of laws to adjust the case. Moreover, some facts that may not be accessible may be the result of assumptions based on the analyst's normal principles, which will be specified in the analysis of each case.

3. Rights of the company that holds the rights to the computer program

Computer programs are considered a form of creative work. Legal systems of various countries certify that a computer program is copyrighted creative work. Thai laws recognizes that as well and consider it as a literary work.[6] Therefore, it is a copyrighted protected work, to which the copyright owner has exclusive rights as follows.[7]

1) Reproduction or adaptation;

2) Communication to the public;

3) Letting for hire of the original or the copies of a computer program, an audiovisual work, a cinematographic work and a sound recording;

4) Giving benefits accruing from the copyright to other persons;

5) Licensing the rights mentioned in 1), 2) or 3) with or without conditions, provided that the said conditions shall not unfairly restricts the competition.

[6] The meaning of literary work under section 4 of Copyright Act B.E. 2537 (1994) includes computer programs.

[7] Copyright Act B.E. 2537 (1994), section 15.

Whether the conditions as mentioned in 5) are unfair restrictions of the competition or not shall be considered in accordance with the rules, methods and conditions set forth in the Ministerial Regulations.

From initial facts, the manufacturer manufactured and sold electric trains to the electric train operator. It can be inferred that the electric train manufacturer was the creator of the computer program used to control electric trains. Therefore, it can be believed that the company that manufactured the electric trains was also the owner of the rights to the computer program used to control the trains. When electric trains were sold, it should be assumed that the manufacturer gave the buyer permission to use the program to control that vehicle because otherwise it would have been impossible to control the trains. For what period it is allowed to be used and under what conditions will be analyzed further.

Facts obtained from reverse engineering shows that there is probable evidence that electric train manufacturers have written several vehicle control programs that cause the vehicles to become unusable after the manufacturer's warranty has expired, as follows.[8]

1) The train did not run at a speed of 60 km/h for at least 3 minutes in a period of 10 days. This was changed to 20 – 21 days in some train systems.

2) The serial number of the device was changed.

3) The version of inverter firmware

[8] The Chaos Computer Club (CCC) and Volunteers, Breaking “DRM” in Polish Trains, The 37th Chaos Communication Congress (37C3) takes place in Hamburg, 27-30 December 2023. [Online], 27 April 2024. Source: https://media.ccc.de/v/37c3-12142-breaking_drm_in_polish_trains#t=3269.

4) The distance has reached 1,000,000 kilometers, which is the distance due for servicing.

5) The value of the odometer compared to other devices varies by more than 100 km.

6) The value of day, month, year is date >= 21 && month >= 11 && year_lo >= 21 which means that if the date is greater than 21 and the month is greater than 11 and the year is greater than 20 (21).

It should be questioned if writing such computer programs by the electric train manufacturer is the right thing to do. In principle, anyone has the right and freedom to create work, but such action must not violate or infringe the rights of other people and go against one's duties. As explained, a violation is "a violation of rights or breach of duty". Therefore, creating work is a right and freedom, freedom to create work such as literary work or drawings from our imagination. If that literary work mentions anybody in a negative way damaging, dishonoring, or despising the person and impeding the person's way of making a living, it is a violation and subject to liability even though the person is exercising his/her rights. Computer programming (which is considered literary work) can be written in any way that does not violate other people's rights. The thing to consider at this point depends on the contract. "At the end of the warranty period, will the buyer still have the right to use the product (electric trains) and the program controlling the trains?" If it is stated in the contract "At the end of the warranty period that the manufacturer states, the buyer has no right to continue using the program to control the vehicle," the manufacturer has the right to suspend the use of such vehicle control program. However, in this case, the maintenance system was auctioned and separated from the train selling contract. As a result, the train manufacturer did not receive a contract to maintain the train. It can be

assumed from bidding for a separate maintenance contract that the contract does not contain an **explicit** provision that the buyer has no right to continue using the train control program, or the manufacturer did not **clearly** inform the buyer of the extent of his or her right to use the train program. In addition, if the buyer knew that he or she had the right to use the train control program during the warranty period only, an auction for train maintenance separate from the sales contract would not have happened. Also, if there is an auction for maintenance, the company that operated the train will have to inform all bidders that the train control program is not in use. The bidder for maintenance must create a new train control program.

The next issue that must be considered is whether the above commands are useful in normal operations of the train system. It is the opposite in engineering. Not only that it is not useful for normal train operations, but also it disrupts all normal train operations. Therefore, commands inserted into the computer program used to operate the train is not useful for train operations. On the other hand, it impedes normal operations of the buyer (the owner of the train) causing it to stop running. In Thai laws, it is comparable with the provisions in Section 421 of the Civil and Commercial Code, which states that *"The exercise of a right which can only have the purpose of causing injury to another person in unlawful".* This section is considered excessive use of rights and dishonest use of rights in violation of the principle of good faith.

The principle of good faith is a principle of law used in many civilized countries such as Germany, France, Switzerland, England, and Poland.[9] This principle of good faith with concepts has been used since Roman times. It is the principle of bona fide, which means the principle of good faith or

[9] Poland Civil Code, article 7

righteousness.[10] Traditionally, this principle was used in prosecution. It may be raised as a defense. The plaintiff's fraud (exception doli) was allowed as a defense.[11] Later, the principle of good faith was used as the basis of the right to file a lawsuit[12] even though there is no law underlying that right. For example, in the case of Cicero's statement (106-43 BC), government officials ordered Claudius to demolish parts of his house so that space could be used for the city's religious ceremonies. Claudius did not follow the order and put his house up for sale. Culporuius bought the house. Later on, officials ordered Culporuius to demolish parts of his house (the same order given to Claudius). After Culporuius had demolished the house according to the officials' order, he learned that Claudius received the order before he sold the house to him. Culporuius was not aware of that when he decided to buy the house. He thought that Claudius concealed the truth and was liable for damages incurred from demolition of parts of the house. He requested the court to make a judgment in good faith referring to the bona tidicium principle. The seller has a duty to inform the buyer of facts that cause the loss of rights in the property that the seller was aware of. The fact that the seller conceals or does not inform the facts is, therefore, in violation of the principles of good faith. The court ruled in favor of the buyer even though the 12 Tables law that was in effect at that time provided that the seller would be liable for defects or loss of rights (eviction) only if the seller has expressly certified that

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[10] Reinhard Zimmermann and Simon Whittaker, **Good Faith in European Contract Law**, (Cambridge: Cambridge University Press, 2000), p. 65.

[11] Prachom Chomchay, **Basic Comparative Private law: Roman and Anglo-Saxons Tradition**, 2 ed. (Bangkok: Faculty of Law Thammasat University, 2009), p. 131.

[12] Kititsuk Prokkati, **Good Faith & Supervening Events**, (Bangkok: Winyuchon Press, 2016), p. 18.

the property being sold had no defects or loss of rights. Moreover, it was a matter of caveat emptor.

This principle of good faith was first enacted in written laws in the German Civil Code in 1900. Then, it was enacted in the Swiss Civil Code in 1907 and the civil codes of many other countries, including Poland. Thailand established the principle in Section 5 stating that *"Every person must, in the exercise of his right and in the performance of his obligations, acts in good faith."* Therefore, the principle of good faith (bona fide) is a principle that is universally accepted in the civil law legal system.

In the English legal system, the principle of good faith was developed among merchants dealing with each other based on trust, truthfulness, and good faith. It became a trading norm, a legal principle in commercial laws. It was then developed into a general principle of contract in the 18th century. As Lord Monsfield said in his decision in Carter v. Boehm (1766), "The great principle applicable to all contracts and agreements is the principle of good faith that prohibits any contracting party from concealing what they know personally to induce the other party to agree to a contract even if it is something the party does not care about it or believe in the opposite." However, even though later on the English court did not consider the principle of good faith when deciding general cases apart from insurance cases, the English Equity Court developed a number of specific principles of good faith.[13]

Nowadays, the principle of good faith is universally accepted. Black's law dictionary defines the principle of good faith as: "good faith" means "honesty in belief or purpose", "faithfulness to one's duty or obligation",

[13] Kititsuk Prokkati, Good Faith & Supervening Events, Teaching Publication in Introduction to Law Course. Faculty of Law, Thammasat University, p. 51.

"observance of reasonable commercial standards of fair dealing in a given trade or business", or "absence of intent to defraud or to seek unconscionable advantage."

The principle of good faith in German is Treu und Glauben. The word 'Treu' means honesty and trust. Glauben means belief and trust.[14]

Based on the above definitions, good faith is the principle of honesty and trust, which can be separated into four categories as follows.[15]

1) Good faith in trust and purpose

2) Good faith in one's duties or debts

3) Compliance with commercial standards or any business which is reasonable in fair negotiation

4) Absence of intent to deceive or take unfair advantage

The principle of good faith is a general principle of law and an obligation (jus cogen), meaning there can be no agreement to waive it as seen in the written law regarding contracts in Section 373 which states that *"An agreement made in advance exonerating a debtor from his own fraud or gross negligence is void"*. It is an example of a provision that considers the principle of good faith mandatory even though the contract was agreed upon with the exception that the person commits fraud (being dishonest). Then the person will not be liable and such contract shall be void.

In intellectual property laws, the principle of good faith is used in interpretation. For example, trademark infringement and the principle of good

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[14] Preedee Kasemsup, **Good Faith Is the Principle of Honesty and Trust**, (1983).

[15] Voranaree Singto, **Study Guide in Contract Law, Tort Law and Advanced Comparative Law**, (Nonthaburi: Sukhothai Thammathirat Open University Press, 2009), pp. 1-19.

faith must be interpreted together. Although it is not clearly stated that dishonesty must be considered when the nature of trademark infringement is defined, the court takes the principle of dishonest use of rights into consideration. In addition, the principle of good faith is applied in determining the nature of trade secret infringement. According to Article 39 of the TRIPS Agreement, there is a limit to protect undisclosed information from disclosure, taking, or using without the consent of the lawful controller. If that action "is of the nature that is contrary to honest commercial practices," it will be considered a violation of trade secret work. A piece of work is an exception to infringement when it is obtained honestly. Therefore, the principle of good faith is used in intellectual property laws in many contexts, such as in interpretation to make the laws more fair and in considering the criteria for infringement of various types of protected work. Therefore, the author is of the opinion that the principle of good faith should be used in the analysis of this article for the sake of justice and as a guideline for striking a balance under the spirit of intellectual property work protection.[16]

Moreover, the principle of good faith is a jus cogens provision that has a broad meaning. It is difficult to specify exactly the extent of the coverage. It requires interpretation of each fact by considering various contexts.

Therefore, reverse engineering and specifications made in computer programs can be analyzed in four cases as follows.

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[16] Walaiwan Mathurotpreechakun, **Equilibrium of Intellectual Property Rights Under Fair Use: Case Study of Copyright Law and Trade Secrets Law Derivation Reverse Engineering in Developing Economy**, (Doctor of Laws, Doctor of Laws Program, Graduate School of Law, National Institute of Development Administration, 2018), p. 105-106.

1) “The electric train does not run at a speed of 60 km/hr. for at least 3 minutes during 10 days”. This was later amended to “The electric train does not travel at a speed of 60 km/h for at least 3 minutes in a period of 20-21 days and stops in the designated area, which is the garage of the company participating in the train maintenance bid.” If the conditions are met, it will cause the electric train to stop operating because electricity transmission that runs the train will be suspended. This clearly shows that the said commands were not beneficial to the electric train operation at all. Instead, they prevent competitors from servicing the train because servicing had to be done by one of the companies participating in the bidding. This programming indicates the intent to prevent maintenance provided by all other companies joining the bidding because the train could not operate normally while parked at any competing company for maintenance. Therefore, this was an unbeneficial exercise of rights causing damage to others, namely the electric train operator, which could not run the train as normal. Moreover, it was damaging to competing companies that provided maintenance services because they could not provide normal repair and maintenance. In addition, it was a trade barrier: no other companies could perform maintenance at all, which was unfair competition.

The author is of the opinion that including such commands in the program was a “dishonest” action that should not have been allowed.

2) The same thing goes for the case of a device replacement order specifying “If the serial number of the device changes or if the version of the inverter firmware changes,” If spare parts are replaced, the train cannot run normally (The train does not run.). However, if the company that sold the train maintains the train, it can fix this part of the program. These commands made maintenance (spare part replacement and changing the version of the

inverter firmware) impossible. Another word, maintenance could not have been done by any other company. Otherwise, the electric train would not run. It is believed that the seller of the electric train definitely did not inform the buyer (the electric train operator). If such conditions had been made known from the beginning, the buyer (the electric train operator) would definitely have organized a maintenance bidding. It would have simply let the seller do the maintenance or it would not have bought the train from this manufacturer in the first place.

The author sees that the commands were written in a way that prevented other from doing maintenance. Moreover, this condition was concealed from the other party (the buyer). Therefore, it was a dishonest exercise of rights. (writing a train control program).

3) Configuring the odometer with other devices, whose values are different by more than 100 kilometers.

4) The command ordering the train to run a distance of more than 1,000,000 kilometers past the 21st of the 11th month in 2021 could be expected to have passed the warranty period of the seller. Therefore, the command was given to stop the electric train from operating, which was not beneficial to train operations at all. However, although it was claimed that when a certain distance or duration was reached, the train should stop for major maintenance and such condition should be informed to the buyer so it can take correct action. It should be just an alert, not a default forbidding the train to run normally.

The author is of the opinion that the commands in the program were a dishonest intention of the seller who wanted to take advantage of the train malfunctioning, of which only the seller knew the cause. The other people maintaining the train could not have known the cause. Had reverse

engineering not been done, the working process of some of the commands could not have been predicted. Such commands were, therefore, a dishonest exercise of rights and also has no authority to do so according to the law (illegal). The consequences are damages deriving from failure to run trains causing damage to the public. It is, therefore, considered a danger caused by an unlawful cause.

In summary, based on an analysis of the four above commands, programming such commands resulted in malfunctioning of the train, which apparently did not benefit train operations at all. Therefore, it is a dishonest act. Such commands not only concealed the truth that should have been revealed, but also were written in a 'poisoning' manner preventing other people to maintain the train under such program, which, on top of that, was kept a secret. If the company contracted to provide maintenance had not reverse engineered the program and discovered the secret, the train operator would have had to terminate the contract with the company that bade for maintenance because it could not keep the electric train running normally. As a result, the train manufacturer was called to provide maintenance. Such action can be considered fraudulent, seeking undue benefits and completely excluding others from the maintenance process. Moreover, it made the manufacturer the exclusive maintenance provider, which is against the principles of fair-trade competition. Therefore, exercising such rights is a wrongful and **not in good faith** act and should not be protected by the law.

4. The ownership of things that have partial rights of the copyright owner

The next issue worth analyzing is when the computer program used to control the train is a copyrighted work that is protected. Only the copyright owner has the exclusive right to reproduce, adapt, let for hire, and licensing

the rights for others to use such exclusive right.[17] If we compare it with Thailand's copyright law in this case study of electric train, the manufacturer wrote the train control program and sold the train to the buyer who was the train operator in Poland. It could be assumed that the manufacturer allowed the train operator to use the computer program. It is not clear if it was expressly specified in the contract or if it was an implied agreement to use this computer program. Otherwise, the computer-operated train could not run. Thai copyright laws allow such use of rights with or without conditions. Such conditions cannot be set in a way that unfairly restricts competition.[18]

The fact in this matter is that the company that did the maintenance could do the maintenance, but the train could not operate normally because the train system did not work. After other systems were checked, no errors were found. Then, there were doubts in the computer program used to control the train, so an inspection was conducted using reverse engineering. It was found that suspicious bits-controlled power supply to the train. A test was run in reverse and it was found that power supply to the electric train system was normal. The point is reverse engineering and a bit reverse test were a computer program alteration, which was considered "modification" of a copyrighted work. Therefore, it should be considered whether such action is a legitimate action or whether there is legal protection and to what extent which will be described in topic 5 and 6.

5. Right to self-defense or self-help

The right to self-defense: the law allows people to protect themselves from unlawful acts. They do not need to suffer from an action

[17] Copyright Act B.E. 2537 (1994), section 15

[18] Copyright Act B.E. 2537 (1994), section 15 (5)

and then file a lawsuit for state enforcement later.[19] This principle appears in criminal laws such as the principle of “a lawful defense” which assumes that there is no offence if an action was reasonably carried out under such circumstances and the principle of “necessity”. Even though it is considered an offense, the offender will not be punished. In civil cases, self-defense is accepted in tort liability requiring compensation even if the act meets the criteria for an infringement on another person. However, an exemption from liability for compensation is accepted. It can be compared with the provisions regarding violations in Thailand, where such principle is accepted and considered an "amnesty," or without punishment. This is provided in the Civil and Commercial Code of Thai laws, Section 449, which states that “A person who, acting in lawful defence or under a lawful command, has caused injury to any other person is not liable to make compensation”. This is similar to criminal defense in the following significant way.[20]

1) It must be done to avoid danger.

2) The danger is caused by an unlawful cause and the person causing the danger has no authority.

3) The action was reasonable.

From the statement mentioned above: “The danger is caused by an unlawful cause and the person causing the danger has no authority.”, it can be concluded that the train manufacturing company wrote several train controlling programs resulting in discontinuation of train services after the

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[19] Jan Arno Hessbruegge, **The Right to Personal Self-Defense as a General Principle of Law**, in Human Rights and Personal Self-Defense in International Law. (Oxford: Oxford University Press, 2016), p. 19.

[20] Preedee Kasemsup, **Civil Law: General Principles**, (Bangkok: Faculty of Law, Thammasat University, 1982), p. 49.

manufacturer's warranty expired. It is considered an action that is not beneficial to normal train operations. On the contrary, such programming disrupted normal train operations. Therefore, such actions caused damage to others and were unlawful acts.

The right to help yourself (self-help): it is human nature, since ancient times, to protect ourselves when danger is imminent. If we wait for other people, it may be too late. However, as states gain power arming themselves with military and police forces, so does its exclusivity to enforcement. However, there are some exceptions where the law allows private individuals to use arbitrary force in compliance with the law. The owner of rights can exercise their rights without having to rely on other people or the state.[21] In the English legal system, the principle of self-help is accepted in order to remedy damages.[22] This principle is developed based on the principle of good faith in the Thai legal system. Thailand has embraced the self-help concept and incorporated it into written laws, such as Section 451 of the Civil and Commercial Code which states that

"A person who uses force for protecting his rights is not liable to make compensation if under the circumstances the help of the Court or of the proper authorities is not obtainable in due time and there is danger that, if he does not act immediately, the realization of his right will be frustrated or seriously impeded.

The using of force according to the foregoing paragraph must be strictly limited to that which is necessary for averting the danger.

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[21] Ibid., p. 100.

[22] Donald Harris et al, **Remedies in Contract & Tort**, 2 ed. (Cambridge: Cambridge University Press, 2005), p. 64.

If any person does the act specified in the first paragraph under the erroneous assumption that the necessary conditions exist to render his act lawful, he is liable to make compensation to the other person, even if the error was not due to his negligence."

The provisions of Section 451, as quoted, refer to the concept of recognizing the right to self-help in cases of urgent need because usually in the event that someone's rights are infringed, that person must file a lawsuit with the state for the state to take care of the case. The person cannot use force and take care of the case by oneself. If the person uses one's force, it will cause social unrest. Moreover, people with more power or authorities may bully people with less power or authorities. Therefore, the state is the only party that can use force or authorities. However, in cases where there is an urgent need to protect one's rights and the power of the state cannot come to aid in time, and one's right may be lost, the state allows an individual to use one's force to protect one's rights. However, the individual must act strictly in a limited way in order to protect oneself. Therefore, it can be seen that the law recognizes the principle of prevention and self-help as acts exempted from the general principle of tort. As a result, the person is not be liable to pay compensation, and in the cases where it is not possible to request the use of state power to protect oneself, the state allows the person to use one's force even though the state normally strictly considers the use of state power's force only. Therefore, this principle of self-help is generally accepted throughout the civil law system, as in the example above, as well as the common law system.

6. Analyzing the case of modification of the computer program that controls the train system.

After the principles of right protection and self-help of right owners were studied and facts in this case were analyzed, it was found that embedding numerous commands in the train control program affected the train's normal operations. It was a dishonest exercise of rights on the manufacturer's part that severely affected the property owner. For instance, the train could not run. In addition, it affected the train operator' liabilities for the public. Therefore, if the property owner files a lawsuit in court, it may take a long time to get a verdict resulting in a disruption of public transport causing significant damage. Another problem is that verifying facts can be very difficult or near impossible because the program including various commands may be edited and changed by the program owner via the Internet without the property owner's acknowledgement. Therefore, it cannot be proved if such commands interfering with the train operations ever existed. One will have to wait for it to be proven in court.

Therefore, from the aforementioned problems and needs, the author finds that the property owner and the person receiving the power of attorney should be empowered to exercise their self-help right, as necessary. They hacked the train control system data and reverse engineered it until they found an abnormality in the said bit. When the said bit was reversed, the train could run normally. The property owner may have edited or modified a copyrighted work, but it was out of necessity and was strictly limited to enabling the train to run. It is the property owner using its the property without seeking any other benefit from the computer program or causing any other damage to the copyright owner. Therefore, even though it was an infringement on the copyright owner's work, it was a result of a dishonest

exercise of rights by the copyright owner who caused damage to the property owner. The property owner used its right to protect itself and help itself survive damage. It also maintained its rights to use its property as normal. Thus, it was a legitimate action.

However, on the other hand, if it was assumed that the train did not run because of the erroneous commands in the computer program or disruptions in the train operation or other reasons, reverse engineering to modify a computer program would have been an unreasonable and illegitimate action. The train operator would be liable for the program owner's copyright infringement. The amount of damage will have to be proven further.

In addition, international intellectual property laws and Thailand's copyright laws can be considered as follows.

The principle of fair use of copyright is a principle that appears in international copyright agreements. This is the principle that limits exclusive rights of copyright owners. Users are allowed to access or use copyrights with permission from copyright owners. Article 9 (2) of the Bern Convention stipulates:

"It shall be a matter for legislation in the countries of the Union to permit the reproduction of such works in certain special cases, provided that such reproduction does not conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interests of the author."

The principle of Section 9(2) above can be divided into three parts: 1. Exceptions to infringement must be provided in specific and definite cases. 2. Actions must not conflict with normal use of copyrighted works of copyright owners. 3. Actions must not unreasonably affect legal rights of copyright owners. This principle under Article 9(2) of the Bern Convention is also set

out in Article 13 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which states:

"Members shall confine limitations or exceptions to exclusive rights to certain special cases, which do not conflict with a normal exploitation of the work and do not unreasonably prejudice the legitimate interests of the right holder."

From the above provisions, Thailand, which has obligations under the Bern Convention and TRIP, has to enact internal laws consistent with providing protection for copyrighted works, including the Exception of Exclusive Right provisions.

Exceptions to copyright infringement regarding computer programs in Thailand are provided under Section 35 (8) of the Copyright Act, B.E. 2537 (1994), which states:

"An act against a computer program copyrighted shall not be deemed an infringement of copyright in the following cases provided that the purposes of such act is not for profit and the first paragraph of section 32 is complied with; ...

(8) making an adaptation of a computer program in the case where it is necessary for use..."

From the provisions of Section 35(8) of the Copyright Act, B.E. 2537 (1994), an act that shall not be deemed an infringement of copyright must comply with Section 32, i.e., it must be an act that does not conflict with a normal exploitation of the copyright work by the copyright owner and does not unreasonably prejudice the legitimate interests of the author.

The author considers that according to Section 32, even though the manufacturer writes a program that has conditions that make the train unusable after the manufacturer's warranty period has expired for its benefits,

writing a program that makes trains unusable after the manufacturer's warranty expires is not a normal exploitation of the copyright work by the copyright owner. In addition, writing a program that makes trains unusable after the manufacturer's warranty expires may be illegal.

In addition, based on Section 35 (8) and facts, the Dragon Sector group introduced a program to reverse engineer so that the electric trains could resume its operations. Therefore, it is considered making an adaptation of a computer program in the case where it is necessary for use. Therefore, such action shall not be deemed an infringement of copyright.

7. Conclusion

A computer program is a copyrighted work protected by laws. When it is attached to another property so that property is usable, it is written in a way that prevents normal use of the property assets as long as there is an agreement to do so. Configuring commands in a computer program to prevent the property owner’s normal use of the property or to prevent trade is a dishonest action. Even though the owner of the computer program owns the copyright, the owner cannot dishonestly exercise his/her right and cause harm or damage to other people, which is also a violation. In such case, the owner of damaged property has the right to protect his/her rights or exercise self-help rights to escape from such danger or damage. However, this can only be done in cases of absolute necessity. The action must be limited to what is necessary to protect one’s rights and will not be liable for compensation.

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