Reverse Engineering's Impact on Trade Secrets: A Comparative study

Obeidat, M. Ibrahim[1], Dr. Al-shammari, A. Mohammad[1], Dr. Khasawneh, S. Saleem[1], Dr. Altaani Diala[2]

[1]Faculty of Law-Private Department/ Yarmouk University-Jordan
[2]Faculty of Law- Public Department/ Yarmouk University-Jordan
Email: ibraheemo@yu.edu.jo

Abstract

Reverse engineering is a legal technical method of obtaining product secrets by examining and analyzing them to form a reverse basis to determine the nature of the product and its mechanism of operation, with the goal of reproducing or producing an improved version of it. Given that trade secrets are considered intellectual property rights that legislation has guaranteed to protect against infringement or illegal access, how can reverse engineering affect the disclosure of the product's trade secrets, and is it a legitimate means of disclosing these secrets, or should they be framed within specific restrictions?. To answer these questions, this research was divided into two sections: the first looks at the definition of reverse engineering and its relationship to trade secrets, and the second looks at the legitimacy of reverse engineering. The study used analytical and comparative approaches from Jordanian and American legislation to conclude that the legislation permitted reverse engineering as an intellectual innovation that develops products, contributes to increasing the volume of commercial investments, and limits technological monopolies. However, this permission is not absolute and is subject to specific legal controls.

Keywords: reverse engineering, trade secrets, technology transfer contracts, unfair competition, and assistance agreements.

1. Introduction

Reverse engineering is a technical process aimed at analyzing existing products or systems to achieve a precise understanding of their design, components, and operational mechanisms. This process is utilized in various fields such as architectural engineering, software development, mechanical engineering, and others. Reverse engineering has a significant impact on commercial trade secrets because it enables competitors to uncover products and manufacturing methods using information extracted from this process, providing them with a competitive advantage in the market by launching similar products, thereby reducing marketing opportunities for the original projects.

This study aims to elucidate the relationship between reverse engineering and trade secrets and to analyze its impact on commercial projects and market economics in general. To achieve this objective, the study will review the methods used in reverse engineering and explain how they are employed to extract technical information from products and systems. Additionally, it will analyze the legal issues and challenges associated with reverse engineering to clarify its effects on trade secrets.

The significance of this study lies in its scientific and precise analysis of the legal implications of reverse engineering in the context of trade secrets, based on comparative legislation, judicial approaches, and legal opinions that address this issue from various perspectives.

The core issue of this study is whether reverse engineering is considered a means of infringing upon trade secrets or if it is a legitimate method sanctioned by legislation to balance the interests of the inventor or technology owner with the public interest. This issue gives rise to several questions:

What is reverse engineering, what are its tools, and what is its importance in benefiting from technologies?

What are trade secrets, what is their significance to their owner, and what role do they play in technology transfer?

What are the legal aspects and implications of the relationship between reverse engineering and trade secrets?

To address the study's core issue and questions, it has been divided into two main sections. The first section deals with defining reverse engineering and its relationship with trade secrets, while the second section explores the impact of reverse engineering on trade secrets and the resulting legal implications for commercial projects. To achieve the study's goals, an analytical approach has been adopted to analyze available scientific sources and previous studies related to reverse engineering and its impact on trade secrets, as well as to analyze the regulatory framework for trade secrets in Jordan and the United States, without neglecting a detailed examination of the relevant legal opinions.

Section One: Introduction to Reverse Engineering

The concept of reverse engineering refers to the process of analyzing existing products or technologies to understand how they function and their composition, with the aim of reproducing them through this analysis. The process of reverse engineering involves recovering information and designs of existing products or technologies. This implies that the analysis and understanding of the existing product or technology aim to uncover its secrets and extract the information and concepts used in its design or development. Thus, it is considered a crucial process in acquiring knowledge and gaining a deep understanding of existing products and technologies. What, then, is reverse engineering? (First requirement); and what is its relationship with trade secrets? (Second requirement).

Subsection One: The Concept of Reverse Engineering

Some define reverse engineering as the practical procedures for creating a reverse (regression) baseline to determine the nature of a product for the purpose of reproducing it or utilizing it . Alternatively, it is described as the method used to produce an enhanced version of the product by examining and analyzing it. As indicated by the U.S. Third Circuit Court, it represents a study and practical analysis of available products in the market to understand their construction, design, and operation mechanisms in order to develop a similar product or improve the version under analysis . Others define it as a practical practice aimed at analyzing something to determine how it was made or produced .

On the legislative level, U.S. lawmakers have considered reverse engineering a legitimate means of obtaining trade secrets. The explanatory memorandum of the law defines it as starting with the known final product and analyzing it in reverse to discover the method used in its production. The product intended for analysis must be obtained through lawful means, such as purchasing it from the market . Although the Uniform Trade Secrets Act (UTSA) does not address reverse engineering in its text, it is defined in the explanatory memorandum (Comments). However, the U.S. Congress has enacted a new law, the Defend Trade Secrets Act (DTSA), which defines it according to the explanatory memorandum of the UTSA but includes it explicitly in the text and excludes it as a means of unlawfully obtaining trade secrets .

In contrast, Jordanian legislation considers reverse engineering as an act that does not contravene fair commercial practices. However, it only mentions the term without defining its nature. This represents an unjustified expansion by the Jordanian legislator. It would have been more appropriate to define the concept of reverse engineering as the U.S. legislator did, by specifying the principles and rules underlying reverse engineering. It should not be taken in an absolute sense but should be defined with conditions addressed by these legislations, including obtaining the product through lawful means and conducting efforts independent of the original owner .

Reverse engineering is crucial for the development of commercial enterprises, as it helps in understanding how products and technologies work. This leads to the improvement and development of existing products or the creation of new products based on similar concepts and technologies. It also aims to verify the performance of certain products or ensure they meet required specifications and standards. Additionally, it can be used to identify and address defects and issues in products. It provides an opportunity to redesign or customize products to meet specific needs or enhance their performance, allowing the extracted concepts and techniques to improve design and achieve a more effective and efficient product .

Reverse engineering is considered a significant method in the development of industries, including software development. Its importance lies in the intellectual creations, efforts, and funds expended to acquire information and trade secrets on which product development is based. This justifies the legislative permissibility of reverse engineering, as it involves obtaining new information leading to the advancement of what is currently available. It is a legitimate method through which reverse engineers gain rights to the information they uncover .

Selling products in the open market is seen as a form of disseminating innovations to make them publicly available. If not protected by patent law, this is not considered an infringement of trade secrets involved in their creation. It is not deemed an infringement unless it involves misuse of

the trade secret, such as theft, breach of trust, or engagement in unlawful behaviors like inducement, bribery, or coercion to obtain such secrets.

The legislative permissibility of reverse engineering is primarily aimed at the right to access information for societal benefit. Therefore, the legislator grants inventors an exclusive right to their invention for twenty years in exchange for its disclosure for the benefit of society. This legislative policy seeks to balance the interests of the inventor and society. If an inventor wishes to protect their invention under trade secret law, it would be subject to disclosure through reverse engineering. Therefore, strict protection of trade secrets by prohibiting reverse engineering would disrupt this balance by elevating the protection of trade secrets to the level of patent protection, thereby depriving society of the development and innovation that would otherwise be available to a wider group of inventors .

From the definitions provided, reverse engineering is confined within an intellectual concept that reflects independent creativity, whether aimed at achieving the final product itself or enhancing it to improve its efficiency and performance. This aligns with the interpretation of the U.S. Supreme Court, which clarified that trade secret law does not protect information obtained through innovative methods consistent with lawful and ethical means, including reverse engineering aimed at understanding or improving the production mechanism . The explanatory memorandum of the U.S. Trade Secrets Act asserts that the policy of trade secret law aims "to maintain standards of commercial ethics ." This is supported by the American Restatement of Torts, which indicates that infringement actions cannot be confined to a single framework, suggesting that some actions may be lawful in obtaining trade secrets . The American Restatement (Third) of Unfair Competition views self-discovery and analysis of available products and information as not constituting unlawful means of acquiring trade secrets. However, whether this permissibility is absolute or conditional will be addressed by examining the conditions required for reverse engineering to be considered a lawful practice compliant with fair competition rules.

Subsection Two: The Relationship Between Reverse Engineering and Trade Secrets

When discussing the relationship between reverse engineering and trade secrets, it is essential to address the concept of trade secrets and their legal nature to define this relationship and clarify the ways in which they influence and interrelate. The concept of trade secrets has emerged as a significant and modern legal concept due to its comprehensive nature, reflecting technological developments and their commercial connections characterized by freedom and competition. Modern trade secrets are based on information, whether documented or not, provided it is kept confidential, holds economic value, and maintains its secrecy. Trade secrets are not limited to scientific and technological subjects but also encompass business-related information, including financial and administrative data such as production processes, data aggregation, computer programs, and algorithms. Basic ideas and methods for designing semiconductor chips can also be considered trade secrets as they are crucial information linked to the product, affecting its production and marketing processes, and providing the owner with significant competitive value in the market by keeping it away from competitors .

Thus, trade secrets are information with significant economic value, provided they are kept confidential. They represent ownership of ideas and innovations that do not meet the criteria for patent protection in industrial and commercial fields or those that the holder does not wish to protect under patent law due to its temporary nature. Although it is challenging to maintain such secrecy due to the potential for transmission and access , it is sufficient to surround them with physical and legal measures to ensure compliance with the legal requirements for their existence and protection. Consequently, they remain a source of competitive value as long as they are kept confidential by the holder and remain protected as long as they are not in the public domain and have not been disclosed .

Trade secrets do not require adherence to the substantive criteria for patents. They represent an important alternative for protecting inventions outside the scope of patent law, allowing inventors the freedom to choose their legal protection method—either seeking a patent or maintaining the information as a trade secret .

It is noteworthy that not all information qualifies as a trade secret. The legislator has stipulated that for information to be considered a trade secret, it must be confidential, difficult to access, and economically valuable, either currently or potentially, derived from its secrecy and general unawareness. The holder must also maintain it under reasonable legal and physical measures to ensure its confidentiality . Therefore, information not meeting these criteria falls outside the realm of trade secrets, such as public information or knowledge available to those in the industrial and commercial field, which is regarded as personal skill even if substantial money and effort have been invested in it .

From the definitions of trade secrets provided, it is evident that reverse engineering has a significant relationship with trade secrets, as reverse engineering relies on trade secrets. Reverse engineering can only be conducted by obtaining information through the analysis of a product, and this information cannot be protected by a patent as it is registered and protected under patent law. On the other hand, trade secrets can be accessed to understand the product. If obtained through lawful means, it is not considered an infringement of those trade secrets, as it is a legitimate competitive activity contrary to patent rules. Thus, the existence of reverse engineering is closely tied to trade secrets .

The question arises: Is reverse engineering always considered entirely legal, or are there specific conditions that must be met for it to be deemed lawful? This will be explored in the following section.

Section Two: The Legitimacy of Reverse Engineering

Reverse engineering must adhere to specific legal constraints so that it does not, in itself, constitute an infringement on the rights of others or be prohibited by legislation or contract. This implies that the right of a trade secret owner is not absolute regarding the possession and use of that secret, and the protection of trade secret ownership is realized if it is acquired, used, or disclosed through unlawful means . Therefore, the acquisition of trade secrets through reverse engineering is not permitted universally; there are controls and conditions that must be met for it to be deemed lawful. But when is reverse engineering considered legitimate, meaning it does not amount to an infringement on trade secrets? To answer this question, it is necessary to

examine the legal circumstances that permit the use of reverse engineering as a form of creative self-expression executed through technical means to obtain information for the purpose of product development.

Subsection One: Obtaining the Product Legally

Those who engage in reverse engineering must acquire the product to be reverse-engineered through lawful means, such as purchasing it from the market. Conversely, if reverse engineering is conducted on products obtained through unlawful means, such as theft or breach of trust, it is considered illegal, and reverse engineering shifts from the realm of permissibility to that of prohibition. This entitles the trade secret owner to pursue legal action for infringement on their trade secrets to stop the violation .

It is noteworthy that U.S. courts have upheld the legitimacy of reverse engineering in accordance with general rules if it is conducted through lawful means without infringing on others' rights. This indicates that reverse engineering does not constitute a valid defense if unlawful means are used to acquire the information, nor does it serve as a defense under criminal laws. The Fifth Circuit Court of Appeals has ruled that "the defense of reverse engineering is unavailable if the defendant initially engaged in unlawful activities by copying the program and then performed reverse engineering on that copy ." Similarly, the Second Circuit Court of Appeals has affirmed this approach by ruling that the determining factor in obtaining the trade secrets in question was that it was done through lawful and fair means and not obtained through a confidential relationship with the employer .

Thus, reverse engineering of a product to determine its design specifications is permissible as long as the means used to acquire the necessary information for reverse engineering are available and accessible in the public domain, rather than through a confidential relationship established with the product’s manufacturer or owner.

Legislators have confirmed the legitimacy of reverse engineering if conducted through lawful means and independent of trade secrets owned by others. The U.S. legislator has emphasized the need to obtain information through reverse engineering using legal methods, requiring the acquisition of the product or goods through fair and lawful means, such as purchasing it from markets, to ensure the legality of reverse engineering and to prevent it from being considered an infringement on trade secrets .

On the other hand, Jordanian legislation considers that obtaining a trade secret in a manner that contravenes honest commercial practices constitutes an abuse of the trade secret. The legislation specifies actions that violate honest commercial practices, including: breach of contracts, breach of confidentiality obligations or encouraging such breaches, and obtaining trade secrets from another party who acquired them through unlawful means with knowledge or the possibility of knowing such. These actions are listed as examples, not an exhaustive list, so any act leading to the acquisition of trade secrets through illicit means without the trade secret owner’s consent is deemed to breach honest commercial practices.

From this, it can be inferred that the product subject to reverse engineering must be available in the market, implying that the efforts to complete the reverse engineering process are conducted

separately from the trade secret owner so as not to infringe upon their rights. Acquiring information through other means would be unlawful due to the lack of connection between the reverse engineer and the trade secret owner. Therefore, the exclusive method is to obtain the product through markets to ensure the legitimacy of reverse engineering.

Subsection Two: Absence of Contractual Conditions Preventing Reverse Engineering

A trade secret owner may include clauses in licensing agreements that prohibit reverse engineering. These clauses are enforceable if agreed upon by both parties and are an important means of protecting trade secrets, especially if they consist of secrets and information that can be easily accessed through the product or service or through the development of models derived from them .

Licensing intellectual property rights, in general, is a significant outcome of the protection system for these rights. It represents a practical translation of the exclusive right of the intellectual property owner in exchange for disclosing it for the benefit of society. This has led to the idea of exploiting these rights to achieve financial benefits for intellectual property owners. Practical experience with intellectual property licensing indicates that licensing patents without including the associated trade secrets is ineffective and insufficient for commercializing the knowledge from the licensor to the licensee. Thus, trade secrets accompanying an invention are crucial because they describe its operation and utilization. It is often preferable to regard accompanying trade secrets as the most important part of the contract because they provide the licensee with access to expertise and reports related to the business associated with the invention. They also contain information about the market and potential customers. More importantly, trade secrets are kept confidential by the owner to ensure their protection, whereas the invention enjoys absolute protection for a limited period despite its disclosure . Consequently, trade secrets are considered an essential part of most technology transfer contracts, and they are the subject of reverse engineering. Some view them as increasing the value of intellectual property licensing from three to ten times the contract value .

Based on this, the failure to address and include trade secrets in a technology transfer contract makes the contract deficient. This is because it prevents the licensee from exploiting the intellectual property rights, especially if the licensed rights relate to a patent . Therefore, it is crucial to maintain the confidentiality of information so that it cannot be disclosed. Non-disclosure agreements are the primary tool governing the maintenance of the confidentiality of such information during its transfer. They also outline the mechanisms for sharing and using the information. However, they do not typically require granting licenses for that information. The licensor may impose restrictions regarding non-disclosure of information, such as in reverse engineering or chemical compositions.

Thus, technology-producing businesses may enter into various contracts designed to determine the appropriate options that define the capabilities and choices of the licensee, as well as their ability to assess the licensed materials. This includes service or technical assistance agreements, which specify the mechanisms for testing these materials, their operational capabilities, and their compliance with licensing conditions. Additionally, these agreements outline the procedures for

technical assistance or services that the producer must provide to ensure the product's continued efficient operation under the licensing terms .

Furthermore, these agreements define the licensee's ability to handle new ideas and inventions resulting from the analysis and testing of the licensed product. This includes whether the resulting invention belongs to the technology producer or whether the licensee can claim ownership if the invention is considered a result of their independent effort, such as through reverse engineering or self-innovation. In these scenarios, knowledge producers might impose restrictive conditions that limit and confine the use of these products and new inventions to their benefit, often referred to as reverse licensing. They may also require control and exclusivity over these products before they are acquired. These restrictions are commonly implemented in assistance agreements made by Contract Research Organizations (CROs), which stipulate complex testing and research systems to be applied to the materials, ideas, and concepts being licensed. In such cases, knowledge producers might impose conditions to restrict and confine the exploitation of these products and new inventions for their own benefit, also known as reverse licensing. Such restrictions are often established in assistance agreements by Contract Research Organizations (CROs), which require comprehensive testing and research systems for the licensed materials, ideas, and concepts .

The U.S. legislator considers discovering information and trade secrets through a legal license granted by the owner to the licensee as a legitimate means of acquiring trade secrets . However, this should not be taken universally; caution is needed due to potential complications. The owner might include clauses in the licensing agreement prohibiting the handling of the trade secret subject to the license, such as through reverse engineering or self-development in a manner that contravenes the agreement or is separate from the owner’s relationship. The licensing relationship necessitates disclosing the trade secrets subject to the license, making it impossible to obtain the trade secret independently of the licensing agreement. Therefore, the conditions of a trade secret licensing agreement are enforceable, and any breach of those conditions inherently constitutes a violation of the confidentiality and contractual relationship between the parties or is considered an unlawful means of obtaining the trade secret .

In regard to Jordanian legislation on this matter, it has moved towards invalidating any clause or condition that requires the licensee to transfer improvements made to the technology solely to the licensor; this is known as reverse licensing. This means that any development made on the products by the licensee is their right to exploit. If the licensor imposes conditions that prevent the use or transfer of these improvements to others, such conditions are considered void. This implies that reverse engineering is recognized as a right of those who have achieved it, and thus, they have the right to act upon that right as they see fit. Any conditions that prevent or restrict this right are deemed invalid, as they restrict fair competition, hinder technology transfer and dissemination, and adversely affect trade . Confirming the stance taken by both Jordanian and American legislators on this issue, this approach is, in fact, a stimulus for invention and development, as well as for expanding commercial investments. Simultaneously, it limits the monopolistic practices of major enterprises on goods and services, thereby fostering a free investment climate characterized by fair competition, which ultimately benefits the consumer public.

The approach taken by both Jordanian and American legislators aligns with the TRIPS Agreement, specifically Article 40, which grants countries the authority to determine that certain practices or conditions stipulated in licensing agreements related to intellectual property rights may have negative effects on trade and could hinder technology transfer and dissemination. It allows countries to stipulate in their legislation that practices or conditions in intellectual property licensing agreements may, in certain cases, constitute an abuse of intellectual property rights or negatively impact competition in the relevant market.

Technology transfer deals, including the associated programs and applications, are among the areas where reverse engineering is most common because these deals are generally more connected to licensing agreements than to sales and assignments. Therefore, clear legal and doctrinal trends defining the relationship between the seller (trade secret owner) and the buyer (other party) regarding the buyer's rights in reverse engineering are still developing, resulting in varied judicial decisions on this right .

On the other hand, some argue that reverse engineering can be a means of infringing on trade secrets, especially if those secrets cost the owner significant time and effort and substantial financial investment, particularly if reverse engineering is carried out in bad faith . However, the reality is that the procedures, methods, and costs associated with creating trade secrets are not a criterion for maintaining protection or preventing disclosure. Instead, the focus should be on the trade secret as a defined legal concept, regardless of the effort and money involved in creating it, as long as there are legal conditions defining this concept in terms of acquisition, protection, and loss.

2. Conclusion

This study reached several conclusions, summarized as follows: Reverse engineering is closely linked to trade secrets because it is fundamentally performed to obtain the secrets of the final product in order to manufacture or develop modified versions of it. The underlying principle in comparative legislation and judicial doctrines is that reverse engineering is permitted as an intellectual endeavor that enhances products, increases commercial investment volumes, and limits technological monopolies. However, this permission is not absolute; it is constrained by legal regulations. Reverse engineering must be conducted on products obtained through lawful means only, such as purchasing the product from the market. Reverse engineering performed on products acquired through unlawful means—such as theft, breach of trust, incitement, or disclosure of trade secrets—is not considered legitimate but rather an infringement on trade secrets.

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