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The Civil Liability of Artificial Intelligence Applications: Between the Limitations of Traditional Liability and the Evolution of the Product Concept

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Abstract - **The expansion in the field of artificial intelligence (AI) has led to the emergence of complex legal challenges, particularly concerning civil liability for damages that may arise from these systems. This raises questions about the adequacy of traditional legal frameworks in addressing such technological transformations. This study examines civil liability for damages resulting from the use of AI applications by analyzing the suitability of contractual and tort liability rules, as well as the need to develop the legal concept of a product to enable the application of strict liability. The research employs a comparative analytical approach, focusing on three Arab countries: the United Arab Emirates, Iraq, and Egypt. Its aim is to conduct a comparative analysis that highlights legislative gaps and frameworks of civil liability through a review of relevant legislation and contemporary legal scholarship, particularly within the context of the European Union. The objective is to formulate a modern legal perspective that reflects the nature and challenges of artificial intelligence. The study clarifies that traditional civil liability rules were not designed to address damages caused by autonomous, dynamic technological systems like AI, where proving fault or causation presents a significant challenge. This is particularly due to the multiplicity of actors involved (developers, users, data providers, and manufacturers) and the overlap in their roles. The research further demonstrates that strict liability, especially under the framework of defective product liability, represents a viable alternative for compensating victims without requiring proof of fault, provided that a defect exists in the system or intelligent application.**

Keywords: **Artificial Intelligence, Civil Liability, Defective Product, Digital Damages, Strict Liability**

I. INTRODUCTION

Artificial intelligence has become a tangible reality, manifested in practical applications across a wide range of fields, including medicine, judiciary, industry, commerce, and transportation, and even in data management and decision-making. One of the most distinctive features of this technology is its capacity for self-learning and continuous development, which sets it fundamentally apart from traditional technological tools based on conventional programming.

With the rapid expansion of AI systems, numerous legal challenges have begun to emerge, particularly those related to civil liability for damages that these systems may cause. AI applications can now lead to material or moral harm to individuals or institutions—whether through misjudgments, data malfunctions, or decisions made by the systems without direct human intervention. This raises a highly important question: Who bears responsibility when harm results from the use of an intelligent system? And are the current legal rules—especially those governing civil liability—adequate to address these qualitative shifts in the nature of harmful actions?

Traditional civil liability, whether in its contractual or tortious form, was formulated within a legal and social context in which human actions were the primary source of harm. In such a context, the causal link was relatively clear, and fault could be attributed to a natural or legal person possessing both will and legal capacity (Ali, 2023). Today, however, we are dealing with autonomous systems that learn and make decisions based on the analysis of massive datasets, without direct human involvement (El Shamsy, 2017; Al-Hakim et al., 2018; Al-Jabouri, 2022) x. This reality complicates the identification of the responsible party, the assessment of fault, and the establishment of causation, thus presenting challenges that exceed the boundaries of traditional civil liability frameworks (Marinković, 2024; Al-Dumyati, 2021).

On the other hand, a new legal trend has emerged, aiming to move beyond fault-based liability by developing the concept of strict liability—particularly through mechanisms of liability for defective products. Within this framework, it has become conceivable to classify certain AI applications as “products,” thereby allowing liability to be assigned to the system’s manufacturer, developer, or distributor without the need to prove fault, provided that a defect or malfunction caused the damage. Nevertheless, this approach faces significant challenges, most notably the question of whether software systems qualify as "products" in the legal sense, and whether a flaw in the algorithm or learning mechanism

constitutes a legally recognizable "defect" for which the producer can be held accountable.

Research Significance

The significance of this research lies in its endeavor to provide a comparative analytical study of civil liability arising from the use of artificial intelligence (AI) applications (Kharitonova et al., 2022; Ahmed & Maher, 2022). It achieves this by examining the shortcomings of traditional civil liability systems and evaluating the effectiveness of proposed solutions, particularly in the context of the evolving concept of a product and the growing adoption of strict liability. The research also holds importance in its comparative analysis of three countries—the United Arab Emirates, Iraq, and Egypt—as analytical models, given their varying levels of legal development in the field of AI. The UAE is considered a pioneer in regulating technologies such as autonomous vehicles, while Iraq reflects a reliance on traditional frameworks without dedicated legislative updates (Ali, 2023; Godswill et al., 2016). Egypt, on the other hand, represents a model of AI application in the medical sector without sufficient legal adaptation (Ali, 2023). This diversity enables a comparative analysis that highlights the contrasting experiences among the three countries (Nwosu & Adeloye, 2023).

II. RESEARCH METHODOLOGY

The research will rely on an analytical approach to relevant texts and a comparative study of jurisprudential and legal positions. Three Arab countries—the United Arab Emirates, the Republic of Iraq, and the Arab Republic of Egypt—have been selected as analytical models for the study. The new direction of the European Union will also be referenced, highlighting the need to amend or develop the current legal framework to accommodate the challenges posed by artificial intelligence (Chatterjee & Singh, 2023) Research Problem:

Accordingly, the research seeks to address the following central question:

Are traditional rules of civil liability sufficient to regulate the consequences of using artificial intelligence applications, or does the emerging legal reality require a re-evaluation of existing legal concepts and mechanisms?

Research Plan

To address the research problem, the text will be divided into three main sections, as follows:

- Section One: Contractual Liability of Artificial Intelligence.
- Section Two: Tort Liability of Artificial Intelligence.
- Section Three: Strict Liability.

Section One: Contractual Liability of Artificial Intelligence

refers to the consequences of breaching a contractual obligation, whether the breach results from a delay in fulfilling the obligation or a refusal to fulfill it. Merely refusing or delaying the fulfillment of the obligation inherently incurs liability, entitling the injured party to fair compensation for the damage incurred. This applies even if the refusal or delay is intentional, in bad faith, involves fraud, or constitutes a gross error (Alwan, 2024). This section will be examined through a two-part analysis: Part One addresses the elements of contractual liability, and Part Two explores the contractual liability of artificial intelligence applications as per the provisions of civil law (Said et al., 2024; Al-Oboudi 1997).

Part One: Elements of Contractual Liability

The realization of contractual liability necessitates the presence of three essential elements. Firstly, there must be a contractual fault. Secondly, this fault must cause damage to the other party. Thirdly, the fault must be the cause of the damage within a framework of causal relationship.

1. Contractual Fault: Contractual fault is embodied in the debtor's failure to fulfill their obligation, whether that obligation is one of care or of achieving a specific result. Contractual fault may manifest as the total or partial refusal of one of the contracting parties to fulfill the obligations they have undertaken. The breach may also take the form of a delay in performance or the defective execution of the obligation. The creditor bears the burden of proving that the debtor has not fulfilled their obligation. However, the debtor may prove that their failure to fulfill the obligation was not due to their fault but rather to an external cause beyond their control (Ma'ruf & Thajeel, 2024; Alwan & Hassan, 2024; Nasr Abu Al-Fotouh Hassan, 2024). The defect warranting a guarantee must meet certain conditions: it must be unknown to the buyer, not apparent, pre-existing in the sold item, and significant. In reality, according to the majority of legal scholars, the rules governing the guarantee for hidden defects are flexible in scope. This includes material damages resulting from the safety risks that artificial intelligence robots may pose (Oliveira, 2016; Ivancevi, 2012).

2. Damage: This is the second element of contractual liability, defined as the harm inflicted upon an individual's right or legitimate interest. The existence of damage is essential for establishing this liability against the debtor. The creditor bears the burden of proving the damage. Damage can be either material, affecting a person's physical well-being, property, or financial standing, or non-material. Contractual damage is the tangible manifestation of the consequences of contractual fault. This means that if no damage results from the fault, the rules of contractual liability do not apply. Any financial losses or missed profit opportunities incurred by the contracting party must be directly linked to the act giving rise to this liability (Al-Haddam, 2022). In the context of artificial intelligence, damage can take various forms. It may result from defective products, such as a faulty smart vacuum robot that knocks over objects in its path. Damage may also arise from the use of AI technologies on individuals or property, as in the case of a surgical robot causing complications for a patient. In such instances, the injured party may seek recourse

against the responsible party, such as a doctor, on the grounds of breach of their obligation to exercise the required care (Aboudi, 1997).

The damage must be actualized, meaning it has already occurred, such as when the injured party suffers physical impairment due to the use of artificial intelligence technology. Alternatively, it may be certain to occur in the future, such as when the injury is guaranteed to lead to the victim's death or disability as a result of that use. Additionally, the damage must be personal. If the claimant has not been personally harmed, the liability claim will not be admissible (Alwan, 2024).

3. Causal Relationship: The third element of contractual liability, where the occurrence of fault and damage alone is insufficient. It is necessary that the fault be the direct cause of the damage (Reesan Jader & Atwan, 2024).

The creditor bears the burden of proving the causal relationship between the fault and the damage. The fundamental principle applied in this regard is that "the burden of proof lies with the claimant, and the oath lies with the denier." Since the creditor is the claimant, they bear the burden of proof in cases where the debtor fails to fulfill their obligation. If the creditor proves this, the law presumes the debtor's fault. However, this presumption is not conclusive, as the debtor may demonstrate that their failure to fulfill the obligation was due to a cause beyond their fault, such as an act of God, unforeseen accident, fault of the injured party, or the act of a third party (Al-Hakeem et al., 2018).

Article 211 of the Iraqi Civil Code states: "If a person proves that the damage arose from a cause beyond their control, such as an act of God, unforeseen accident, force majeure, the act of a third party, or the fault of the injured party, they shall not be liable for compensation unless otherwise provided by law or agreement." Establishing the connection between fault and damage in the context of artificial intelligence involves proving a material fact, particularly since the damage results from technical components, which may be proven by any means of evidence (Article 448 of the Iraqi Civil Code & Article 7 of the Iraqi Evidence Law No. 107 of 1979).

Part Two: Contractual Liability of Artificial Intelligence Applications According to Civil Law Provisions

The Iraqi legislator has regulated contractual liability in accordance with the general principle outlined in Article 168 of the amended Civil Code. This article defines the scope of such liability, which arises from the failure to fulfill an obligation specifically or the delay in its fulfillment, constituting a contractual fault. The legislator also addresses the generality of these obligations in paragraph (2) of Article 169 of the Civil Code, without overlooking its applications. It states: "Compensation shall be due for any obligation arising from the contract, whether it is an obligation to transfer ownership, usufruct, or another real right, or an obligation to perform an act or refrain from an act. It shall cover both the loss sustained by the creditor and the profit missed due to the loss of the right or the delay in its fulfillment, provided that this is a natural consequence of the debtor's failure to fulfill the obligation or their delay in fulfilling it". Upon examining the above text, it becomes clear that it does not cover damages arising from artificial intelligence. The reason lies in the fact that the obligations intended by the Iraqi legislator require the personal intervention of the contracting party in causing the damage as a result of the fault, with a causal link between the fault and the damage. Such fault cannot be attributed to artificial intelligence in isolation. Moreover, it is impossible to conceive of artificial intelligence as a party to a contract, as the Iraqi legislator defined a contract in general terms in Article 73 of the Iraqi Civil Code, which states: "A contract is the linkage of an offer made by one contracting party with the acceptance of the other in a manner that establishes its effect on the subject matter of the contract". The definition was not intended to encompass artificial intelligence technology, as its meaning is confined to an agreement concluded between two or more persons based on a will directed toward the formation of such a contract (Al-Abbasi, 2023).

The exclusion of artificial intelligence from the definition can be justified because will is a temporary psychological phenomenon, and its expression is sufficient for its existence, transforming it into a social phenomenon. One of its characteristics is that it dissipates upon disclosure. It is considered the essence of legal acts, whether arising from the convergence of two wills or from a single will (Al-Dimyati, 2021). Will can produce legal effects, serving as a source of rights and obligations. This makes the manifestation of will an imperative necessity for it to be recognized by law. Such manifestation occurs through its expression. It is also necessary to communicate that will through a directed expression that conveys the intention to commit, whether positively through speech, writing, gesture, or any unequivocal indication of that will, or negatively through silence that constitutes acceptance (Articles 79, 80, and 81 of the Iraqi Civil Code No. 40 of 1951, as amended). Will is linked to the principle of consensuality, which is based on the freedom to create acts and assume obligations. The role extends beyond the will to express to the will to produce effects. The relationship between will and expression is natural, and the agreement between them is inseparable except based on an intent that contradicts the true will when it is marred by a defect that conflicts with the principle of consent, whether the will is apparent or latent.

Artificial intelligence systems may appear to simulate human will in its essence and components, particularly with their ability to speak, make decisions, and express stored knowledge. However, this simulation cannot be considered a true replication of human will and its modes of expression, for two main reasons: First, scientific advancements have not proven a genuine equivalence between human will and the will of artificial intelligence. Second, legal rules governing

the actions of natural and legal persons cannot be directly applied to artificial intelligence systems. The will in these systems remains artificial, constrained by human-designed programming limits, and lacks the distinction between apparent and latent will. Their outputs are predetermined and do not exhibit internal variability, as is the case with humans (Al-Abbasi, 2023).

In accordance with the general provisions of contracts, the UAE legislator permits contracts to pertain to anything not prohibited by law or contrary to public order or morals (Articles 199–206 of the UAE Civil Transactions Law No. 5 of 1985, as amended by Federal Decree-Law No. 30 of 2020). Given that artificial intelligence can be either physical, such as a robot with a tangible presence, or intangible, such as smart applications and algorithms provided to people for use on their smart devices, the physical type of artificial intelligence with a tangible existence—such as robots, drones, and smart devices—can be treated as tangible movables subject to the general rules governing the trade of movables. Ownership is transferred upon the conclusion of the contract, with the obligation to establish a special registry for its registration to preserve its specificity. This registry would include data related to the AI, program specifications, and usage methods, ensuring transaction transparency and identifying the party responsible for damages and the guarantor, as is the case with autonomous drones and self-driving cars (AlKhamaiseh et al., 2025).

As for the intangible type of artificial intelligence, such as smart applications and blockchain, these are non-tangible transfers with no physical existence. They can be dealt with, but the UAE legislator has not distinguished in its definition of "things" between tangible and intangible ones, so they can be addressed through legal means. Similarly, the legislator has not differentiated between the rights applicable to tangible and intangible things. Nevertheless, the rights applicable to intangible things are moral rights governed by special laws, such as those related to intellectual property. This is addressed in Law No. (38) of 2021 concerning Copyright and Neighboring Rights (AlKhamaiseh et al., 2025).

It is noteworthy that the United Arab Emirates is among the pioneering countries in introducing smart vehicles and enacting specific legislation to regulate them. This is exemplified by Law No. (9) of 2023 concerning the regulation of the operation of autonomous vehicles in the Emirate of Dubai. Article 14 of this law stipulates: "The operator shall be liable for compensating damages caused to individuals or property by the autonomous vehicle. This shall not prejudice the operator's right to seek recourse against the actual party responsible for such damages, in accordance with the general rules of liability established in this regard".

Through the aforementioned law, the Emirati legislature has introduced a practical solution to facilitate the compensation of injured parties in cases of civil liability arising from smart vehicles. It achieves this by designating the operator as primarily liable for ensuring compensation for damages. However, the operator retains the right to seek recourse against the actual party responsible for such damages. It is evident that the general rules of civil liability, in their current form, are insufficient to provide effective solutions to the complex issues related to liability arising from damages caused by artificial intelligence in general (Hassan, 2024).

In Egyptian legislation, the contractual liability of artificial intelligence systems still falls under general rules. The provisions of contractual liability apply if artificial intelligence systems are not delivered in accordance with the terms and conditions of the contract between the seller (manufacturer) and the buyer (user). It is clear that a robot is merely a commodity or product exchanged. Therefore, some scholars argue that applying traditional liability rules in cases of contract breach does not pose any problem (Al-Rashed, 2022).

The non-conformity of artificial intelligence systems with the specifications outlined in the contract entitles the buyer to compensation. The creditor is not obligated to accept something other than what is due, even if it is of equal or higher value. Under the Egyptian Civil Code, the seller is also obligated to deliver the sold item to the buyer in the condition it was in at the time of contracting (Articles 341, 431, and 215 of the Egyptian Civil Code No. 131 of 1948). In addition to the seller's obligation to ensure the functionality of the sold item, there is no doubt that this latter obligation is contractual. These obligations are considered obligations to achieve a result. Therefore, if there is a change in the condition of the sold item, its ruling differs depending on whether the change is for the worse or for the better. It is noted that the obligation to ensure the functionality of the sold item is not fulfilled merely by achieving this result; rather, it must be accomplished in a manner consistent with the terms of the contract and the requirements of good faith (Al-Rashed, 2022).

The rules governing the guarantee for hidden defects are of a flexible scope, as they encompass material damages resulting from the safety risks posed by artificial intelligence systems. Accordingly, the provisions of contractual liability apply if these smart systems are not delivered in accordance with the terms and conditions of the contract between the seller (manufacturer) and the buyer. It is clear that these systems are merely a commodity or product exchanged. Therefore, it can be seen that applying traditional liability rules in cases of contract breach does not pose any problem.

However, this justification has been criticized on the grounds that applying contractual liability to artificial intelligence is insufficient to address all the damages caused by these applications. This is particularly because the theory applies to natural persons bound by a contract and does not include artificial intelligence. The latter cannot be a party to a contract. Even if we assume that the parties add clauses to the contract to describe the capabilities and risks of artificial intelligence, the contract only generates an obligation of care, not an obligation to achieve a result.

It is noteworthy that the Arab Republic of Egypt is among the countries that have begun effectively implementing artificial intelligence technologies in the healthcare sector. One example is the use of robots at Sharm El-Sheikh International Hospital. Among these robots is "Duet," which is tasked with guiding patients, organizing their entry into medical facilities based on specialty, and evaluating their visits. Another robot, "Rolly," is used to provide nursing care and transport samples and medications within isolation areas. Meanwhile, "Mozo" handles meal distribution to patients and gathers their feedback on the quality of medical services. The robot "MDR-C" contributes to sterilizing operating rooms and reception facilities using ultraviolet radiation in an environmentally friendly manner ("Healthcare: Enhancing Sharm El-Sheikh International Hospital," 2025). Despite the extensive and advanced use of these applications, the Egyptian legal system still lacks specific rules governing civil liability for potential damages arising from artificial intelligence. This creates a legislative vacuum in this rapidly evolving field.

From the review of legislative rules in Iraq, the UAE, and Egypt, it is evident that the contractual liability of artificial intelligence systems remains directly inapplicable. This is due to the lack of recognition in these legislations of artificial intelligence as a party to a contract with independent will. Liability in contracts involving artificial intelligence typically falls on manufacturers, developers, or operators, in accordance with traditional rules of contractual liability. It is noteworthy that both the Egyptian and UAE legislators have taken steps toward enacting legal provisions governing the use of automated drones, which may rely on artificial intelligence.

Section Two: Tort Liability of Artificial Intelligence

Tort liability refers to the "breach of a general legal duty imposed by law on all individuals not to harm others." The general principle underlying it is that anyone who causes harm to another is liable for compensation, even if they are not of legal capacity, based on the provisions of the law. Tort liability arises from the breach of an obligation whose source is the law. This liability presumes the absence of a contractual relationship between the creditor and the debtor. Tort liability is the general liability regime applied to civil wrongs committed by one person against another (Yas et al., 2023).

This can be applied to the person responsible for damages resulting from the use of artificial intelligence (Al-Qusi, 2018). For example, if a doctor relies on an AI-powered clinical decision support program to prescribe medication, but the program issues an incorrect recommendation that a reasonably competent specialist in similar circumstances would have noticed and ignored, the doctor may be held liable for the resulting harm and injuries to the patient due to their negligence, not because of the incorrect recommendation issued by the artificial intelligence (Wahbah, 2020).

Like contractual liability, tort liability is based on three elements: fault, damage, and the causal relationship between them. For the injured party to obtain compensation, they must prove these elements, which can be clarified as follows:

1. Tortious Fault: Defined as a breach of a pre-existing legal obligation that occurs with awareness (Hassan, 2019). This pre-existing legal obligation is the duty of every individual to respect the rights of others and not to harm them, which is an obligation of care. The care required here involves taking precautions, exercising foresight, and maintaining vigilance in one's conduct to avoid harming others (Al-Jubouri, 2022). As evident from the definition, tortious fault consists of two elements: the material element, which is the breach or violation, and the moral element, which is awareness or discernment. Since artificial intelligence systems differ from ordinary machines through their ability to operate autonomously without human intervention, these systems will make decisions regarding the functions they are designed for, without recourse to human input. An example of this is autonomous vehicles, which are naturally prone to accidents that may cause human injuries and property damage. Here, we must distinguish between two scenarios of violation by these (smart) vehicles, as follows:

First Scenario: The autonomous vehicle violates based on a command from its owner. In this case, the owner's liability arises. Here, there is no doubt that the operator or owner is held liable on the basis of tort liability, provided the injured party proves the violation and its connection to the damage (Salman, 2024; Taybi, 2018). For example, if the autonomous vehicle has specific issues with its brakes or operating software, and the operator or owner fails to perform the necessary maintenance, they would be liable to compensate the injured party for committing a tortious fault (Abdelnabi, 2022).

Second Scenario: The vehicle violates on its own without human intervention, such as when the vehicle moves while in park mode, without any command from the owner and without a destination being set. In this case, the owner bears no liability for any damages caused (Al-Soudi & Al-Duraie, 2019). The Law Regulating the Operation of Autonomous Vehicles in the Emirate of Dubai (No. 9 of 2023) holds the operator civilly liable for damages caused by the autonomous vehicle, including tortious faults related to artificial intelligence systems. The law allows the operator to seek recourse against other parties responsible for the malfunction, such as the manufacturer or developer, in accordance with the general rules of civil liability. Additionally, the law imposes several obligations on the operator to ensure the safe operation of the vehicle and mandates insurance to cover potential damages (Article 14 of the Law Regulating the Operation of Self-Driving Vehicles in Dubai, No. 9 of 2023).

2. Damage: This is the second element of tort liability, defined as harm inflicted upon an individual's right or legitimate interest. Damage may result from the use of

artificial intelligence applications, affecting others. The cause of such damage could be a fault by the manufacturer or programmer of the artificial intelligence, a fault by its owner or user, a fault by a third party, or a fault by the artificial intelligence itself (Abdelbaqi, 2022). The burden of proof lies with the injured party. Damage can be either material, affecting a person's property, body, or financial standing, or moral, affecting their feelings and emotions (Asran, 2023; Hathout 2024; Benhamou 2020). In incidents involving traditional machines, the damage is usually easy to identify, as it results from human error, a defect, or a malfunction in the machine. Therefore, the operator of such a machine bears full liability for the resulting damages. In contrast, with machines linked to artificial intelligence, such as smart vehicles, the human element has no direct control. In most cases, autonomous driving technology is likely to shift liability to the vehicle manufacturer and other parties involved in its production, rather than the driver (Alwan & Hasan, 2024).

3. Causal Relationship: Establishing a causal link between the wrongful act and the resulting damage involves distinguishing between direct and indirect damage. The purpose of this connection is to determine the obligation to compensate the party responsible for the harmful act, provided the complained-of damage is a natural and ordinary consequence of that act. The operation of artificial intelligence adds complexity to the issue of causation, as it may be difficult to prove that the analyzed behavior occurred simultaneously with the damage. For example, in neural networks that rely on learning algorithms, their internal analysis is opaque, and their logical sequence cannot be extracted. Therefore, some seek to track learning data using tools that continuously record and document its source and development, thereby recording the behavior of artificial intelligence with the aim of attributing this behavior to the responsible party (Youssef, 2021; Yusuf 2022).

Section Three: Strict Liability

The new legal situations arising from artificial intelligence applications necessitate a different approach from traditional rules regarding the identification of the party responsible for damages caused by AI-enabled machines. It is essential to move away from conventional foundations based on defect and fault and seek new grounds to justify civil liability in the field of artificial intelligence.

Strict Liability (or liability without fault) is a type of civil liability that operates regardless of the presence of fault or negligence on the part of the responsible party. This means a person may be held legally liable and obligated to compensate even if they have not committed any fault, simply because they are engaged in a hazardous activity or are the producer of a defective product. Therefore, some scholars have proposed establishing strict liability and imposing it by treating the use of artificial intelligence in certain places and circumstances as a hazardous and unnatural activity. This approach deviates from the traditional civil liability system, which requires a contract or fault as its basis (Hubbard, 2014; Sood, 2023; Pichler, 2021). Under strict liability, the injured party need only prove the damage without having to establish fault (Abdulrazzaq, 2023; Al-Atraq, 2023).

This section will be examined through a two-part analysis. In Part One, we will focus on the concept of products as defined in Iraqi law. Subsequently, Part Two will delve into the expanded understanding of the concept of products within European Union law.

Part One: The Concept of Products in Iraqi Law

The Iraqi Consumer Protection Law No. (1) of 2010 defines the term "commodity." Although the law does not directly define the term "product," the definition of commodity encompasses products of various types provided to consumers. This lends a general framework to the concept of a product in this context. The law defines a commodity as: "Any industrial, agricultural, processed, semi-manufactured, raw material, or other product that can be counted, weighed, measured, or quantified and is intended for consumption" (Iraq Consumer Protection Law No. 1 of 2010, Art. 1[Second]). The Iraqi legislator, in the Consumer Protection Law No. (1) of 2010, distinguishes the term "commodity" (product) from "service," defining the latter as: "Any act or activity provided by any entity, whether for a fee or not, intended for use or benefit" (Iraq Consumer Protection Law No. 1 of 2010, Art. 1[Third]).

The distinction between commodity and service reflects the legislator's intent to establish specific rules for each. The legal relationship and responsibilities between providers of goods and providers of services may differ, necessitating additional clarifications or provisions to define the relationship between products and services in modern contexts, such as artificial intelligence.

The injured party faces challenges in proving the existence of a defect or malfunction in artificial intelligence as a product, given the endless complexities of these smart applications. It is difficult for the affected person to identify and prove whether the defect existed at the time the smart application or robot left the hands of its manufacturer or developer. Determining the liability of the party responsible for artificial intelligence applications, in accordance with product liability rules, becomes increasingly difficult when distinguishing between damages resulting from the smart application's own actions—derived from autonomous decisions—and other damages arising from inherent defects or malfunctions. Artificial intelligence systems, by their inherently hazardous nature, may cause significant harm to users or third parties, with risks stemming from their composition, structure, or the surrounding circumstances in which these smart applications operate (Al-Abbasi, 2023, pp. 113–118). We hope that the Iraqi legislator will intervene to amend Article (1) of the Iraqi Consumer Protection Law No. (1) of 2010, specifically paragraph (Secondly). We propose that the text be revised to include products within the scope of artificial intelligence applications, defined by the programs and algorithms that

constitute them. This proposed amendment would place artificial intelligence systems within the framework of legislation that provides the legal protection consumers deserve, as they are the party that must be safeguarded from potential harms or any threats to their safety and health. This ensures the protection of social, economic, and environmental interests. Additionally, we propose amending Article (1) of the Law on the Protection of Iraqi Products or Similar Products Manufactured in Iraq or Imported from Abroad to guarantee protection from their harms. We suggest the following wording: "Industrial or agricultural products, both traditional and smart, whether plant-based, animal-based, produced in Iraq, or imported from abroad".

Based on the foregoing, artificial intelligence applications can be considered a commodity when viewed as programs or digital systems. If artificial intelligence is regarded as a digital product that can be sold or marketed (such as software or ready-to-use applications), it may be classified as a "non-tangible commodity," a concept that has begun to expand with technological advancements. Artificial intelligence applications can also be considered a service, as many applications (such as analytics systems or machine learning-based services) are provided as services. For example, companies offering artificial intelligence solutions to the medical or legal sectors provide services that fall under this description. Although the definition of "commodity" in Iraqi law is linked to traditional tangible products, technological developments necessitate broadening the concept to include digital products (Tarrad, 2025; Hussein, 2024).

Part Two: The Expansion of the Concept of Products in European Union Law

The European Parliament's resolution issued on October 20, 2020, emphasized the effectiveness of civil liability provisions for defective products. It noted that, over the past thirty years, these provisions have proven to be among the best means for obtaining compensation for damages caused by product defects (Council Directive 85/374/EEC, 1985).

However, these provisions must be reviewed and updated to address the challenges arising from digital technology, ensuring the best possible protection for consumers. The resolution stressed the need to define "products" by determining whether digital content and services (artificial intelligence systems) fall within their scope. It also called for the adaptation of certain concepts and terms, such as "damage," "defect," and "product." The concept of "product" must be expanded to include manufacturers, developers, programmers, service providers, and operators of the backend of digital technology systems. The resolution defines a backend operator as: "Any natural or legal person who continuously determines the features of the technology, provides data, and supports the essential backend service, thereby also exercising a degree of control over the risks associated with the operation and performance of the artificial intelligence system" (European Parliament, 2020, Art. 3(f)).

The resolution emphasized the need to rely on the specific rules of civil liability for defective products in claims arising from damages caused by artificial intelligence systems, provided that such systems meet the definition of a "product" in accordance with the European directive. It also stressed the importance of updating these rules to align with European Directive No. 95 of 3 December 2001 on general product safety, in order to ensure their compatibility with technological developments (European Parliament, 2020, Art. 8).

Product liability demonstrates significant effectiveness in regulating damages associated with artificial intelligence, holding manufacturers accountable for defects that cause harm, such as defectively designed autonomous vehicles or companies that fail to inform customers of risks. However, applying this liability to artificial intelligence systems, particularly AI applications, presents substantial challenges due to their autonomy and self-learning capabilities. This limits control over them and transforms them into a source of general risks. These systems can make independent decisions that are difficult to attribute to a specific malfunction or direct human intervention (Tayebi & Yekach, 2018).

Proving the existence of defects in artificial intelligence products poses a significant challenge, particularly when attempting to determine whether these defects were present at the time the product left the hands of its manufacturer or developer. Drawing a clear line between damages resulting from AI's autonomous decisions and those stemming from product defects is difficult. Additionally, the complexity of the production chain makes identifying the responsible party arduous, given the multitude of parties involved in the development and manufacturing of these systems (Dagher, 2023).

Consequently, there are cases where damage cannot be remedied based on the provisions of liability for defective products, particularly if the defect relates to the effects of self-learning and autonomous decision-making. For example, an artificial intelligence system like "Lurnox," used in trade chambers, may cause significant financial losses not due to its core programming but because of its owner's negligent use. In such contexts, courts in many countries, especially when examining design defects, resort to analyzing aspects beyond traditional defects to more accurately determine liabilities (Rahmani, 2016).

Applying the principle of strict liability to artificial intelligence applications poses a challenge due to their exceptional nature as hazardous activities resulting from scientific and technological advancements. The danger of smart robots lies in their difficulty to penetrate and their extreme complexity, making it complicated or even impossible to prove fault. Additionally, the mobility of robots increases potential risks; for example, self-service robots, such as delivery robots, may leave the possession of their

owner and cause harm to others during their movement (Dagher, 2023; Soyer, 2022; Kārkliņš, 2020).

In addition to the exceptional nature of smart robots, their lack of widespread and conventional use complicates a full understanding of their limited characteristics. As a result, they may be classified as hazardous activities not specifically regulated, based on the precautionary principle, which aims to protect consumers, the environment, and public health from potential risks (Ivancevic, 2012; Badawy, 2025; Pałka, 2025). However, applying this principle to robots faces significant challenges, as it may lead to excessive protection based on anticipating and predicting risks that are currently unverifiable. These risks may cause substantial and far-reaching damages in the future, potentially surpassing the consequences of economic crises (Al-Qawsi, 2018; Asadinejhad, 2024; Abou Kamar, 2021).

It is noteworthy that the Arab Republic of Egypt has shown significant interest in artificial intelligence applications and their uses. This is reflected in the establishment of the National Council for Artificial Intelligence and the issuance of several important documents, including the National Strategy for Artificial Intelligence 2025-2030 and the Egyptian Charter for Responsible Artificial Intelligence 2023. According to the National Strategy for Artificial Intelligence, an Egyptian law to regulate artificial intelligence is currently under preparation and is in the drafting phase (Regulating Artificial Intelligence in Egypt, 2025; Farajpour, 2025; de las Heras Ballell, 2025). The United Arab Emirates, on the other hand, has already begun issuing legislation specific to artificial intelligence applications, such as Law No. (9) of 2023 concerning the regulation of the operation of autonomous vehicles in the Emirate of Dubai. Additionally, the UAE has issued the Charter for the Development and Use of Artificial Intelligence (2024) to promote the ethical and responsible use of artificial intelligence (UAE Government, 2024). Lastly, Iraq is somewhat behind in developing legislation for artificial intelligence and its applications. However, there are some initiatives, including one by the Iraqi Minister of Communications, proposing legislation to define the uses of artificial intelligence and establish global frameworks and standards to be officially adopted for "embedding AI ethics" (Draft AI Law in Iraq, 2025; Reimann, 2003).

III. CONCLUSION

After reviewing the legal aspects related to civil liability arising from artificial intelligence applications and highlighting the shortcomings of traditional liability frameworks, it has become evident that these applications present new challenges that necessitate a reevaluation of prevailing rules. Below, we will address the findings and proposals as follows:

First: Findings

1. The three countries (Egypt, the UAE, and Iraq) are moving toward regulating the use of artificial intelligence, but at varying levels of progress. The United Arab Emirates demonstrates leadership in this field through the issuance of actual legislation and regulatory charters. Egypt has taken significant steps in strategic planning and the formulation of ethical principles, with a draft law under preparation. Meanwhile, Iraq remains in the initial initiative phase and has not yet issued clear legislation, reflecting disparities in the levels of legislative and regulatory readiness to address the challenges of artificial intelligence (Seghir, 2023; Nikolinakos, 2024).
2. Traditional civil liability rules (contractual and tort-based) were not originally designed to address autonomous technological systems like artificial intelligence. These rules often require proof of fault and causation, which is challenging to establish in cases of harm caused by self-learning and evolving systems (Borghetti, 2019).
3. The dynamic nature of artificial intelligence complicates the identification of the liable party, as the roles of developers, users, data providers, and device manufacturers overlap, creating a legislative gap that requires resolution.
4. The strict liability regime, particularly liability for defective products, provides a relatively suitable legal framework for compensating victims of AI-induced harm. This is because it does not require proof of fault; rather, the existence of a defect in the product and a causal link to the harm suffices.
5. Modern legislation, especially in Europe, is increasingly inclined to broaden the definition of "product" to include software, algorithms, and intelligent systems. This allows consumer protection laws and liability for defective products to be applied to these applications.
6. The rapid advancement of artificial intelligence technologies necessitates the establishment of a specialized legal framework, encompassing clear provisions on liability, evidence, technical standards, and transparency mandates. This is exemplified by the proposed European Union Artificial Intelligence Act.

Second: Proposals

1. Arab legislators should work towards enacting specialized legislation to regulate the use of artificial intelligence and establish specific rules for civil liability arising from its applications. This should include defining intelligent systems, assigning responsibilities, and outlining compensation mechanisms.
2. It is essential to amend civil laws and consumer protection laws to encompass liability for software and intelligent services, while recognizing artificial intelligence as a product that can be defective.
3. A national registry for intelligent systems used in the market should be established to facilitate the tracing of errors or defects. This registry should include

information on system developers, software, updates, and safety data.

4. Developers of artificial intelligence should be required to provide documentation explaining how their systems operate and the level of human intervention involved. This would enable users and the judiciary to understand the nature of malfunctions when they occur.
5. Companies developing or distributing AI applications should be mandated to obtain specialized insurance to cover potential damages, similar to practices in sectors like automotive.
6. Given the cross-border nature of artificial intelligence, it is imperative to collaborate with international organizations and regional bodies to establish common liability standards and share information on damages and violations.

Legal Basis

1. Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products.
2. Dubai Law No. (9) of 2023 on Regulating the Operation of Autonomous Vehicles in the Emirate of Dubai.
3. Egyptian Civil Code No. 131 of 1948.
4. European Parliament Resolution of 20 October 2020, Article (3/F).
5. Iraqi Civil Code No. 40 of 1951 (amended).
6. Iraqi Consumer Protection Law No. 1 of 2010.
7. Iraqi Law of Evidence No. 107 of 1979.
8. Law Regulating the Operation of Autonomous Vehicles in the Emirate of Dubai No. 9 of 2023.
9. United Arab Emirates Civil Transactions Law No. 5 of 1985, amended by Federal Decree-Law No. 30 of 2020.

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