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Liability for Autonomous Vehicle Damages: A Comparative Analytical Study under Islamic Jurisprudence and Civil Law

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ABSTRACT

Modern civil law traditionally anchors liability in the doctrine of fault, whereby an individual who commits a harmful act must compensate the victim on the basis of wrongdoing. Yet this foundation proves inadequate when applied to accidents involving autonomous vehicles, since attributing fault to a specific actor—whether the manufacturer, programmer, or owner—is often unfeasible. Consequently, contemporary scholarship increasingly favors an objective theory of liability, emphasizing the harm itself as a product of the vehicle's operation or system, and assigning responsibility to the party exercising control, even absent proven fault. However, this theory, while significant, remains insufficient in addressing complex scenarios involving multiple contributors. In this context, Islamic jurisprudence offers a more nuanced framework through the doctrine of direct and indirect causation (al-mubāshir wa al-mutassabbib), which distinguishes between immediate actions and contributory causes. This approach provides a balanced and flexible basis for regulating liability in autonomous vehicle accidents, ensuring fairness, protecting victims' rights, and accommodating technological innovation.

Keywords: Objective Liability Autonomous Vehicles, Islamic Jurisprudence, Direct and Indirect Causation, Harm Reparation

INTRODUCTION

The Concept of Liability in Islamic Jurisprudence

Liability, in its general legal sense, refers to the state in which a person is held accountable for committing an act that warrants sanction. In other words, it denotes the existence of a harmful act that obliges its perpetrator to bear responsibility whenever such act results in harm to others (Marqus, 1988).

Liability in Islamic jurisprudence carries the same meaning, as it arises in cases of violating the requirements of Islamic law. Although the jurists did not explicitly use the term *liability* (*mas'ūliyya*), they employed expressions that convey its meaning. They mainly used two terms, namely:

The first term is *ghurm* (liability, fine, or indemnity). Jurists noted, for example: "because the one who pricks [the animal] is considered a transgressor by his causation, whereas the rider in his act is not a transgressor; hence, the former is given precedence in liability due to his transgression" (Al-Marghinani, 2020). The second term is *ḍamān* (guarantee or compensation), which is the most common term used by jurists (Shaltut, 2001). The definitions of *ḍamān* varied among the schools of law.

The Hanafis translated *ḍamān* as *kafāla* (suretyship) and defined it as: "joining the liability of the guarantor to that of the principal in demand, whether for a person, a debt, or property" (Ibn ʿĀbidīn, 2000). The Malikis defined it as: "the occupation of one person's liability by the right of another" (Al-Dusuqi, 2015). The Shafiʿis used *ḍamān* in broader one encompassing wealth, property, and persons, as expressed by Al-Khatib al-Shirbini: "legally, it refers to the obligation of a right established in another's liability, or the obligation to produce a guaranteed entity" (Shirbini, 1997). The Hanbalis defined it as: "the joining of the guarantor's liability to that of the guaranteed in the obligation of the right, so that it becomes established in both liabilities, and the right-holder may demand whichever of them he wishes" (Ibn Qudama, 1985).

The Concept of Autonomous Vehicles

Various legal definitions have been provided for autonomous vehicles. One such definition describes them as: "vehicles equipped with advanced technological systems that enable them to perform the task of transportation on public roads without direct human intervention, whether in terms of decision-making or the execution of reactions during driving" (Matran, 2018).

Autonomous vehicles are thus vehicles that operate through advanced technological systems, enabling them to perform transportation tasks on roads without direct human involvement, whether in making decisions such as lane selection, speed regulation, and stopping, or in executing reactions such as avoiding obstacles or making sudden stops in the presence of danger (Sultan, 2024).

They are vehicles capable of self-operation and of carrying out all the functions necessary for driving without any human intervention. This is achieved through advanced systems that allow them to perceive their surroundings, relying on a fully automated driving system that enables them to independently make and implement decisions while in motion. In other words, they are "vehicles equipped with an autonomous operating system capable of driving the vehicle efficiently without direct or active human control while driving" (Al-Baqli & Rashid, 2023).

The Legal Framework of Strict Liability for Autonomous Vehicles

Autonomous vehicles introduce a unique category of risks commonly referred to as "development risks." These are risks that remain unknown or unforeseeable at the time of the vehicle's manufacture or release to the market, owing to their reliance on advanced and complex technologies such as artificial intelligence, sensor systems, and autonomous control mechanisms. The danger inherent in such products lies in the fact that the defect causing harm may not manifest until after a period of use, and may even be undetectable by manufacturers themselves due to the novelty of the technology or the lack of sufficient information regarding how intelligent systems interact with unpredictable external conditions (Sultan, 2024).

It is well established that safety and security issues are closely tied to the functioning of the algorithms embedded within the vehicle's electronic system. These algorithms constitute a core component in the operation of autonomous vehicles, while simultaneously generating considerable legal and ethical debate—particularly when confronting emergency or life-threatening situations. Examples include the sudden appearance of children on the road, pedestrians in the lane, or abrupt changes in weather conditions. In such scenarios, the algorithms are entrusted with making decisions directly impacting human life and safety. This may require choosing between legally or morally conflicting options, thereby raising serious questions regarding the normative frameworks that guide the vehicle in prioritizing one course of action over another (Jaafar, 2020).

In addition to the aforementioned challenges, there exist other equally significant risks that can be classified into four main categories: the potential failure of autonomous operating systems, malfunctions in the networks upon which the vehicle relies, as well as the possibility of hacking or exposure to cyberattacks with disruptive or even terrorist intent. In this regard, the United States Federal Bureau of Investigation (FBI) explicitly warned vehicle manufacturers in 2016 of the potential threats surrounding this technology, urging both producers and consumers to remain aware and cautious throughout all stages of design and operation (G. Subhalakshmi, 2019).

In this context, the German legislator has adopted a precautionary approach to address the legal challenges associated with autonomous vehicles. It expressly required that such vehicles be equipped with a so-called "black box," similar to those used in the aviation industry, for the purpose of recording and analyzing data related to the vehicle's operation and its decision-making processes while driving. This measure came in response to the growing number of civil and criminal liability claims directed against manufacturers and operators of these vehicles, ensuring

the precise traceability of technical facts in the event of accidents. Likewise, several U.S. states—particularly California and Nevada—have emphasized the necessity of mandating such devices in autonomous vehicles, recognizing the critical importance of recorded data in establishing or negating legal liability and addressing the legislative gap concerning the identification of the responsible party in case of harm. Accordingly, this approach represents an advanced regulatory step toward promoting transparency and achieving a balance between consumer protection and the accountability of manufacturers for any technical or programming deficiencies in the vehicle's performance (Jaafar, 2020).

On the other hand, these risks may not necessarily amount to a fundamental or external defect in the product unless they result in a performance failure that exceeds reasonable limits or renders normal use impossible. This raises a significant legal challenge concerning the timing of evaluation: should the product's safety be assessed at the moment it is placed on the market, or should consideration also be given to the possibility of future defects arising from the behavior or updates of artificial intelligence systems? Furthermore, users' sense of unease due to the opacity of decision-making mechanisms within intelligent systems adds another layer of complexity to the issue of manufacturer liability. Legal assessments are often based on traditional mental models that do not necessarily align with the behavior of self-learning systems, thereby calling for a reconsideration of legal standards for risk assessment in light of emerging technologies (Sultan, 2024).

Undoubtedly, the rapid advancements in the autonomous vehicle industry have brought about a fundamental transformation in legislative approaches. Several countries have begun to establish general policy frameworks and to develop regulations and laws designed to address the challenges posed by this new mode of transportation. One prominent example is the set of guidelines issued by the United States National Highway Traffic Safety Administration (NHTSA), which serve as a general framework for regulating the use of autonomous vehicles at various levels (Jaafar, 2020).

In a more advanced legislative step, the United Kingdom enacted the Automated and Electric Vehicles Act on July 19, 2018. Article 1 of the Act explicitly requires the Secretary of State to prepare and maintain a list of all vehicles that are designed or adapted to be capable, in certain circumstances, of safely driving themselves when lawfully used on roads or in other public places within Great Britain. The Secretary is also obliged to publish this list both upon its initial preparation and with each subsequent update.

Forms of Transgression and Damage in Accidents Involving Autonomous Vehicles

In Islamic law, the notion of ta'addi (unlawful interference leading to damage) manifests in several forms: it may occur through direct causation (mubasharah), indirect causation (tasabbub), or omission:

First: Direct Causation (Mubasharah)

Linguistically, mubasharah derives from bashara al-amr, meaning to undertake a matter personally, or to attend to it oneself (Ibn Manzur, 1994). Juristic definitions of mubasharah vary across schools of law. According to the Hanafis, it is "the occurrence of destruction through one's act without the intervention of another voluntary act between his act and the destruction" (Al-Hamawi, 1985). The Malikis define it as "that by which destruction occurs without mediation" (Al-Qarafi, 1985). The Shafi'is define it as "creating the cause of destruction, such as killing, consuming, or burning" (Al-Ghazali, 1997). The Hanbalis describe it as "directly committing destruction by a cause that necessitates it, such as killing" (Ibn Rajab, 1998).

Therefore, every individual is responsible for their act, whether committed intentionally or negligently, unlike the case of indirect causation (tasabbub), which requires that no intervening act occurs between the conduct and the resulting harm. When the act of a person is directly connected to the harm, liability is established. For example, if the driver deliberately disables the autonomous driving system during operation or applies the brakes or steering wheel in a manner that immediately causes an accident, this constitutes mubasharah (direct causation) warranting liability. This is in contrast to a scenario where the accident results from the company's programming error or its failure to update the system, which would constitute tasabbub (indirect causation), as it is not an immediate act, albeit a substantial contributing factor**.**

Second: Indirect Causation (*Tasabbub*)

Linguistically, *tasabbub* derives from the term *sabab* (cause), which refers to any means by which one reaches another. For example, "I made him a means to reach so-and-so" (Ibn Manzur, 1994). Juristic definitions of *tasabbub* vary across schools. According to the Hanafis, it is "an act performed in a manner that ordinarily leads to the destruction of another" (Al-Kasani, 1982).

In the context of autonomous vehicles, the manufacturer that programs the system and installs the driving algorithms represents the principal direct actor (*mubashir*), as its act is the foundational cause upon which the vehicle

operates. However, if the user neglects to update the system or tampers with its settings in a way that results in loss of control or an accident, their act constitutes *tasabbub*, as they did not execute the harm directly but introduced a cause leading to it. Accordingly, Islamic jurisprudence continues to differentiate between *mubashir* (direct actor) and *mutasabbib* (indirect actor) in allocating liability, based on the degree of control and influence over the occurrence of harm.

Two conditions are traditionally required for the liability of the indirect actor: first, intentionality; and second, unlawfulness (*'udwan*) (Al-Qarafi, 1994). While harm typically occurs directly from the vehicle during operation, destruction may also arise through *tasabbub*. For instance, a manufacturer that designs autonomous driving software without adhering to safety standards, or fails to provide essential updates, is considered a *mutasabbib* for resulting accidents—even when the actual harm occurs during vehicle operation. Similarly, a user who neglects to perform mandatory maintenance or upload critical safety updates, thereby impairing sensor performance and causing an accident, is also deemed a *mutasabbib*.

Thus, under Islamic law, the principle remains consistent: the distinction between *mubashir* (direct actor) and *mutasabbib* (indirect actor) is essential in determining liability. *Tasabbub* entails an act that serves as a means to cause harm without direct execution, such that the harm would not have occurred but for this act. In this context, liability for *tasabbub* arises when the owner or operator engages in indirect acts leading to an accident, such as operating the vehicle in an unauthorized environment, neglecting safety updates, or introducing unauthorized modifications to driving systems. It also encompasses the manufacturer's responsibility when programming flawed decision-making algorithms that, for example, prioritize sacrificing one pedestrian over another. Consequently, *tasabbub* imposes liability even in the absence of direct action, provided the act is customarily recognized as a cause leading to the harm.

Third: Liability for Omission (*Tark*)

A key question arises in the context of autonomous vehicles: Can an act that triggers liability be negative (an omission) just as it can be positive (an act)? For instance, if the vehicle owner fails to update the software supporting autonomous driving despite being aware of essential updates intended to prevent malfunctions, or if the manufacturer neglects to address a discovered security vulnerability, and a subsequent accident occurs—should this omission be considered an act giving rise to liability?

Islamic jurisprudence recognizes liability for omissions in certain circumstances when the failure to act constitutes a direct cause of harm, which opens the door for applying this principle to modern technological activities such as autonomous driving.

First Opinion – The Hanafi School (Abu Hanifa)

Imam Abu Hanifa held that a person who refrains from an act and as a result causes destruction bears no liability. In *Radd al-Muhtar*, it is stated: *"If he threw someone into a well or from the top of a mountain or a roof, he is not liable for killing him; and if he plastered someone inside a house until the person died of hunger or thirst, he bears no liability"* (Ibn Abidin, 6/543).

According to Abu Hanifa, omission leading to destruction does not incur liability. Applied to autonomous driving, this would mean that if a driver refrains from intervening during an emergency while the vehicle is in autonomous mode, and this inaction is not tainted by transgression or violation of contractual obligations, he would not be liable for the accident. However, this view poses challenges when applied under modern legal frameworks, which explicitly require the driver to remain alert and ready to intervene when necessary. Failure to intervene in such circumstances constitutes a breach of licensing and usage conditions, making the driver legally liable—even though the Hanafi doctrine does not impose liability in such cases. The rationale of Abu Hanifa is that omission does not constitute direct causation (*mubasharah*) nor indirect causation (*tasabbub*), and thus entails no liability (Ibn Abidin, 2000).

In Contrast – The Two Companions (Hanafi School)

The two companions of Abu Hanifa (Abu Yusuf and Muhammad) adopted a different stance, holding that liability exists because the omission serves as a cause leading to destruction, thereby necessitating compensation. This opinion is considered stronger in contemporary application, as preventing injustice requires imposing liability for omissions that cause harm. Applied to autonomous driving, if a driver fails to intervene in time to prevent an accident while intervention was both possible and contractually required, such omission constitutes a cause of destruction, and therefore incurs liability—mirroring the position of the two companions who imposed liability on one who refrains from preventing harm when capable of doing so (Ibn Abidin, 2000). This approach aligns with modern regulations requiring the driver to remain ready to take control when necessary

and treating failure to intervene as a culpable omission giving rise to liability, even if the vehicle is operating in autonomous mode.

Second Opinion – The Maliki School

The Maliki jurists held that a person who refrains from acting despite having the ability to do so is liable, because he failed to avert destruction when it was within his power, thereby incurring liability (al-Ḥaṭṭāb, 1992). Applied to autonomous vehicles, if the driver is legally or contractually obligated to intervene during an emergency, and is fully capable of doing so, yet refrains from intervention until the harm occurs, such omission gives rise to liability, as it constitutes failure to perform a mandatory act within his capacity.

Similarly, if the owner of an autonomous vehicle is legally required to update the vehicle's systems periodically to ensure safe operation, yet neglects to perform these updates despite their availability from the manufacturer, resulting in the system's inability to detect obstacles and causing an accident, his omission entails liability. This reasoning accords with the Maliki principle that refraining from performing an obligatory act that results in destruction necessitates liability.

Third Opinion – The Shafi'i and Hanbali Schools

The Shāfiʿīs (Al-Shirazi, 1997) and the Hanbalīs (Al-Buhuti, 2003) held that liability is established when transgression (*taʿaddī*) occurs through omission (*tarḳ*). Ibn ʿAqīl stated: "If one detains another and withholds food and drink, or withholds either food alone or drink alone, or denies him warmth during the winter and its cold nights until he dies of hunger, thirst, or cold in a period in which such death would ordinarily occur—provided that the victim was unable to seek relief—then the offender is deemed to have acted deliberately and is liable, for God Almighty has made death the usual outcome in such circumstances; thus, if a person deliberately causes this, he is considered to have intended killing" (Al-Buhuti, 2003).

By analogy, if the owner of an autonomous vehicle is aware of a defect in the sensor system, or of the necessity of security updates to avoid danger, yet neglects to repair the defect or fails to install the updates despite being able to do so, and this omission leads to an accident causing loss of life or property damage, such omission constitutes a transgression establishing liability. Similarly, if the operating systems require the driver to remain attentive and ready to intervene when needed, but the driver neglects this duty and leaves the seat, resulting in an accident, then he is bound by liability under both Islamic law and modern law, for he abandoned an obligatory duty despite having the ability to fulfill it (Al-Nawawi, 1997).

Liability for omission is analogous to liability for causing harm by depriving someone of food or water. If the manufacturer becomes aware of a fundamental defect in its software that may cause severe accidents, or issues an update to address a security flaw but fails to make it available to vehicle owners—or neglects to notify them—resulting in a fatal accident or property damage, such omission entails liability because the manufacturer withheld an essential safety measure, which is comparable to depriving a person in dire need of sustenance under Islamic legal analogy (*al-Mawardi, 1999*).

The preponderant view in Islamic jurisprudence affirms that liability may arise from both positive acts and omissions for two main reasons: first, to prevent individuals from exploiting omissions as a means of harming others; and second, because failure to act resulting in harm constitutes an unlawful omission, and Islam prohibits causing harm. By analogy, the liability of an autonomous vehicle owner may arise through positive conduct, such as unauthorized interference with operational systems or altering software in a manner that compromises safety, or through negative conduct, such as neglecting to update software or refusing to maintain sensor systems when legally required. This principle aligns with both Islamic jurisprudence and modern civil law, which hold that liability attaches to an omission when the omission serves as a causal factor in producing harm.

The Basis of Liability for Accidents Caused by Autonomous Vehicles in Islamic Jurisprudence

As previously noted, Islamic jurisprudence has long adopted an objective approach—akin to what modern legal scholars describe as the "objective theory" of tort liability. This is evident from the clear statements of scholars:

- Al-ʿIzz ibn ʿAbd al-Salam states: *"The purpose of compensatory measures (jawabir) is to rectify what was lost from the interests of the rights of Allah and the rights of His servants, and it is not a condition that the one upon whom compensation is imposed be sinful. Accordingly, compensation is prescribed for harm caused by mistake, intentional acts, ignorance, knowledge, remembrance, forgetfulness, and even upon the insane and minors"* (*Ibn ʿAbd al-Salam, 1991*).

This demonstrates that liability under Islamic law is grounded in the occurrence of harm (*darar*) as a causal basis, irrespective of intent, fault, or capacity, thus embodying a fundamentally objective criterion for imposing liability.

Objective Basis of Liability in Islamic Jurisprudence and Its Application to Autonomous Vehicles

Al-Ḥaṭṭāb al-Mālikī asserts: *"Intentional acts, mistakes, and coercion regarding the property of others are treated equally; liability for damages is imposed under the rules of legal consequence (khiṭāb al-waḍʿ), and it is not contingent upon legal capacity or knowledge"* (al-Ḥaṭṭāb, 1992).

From the statements of jurists such as al-ʿIzz ibn ʿAbd al-Salām and al-Ḥaṭṭāb, it is evident that liability (*ḍamān*) in Islamic jurisprudence is based on the principle of reparation (*jabr*), rather than on the principle of culpability (*ithm*). These scholars affirm that compensation is obligatory for financial losses, whether the act was committed intentionally, negligently, or even out of forgetfulness, as the primary objective is to rectify the harm caused. This concept aligns with the objective basis of liability in modern legal systems, which is increasingly applied in the context of autonomous vehicles. Under this framework, liability arises upon the occurrence of harm caused by the operation of these vehicles, even in the absence of proven negligence by the manufacturer or user, thereby serving the goals of justice and harm prevention.

Accordingly, liability in Islamic law does not differentiate between harm caused by intentional acts, mistakes, or forgetfulness; rather, it is established by the mere occurrence of damage. The underlying reason (*ʿillah*) for imposing liability is the existence of harm, and when the cause exists, the effect necessarily follows. The obligation to compensate falls under the category of *khiṭāb al-waḍʿ* (the law of consequences), not *khiṭāb al-taklīf* (the law of moral responsibility). Consequently, the intention or motive of the actor bears no significance in determining liability; instead, the standard is objective, focusing on the act itself and its result rather than on subjective considerations.

Applied to autonomous vehicles, this principle dictates that liability for damage caused by these vehicles should arise upon the mere occurrence of harm resulting from their operation, regardless of whether the error lies in the technological system or in human negligence. This approach is consistent with the objective theory of liability established by Islamic jurisprudence centuries ago, which prioritizes harm prevention and equitable compensation (al-Khafīf, 2000).

Thus, it can be concluded that Islamic jurisprudence preceded modern legal theory in developing an objective basis for liability founded upon the principle of harm reparation rather than culpability. Classical jurists affirmed that liability applies in cases of intentional conduct, negligence, and even ignorance or forgetfulness, which parallels the contemporary doctrine of strict liability. Therefore, whether an accident arises from a programming error by the manufacturer, an unintentional defect, or even in the absence of apparent negligence, the principle of liability remains, as the ultimate purpose is to redress harm, not to assign blame.

DISCUSSION

This study has demonstrated that the traditional fault-based model of civil liability is insufficient when applied to damages arising from autonomous vehicles, since it is often difficult to attribute fault to a single actor, whether the manufacturer, the programmer, or the vehicle owner. Islamic jurisprudence, through the theory of *direct action and causation*, provides a more flexible and equitable foundation by distinguishing between those who directly cause harm and those who contribute to it through their acts or omissions. Each party is thus held accountable in proportion to their role in the occurrence of the damage. Furthermore, Islamic jurisprudence anticipated the modern shift towards objective liability by imposing compensation whenever harm occurs, regardless of intent, fault, or even negligence. This principle, rooted in the idea of *redressing harm rather than attributing blame*, is consistent with contemporary doctrines of strict and objective liability in addressing technological risks.

In light of these findings, it is recommended that national legislation be developed to regulate liability for damages caused by autonomous vehicles, clearly defining the responsibilities of manufacturers, programmers, and vehicle owners in line with the jurisprudential foundations of Islamic law. A mandatory insurance system should also be introduced to ensure prompt compensation for victims and guarantee effective access to remedies. Moreover, liability should be apportioned fairly when multiple parties are involved, with responsibility distributed according to each party's contribution to the harm. Strict regulatory oversight of manufacturers should be established, requiring periodic system updates and adherence to safety standards, with liability imposed for any negligence or omission in this regard. Finally, the rules of Islamic jurisprudence concerning direct action, causation, and omission should be incorporated into modern legal frameworks, as they offer a balanced approach that encourages technological innovation while safeguarding human life and property.

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