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Legal Gaps in Regulation and Criminal Liability for the Use of Personal Mobility Devices on Sidewalks and Roads

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Abstract: *The development of micro-transportation technology has given rise to Personal Mobility Devices (PMDs) as a new mode of mobility increasingly used in public spaces, both on sidewalks and on roads. The presence of PMDs raises legal issues because the Indonesian traffic law system does not yet provide clear and comprehensive regulations regarding the status, usage space, and criminal liability mechanisms for users. Law Number 22 of 2009 concerning Traffic and Road Transportation still relies on conventional vehicle classifications, placing PMDs in a normative area that is not explicitly addressed. The condition creates legal uncertainty, difficulty in enforcement, and potential violations of the safety of pedestrians and other road users. This study aims to analyze the nature of the legal vacuum in PMD regulations, examine the weaknesses of the applicable criminal liability construction, and formulate the need for more adaptive traffic law reform. The research method employed is normative legal research with statutory, conceptual, and comparative legal approaches. A comparative analysis was conducted on PMD regulations in Singapore, the United Kingdom, Germany, and France to identify a proportional and safety-oriented regulatory model. The results reveal that a purely repressive approach through criminal law is ineffective when applied to PMDs and risks excessive criminalization. This study recommends reforming traffic law through special regulations on Personal Mobility Devices (PMD) that prioritize administrative and preventive approaches, along with selective criminal sanctions to ensure legal certainty and public safety.*

Keyword: *Personal Mobility Devices; Traffic Law; Legal Gaps; Criminal Liability; Public Safety.*

INTRODUCTION

The development of micro-transportation technology has given rise to various forms of personal mobility devices, now known as Personal Mobility Devices (PMDs) (Suseno, 2024). The presence of PMDs reflects the changing mobility patterns of urban communities, which increasingly demand speed, efficiency, and flexibility in their activities (Rahmawati, 2023). These devices are no longer positioned as mere technological innovations, but have become part of everyday traffic practices in public spaces (Razaob, 2020). This phenomenon marks a

shift in how society interprets transportation, from conventional motorized vehicles to individual modes based on light technology. This transformation poses serious challenges to traffic laws, which have historically been formulated based on the assumption of relatively stable modes of transportation.

Sidewalks and roads have undergone functional changes with the increasing use of PMDs in public spaces. Spaces originally designed normatively for pedestrians or motorized vehicles are now shared by new traffic entities that have not yet received adequate legal recognition (Firmansyah, 2024). The transformation is not only physical but also normative, shifting the boundaries of the rights and obligations of road users. The unclear function of traffic space gives rise to tensions between user groups with varying levels of legal protection (Muntaha, 2025). This situation creates a conflict-prone situation that is difficult to resolve through existing legal mechanisms.

Empirical evidence shows that the increasing use of personal mobility devices (PMDs) on sidewalks and public roads has heightened the potential for traffic conflicts. Conflicting interests between PMD users and pedestrians frequently create tangible safety concerns and disruptions in public spaces (Noor, 2025). The risk of accidents is therefore no longer merely hypothetical, but has become a real social issue experienced by urban communities. The absence of technical regulations regarding speed, lanes, and safety standards for PMDs exacerbates the situation. This situation indicates a serious gap between the development of social practices and the readiness of legal norms.

Indonesian traffic law demonstrates limitations in responding to the emergence of PMDs as a new legal object (Devid, 2025). Existing regulations still rely on a dichotomy between motorized vehicles and pedestrians, without providing normative space for non-conventional modes. Rigid legal classifications prevent PMDs from gaining a clear position within the traffic law system. This ambiguity has implications for the weak legal basis for enforcement and accountability (Manurung, 2025). This situation highlights the structural unpreparedness in the design of national traffic laws.

Legal certainty and legal protection for all road users have become urgent needs as PMDs develop (Roeroe, 2024). The principle of legal certainty relates not only to the existence of written norms but also to the clarity of their application and consistency of law enforcement (Haerunisa, 2025). Without clear regulations, PMD users, pedestrians, and law enforcement officers are equally vulnerable. This vulnerability has the potential to lead to injustice and erode public trust in the law. Balanced legal protection is a prerequisite for maintaining order and traffic safety (Faniyah, 2024).

Personal Mobility Devices technically refer to electrically or mechanically powered individual mobility devices of relatively small size (Laverdet, 2023). Legally, PMDs have not yet received an explicit definition in Indonesian traffic laws and regulations. The lack of a legal definition leaves PMDs in a normative gray area that is difficult to categorize. This condition complicates the process of legal interpretation in enforcement practice. The vague definition has the potential to give rise to differing interpretations among authorities and the public.

The characteristics of PMDs as non-conventional modes distinguish them from motorized vehicles and walking aids. PMDs have speeds, cruising ranges, and potential risks that fall between these two categories (Shin, 2018). This hybrid nature means that PMDs cannot be fully treated as vehicles, but they also cannot be equated with pedestrians. This inconsistency in characteristics creates a normative gap in traffic regulation. Laws that fail to adapt to the new nature of transportation risk losing their regulatory power (Yunus, 2024).

The position of the PMD within the traffic classification system is a fundamental issue that determines the direction of legal regulation and accountability. Legal classification serves as the entry point for determining rights, obligations, and sanctions (Sugiarto, 2021). Without a clear classification, PMD lacks a solid normative foundation within the traffic law system.

This directly impacts the unclear distinction between legal subjects and objects of regulation. This classification problem reflects the law's failure to keep pace with rapidly evolving social dynamics (Erlyani, 2024).

The legal gap theory explains the situation in which written law does not provide adequate norms to regulate a social phenomenon (Indah, 2025). This gap often arises due to the acceleration of social change that exceeds the capacity of legislation. In such situations, the law loses its preventive and corrective functions. A legal gap is not simply the absence of rules but also encompasses the inadequacy of existing norms (Nasir, 2017). The PMD phenomenon concretely reflects this situation in the traffic sector.

Regulatory lag demonstrates the gap between technological developments and legal responses. Lagging laws have the potential to create uncertainty and unfairness in their application (Lazarus, 2024). Law enforcement officials often face a dilemma between the need for control and the limitations of the legal basis. The situation creates room for inconsistent law enforcement. The regulatory lag in traffic law regulations demonstrates the urgency of more responsive legal reform.

Criminal liability in traffic law rests on the elements of an act, a fault, and a legal subject. Traffic law challenges this construction because it is not expressly recognized as an object capable of incurring criminal liability. The principle of legality demands clarity of norms before criminal sanctions are imposed (Kurniawan, 2020). The unclear status of traffic law potentially violates this principle. This challenge demands a more cautious approach in formulating criminal sanctions.

The concepts of strict liability and administrative penal law offer alternatives in responding to technical traffic violations. This approach emphasizes protecting the public interest and safety without complex proof of fault. In traffic, the administrative approach is often considered more proportionate and effective (Adiatma, 2025). As a new phenomenon, traffic law opens up space for the application of this approach. The choice of accountability model is crucial to prevent the law from being overly repressive. Pedestrian protection is a fundamental principle in traffic law, which prioritizes human safety. Sidewalks, as public spaces, have social and legal functions that cannot be ignored. The use of sidewalks by PMDs without clear regulations may diminish pedestrian rights. A balance between mobility innovation and road user protection must be maintained normatively (Pebrian, 2025). The law is expected to accommodate change without sacrificing safety and fairness.

METHOD

This study employs a normative legal research method that positions law as a written norm that is analyzed systematically and critically. A legislative approach is used to examine traffic and road transportation regulations, specifically Law Number 22 of 2009 and its implementing regulations, to identify gaps in norms related to Personal Mobility Devices. A conceptual approach is utilized to examine the theory of legal gaps, the principle of legality, and the construction of criminal liability in traffic law. Comparative legal analysis reviews PMD regulations across several countries, including Singapore, the United Kingdom, Germany, and France, to identify more adaptive and proportional regulatory patterns. All primary, secondary, and tertiary legal materials are analyzed qualitatively using systematic and argumentative interpretation methods, resulting in normative recommendations oriented towards legal certainty, public safety, and traffic law reform that is responsive to developments in mobility technology.

RESULTS AND DISCUSSION

Legal Gaps in Regulating the Use of Personal Mobility Devices (PMD) in Indonesia

Law Number 22 of 2009 concerning Traffic and Road Transportation is structured within a framework that primarily positions motorized vehicles and pedestrians as the main subjects of traffic regulation. The normative provisions within the law largely concentrate on motorized vehicles as the principal source of road-related risk. Although Article 1, point 2 defines traffic as the movement of vehicles and people within road traffic spaces, this definition is not accompanied by detailed regulatory provisions addressing non-conventional modes of transportation. This normative structure reflects an underlying assumption that the development of transportation modes is linear and predictable. However, this assumption is increasingly misaligned with contemporary developments in mobility technology, which are far more dynamic and diverse.

The absence of explicit norms regarding Personal Mobility Devices is evident in the absence of a single article that directly mentions or regulates light-technology-based personal mobility devices. PMDs cannot be qualified as motorized vehicles as referred to in Article 1, number 8 of the Traffic and Road Transportation Law because they do not meet the required combustion engine requirements or technical specifications. PMDs also cannot be fully positioned as pedestrian aids because they have different speeds and cruising ranges. This gap creates a wide scope for interpretation without a strong normative basis. It demonstrates that written law has not been able to address new legal issues emerging in the public sphere.

The legal status of street lighting (PMD) on sidewalks and roads is ambiguous due to the lack of a clear classification. According to Article 45, paragraph (1) of the Traffic and Road Traffic Law, sidewalks are intended for pedestrian traffic. The use of PMD on sidewalks may conflict with this normative function. Roads designated for vehicles also do not explicitly allow for non-conventional modes of transportation, such as PMD. This ambiguity creates uncertainty regarding the rights and obligations of PMD users. This unclear legal status directly impacts the weak basis for law enforcement.

Law enforcement officials face serious difficulties in enforcing violations involving PMD. The absence of specific norms often leaves law enforcement dependent on individual interpretations by officers in the field. Some officers attempt to use an analogous approach to motorized vehicles, while others choose not to take action at all. This difference in approach creates inconsistencies in the application of the law. This situation reflects the lack of legal certainty in enforcement practices.

Disparities in law enforcement are an inevitable consequence of the lack of PMD regulations. The public faces a situation where the same action can be treated differently in different areas. This unequal legal treatment has the potential to violate the principle of equality before the law. Law enforcement officials are also in a difficult position due to the lack of clear operational guidelines. This disparity risks undermining the legitimacy of traffic laws in the public eye.

The risk of violations of pedestrian rights increases with the uncontrolled use of pedestrian-controlled vehicles (PMDs) on sidewalks. Pedestrians, as a vulnerable group, lose their legally protected safe space. The principle of protecting pedestrians, as reflected in Article 131 of the Traffic and Road Traffic Law, becomes difficult to implement without clear regulations. Disturbances to public safety are no longer potential but have become a real problem in urban traffic. This situation demonstrates a failure of the law to protect the public's fundamental interests.

The lack of clarity regarding the legal subjects and objects in violations involving PMDs is evident in the uncertain legal status of PMD users. Specifically, PMD users cannot be clearly categorized as either vehicle drivers or pedestrians within the current legal framework. The legal objects, PMDs themselves, are not included in the category of vehicles that are

specifically regulated. This lack of clarity hampers the process of determining the type of violation and the sanctions that can be imposed. The law lacks clarity in determining who is responsible and on what basis that responsibility is imposed.

The issue of legal sanctions is another aspect that emphasizes the lack of norms governing motor vehicle traffic violations. The LLAJ Law specifically formulates criminal and administrative sanctions for motor vehicle violations. Motor vehicle traffic violations are not covered by this sanction scheme, leaving authorities without a legitimate basis for imposing penalties. Efforts to enforce sanctions might violate the principle of legality as stipulated in Article 1, paragraph (1) of the Criminal Code. The principle of *nullum crimen sine lege* requires clarity of norms before criminal sanctions are imposed.

The principle of legality faces serious challenges due to the uncertainty of PMD regulations. Imposing sanctions without a clear legal basis risks violating citizens' rights. Law enforcement that is not based on written norms opens up room for arbitrariness. Criminal law, as the instrument of last resort, should be implemented strictly and carefully. The lack of PMD norms demonstrates the need for caution in expanding the scope of criminal penalties.

The social and legal impacts of PMD regulatory uncertainty are widespread and multi-layered. PMD users are vulnerable to inconsistent enforcement. Pedestrians lose the optimal protection of safe spaces promised by the law. Law enforcement officials face a dilemma between the need for control and the limitations of the normative basis. The uncertainty demonstrates the urgency of reforming traffic laws to be more adaptive and oriented toward certainty and justice.

Criminal Liability of PMD Users: Analysis and Comparison

The construction of criminal liability in Indonesian traffic law has historically relied on motor vehicle violations, which have relatively clear technical and legal characteristics. This system assumes a driver, a motor vehicle, and violations that have been classified in detail in Law Number 22 of 2009 concerning Road Traffic and Transportation. This system facilitates the determination of legal subjects, elements of fault, and the types of sanctions that can be imposed. Traffic law also tends to position criminal penalties as an instrument for controlling behavior on the road. This construction works effectively as long as the regulated objects remain within the category of conventional vehicles.

The conventional criminal liability model faces serious difficulties when confronted with the existence of Personal Mobility Devices (PMDs). PMDs do not fully fulfill the requirements of motor vehicles, but they also cannot be categorized as ordinary pedestrians. This characteristic obscures the basis for attribution of fault, a key requirement for criminal liability. The application of criminal traffic norms to PMDs has the potential to impose legal categories that do not align with the reality of the objects. This inconsistency demonstrates the limitations of the old model in addressing new mobility phenomena.

The limitations of the application of criminal sanctions to PMD users are a crucial issue in the criminal traffic law system. Criminal sanctions can only be imposed if there is a clear legal basis and they meet the principle of legality as stipulated in Article 1, paragraph (1) of the Criminal Code. PMD users are in a situation where their actions can be considered dangerous, but this does not always qualify as a criminal offense. Punishment without a clear normative basis risks violating the principle of protecting citizens' rights. Limiting criminal penalties is crucial to ensure that criminal law does not exceed its *ultimum remedium* function.

Several developed countries have responded to the development of PMDs through more adaptive and structured regulations. Singapore regulates PMDs through the Active Mobility Act, which strictly classifies PMD types, establishes usage routes, and limits speeds. This approach places PMD violations primarily in the administrative realm, with progressive fines.

Criminal sanctions are only applied for serious violations that threaten public safety. This model demonstrates a balance between controlling and protecting mobility innovation.

The United Kingdom has adopted a different approach, placing PMDs in a strictly restricted position in public spaces. E-scooters, for example, are only permitted for use within government-supervised trial schemes under the Road Traffic Act. Use outside of these schemes is treated as an administrative violation, not a serious crime. This approach emphasizes strict controls while awaiting long-term regulatory readiness. The UK has shown caution in expanding criminal penalties for new modes.

Germany has chosen a more systematic regulatory approach through the Electric Small Vehicles Regulation (Elektrokleinstfahrzeuge-Verordnung). Small electric vehicles (PMDs) are recognized as a separate vehicle category with specific technical, insurance, and lane use requirements. Violations of these provisions are mostly subject to administrative sanctions. Criminal penalties are only possible in the case of serious violations that pose a real danger. The model demonstrates the integration of traffic law and public safety policies.

France regulates small electric vehicles (PMDs) through the Code de la Route, with a strong emphasis on pedestrian protection. Small electric vehicles (PMDs) are prohibited from being used on sidewalks except under certain, strictly regulated conditions. Administrative sanctions are the primary enforcement instrument, including fines and confiscation of the devices. A preventative approach is prioritized through speed limits and mandatory use of safety equipment. France prioritizes public safety in the design of its PMD regulations.

The experiences of these countries demonstrate a tendency to avoid excessive criminalization of small electric vehicle (PMD) users. Criminal penalties are not the primary response to every violation, but rather a last resort. This approach reduces the risk of criminalizing behavior that is more appropriately subject to administrative control. Disproportionate criminalization has the potential to generate social resistance and reduce the effectiveness of the law. Criminal law is positioned as a selective instrument that seriously protects the public interest.

A purely repressive approach to criminal liability for traffic violations (PMD) exhibits various structural weaknesses. Punishment without the support of technical regulations tends to be symbolic and difficult to enforce consistently. Law enforcement officials also face limited legitimacy when imposing criminal sanctions. The repressive model does not always align with the developmental and preventive objectives of traffic law, highlighting the need for a more proportionate approach. Accordingly, there is a growing need for an adaptive and equitable model of criminal liability in regulating PMDs. Such a model should integrate administrative, preventive, and criminal measures in a balanced and proportionate manner. The experiences of Singapore, Germany, the UK, and France provide valuable lessons for Indonesia in designing responsive regulations. Adaptation to national social and legal characteristics remains necessary to avoid the transplantation of rigid laws. Adaptive criminal liability allows traffic laws to remain relevant without sacrificing certainty and fairness.

CONCLUSION

The legal vacuum surrounding Personal Mobility Devices (PMDs) is characterized primarily by the absence of normative recognition of new mobility objects already in use in traffic. The national traffic law system still relies on conventional vehicle classifications and therefore does not adequately accommodate PMDs. The absence of regulation results in unclear legal status, scope of use, and legitimate control mechanisms. The current criminal liability framework demonstrates fundamental weaknesses because it is not designed to address subjects and objects with hybrid characteristics such as PMDs. This situation emphasizes the need for traffic law reform, not only technical but also conceptual, prioritizing public safety and legal certainty.

Normative recommendations for legislators highlight the need to establish specific regulations on PMDs through statutory revisions or implementing regulations that clearly define their classification, scope of use, and proportionate sanctions. In addition, law enforcement officials and local governments require clear policy guidelines to ensure consistent enforcement and prevent sporadic or discriminatory practices. Administrative and preventive approaches should be prioritized as primary control instruments, while criminal law should be selectively applied to violations that seriously endanger safety. Further research should focus on integrating traffic law, mobility technology, and urban safety policy. Developing interdisciplinary studies is crucial to ensure the law can adapt without losing its legitimacy and protective power.

REFERENCES

- Adiatma, A. F.-q. (2025). Penyelesaian Tindak Pidana Kecelakaan Lalu Lintas Melalui Mediasi Penal. *Judge: Jurnal Hukum*, 6(02), 41-47.
- Devid, R. I. (2025). Tantangan Hukum dan Keamanan Mobil Auto Pilot Perspektif Hukum Transportasi di Indonesia. *Sosaintek: Jurnal Ilmu Sosial Sains dan Teknologi*, 2(1), 82-95.
- Erlyani, R. P. (2024). Dinamika Politik Hukum Dalam Konteks Perubahan Sosial. *Lex Sharia Pacta Sunt Servanda: Jurnal Hukum Islam Dan Kebijakan*, 2(1), 14-24.
- Faniyah, I. &. (2024). Perlindungan Hukum Terhadap Pengguna Jalan Yang Mengalami Kecelakaan Lalulintas Karena Kelalaian Penyelenggara Jalan. *Ekasakti Legal Science Journal*, 1(3), 196-203.
- Firmansyah, F. D. (2024). Evaluating Legal Protections for Pedestrians and Infrastructure in Indonesia. *Indonesian Journal of Law and Economics Review*, 19(3), 10-21.
- Haerunisa, S. (2025). Dilema keseimbangan dalam penegakan hukum: Analisis kritis terhadap penerapan teori tujuan hukum (keadilan, kepastian, dan kemanfaatan). *Manazir: Jurnal Ilmiah Universitas Ibnu Chaldun*, 1(2).
- Indah, R. M. (2025). Penemuan hukum sebagai implementasi teori hukum dalam menjawab kekosongan norma. *Media Hukum Indonesia (MHI)*, 3(4).
- Kurniawan, D. (2020). Pertanggungjawaban Pidana Penyelenggara Jalan. *Jurnal Ilmu Kepolisian*, 14(2), 9-9.
- Laverdet, C. M. (2023). Electric personal mobility device driver behaviors, their antecedents and consequences: a narrative review. *Journal of safety research*, 86, 274-285.
- Lazarus, L. (2024). Pengaruh Teknologi dan Globalisasi Terhadap Sistem Hukum dan Identitas Sosial Masyarakat. *Media Hukum Indonesia (MHI)*, 2(2).
- Manurung, P. (2025). Analisis Yuridis Pertanggungjawaban Pelaku Kecelakaan Lalu Lintas Dalam Perspektif Hukum Berdasarkan Undang-Undang Nomor 22 Tahun 2009 Tentang Lalu Lintas Dan Angkutan Jalan: Studi Putusan Nomor 2698/Pid. Sus/2018/PN Lbp. *Al-Zayn: Jurnal Ilmu Sosial & Hukum*, 3(2), 878-892.
- Muntaha, M. G. (2025). Hukum dan Ketertiban Lalu Lintas: Perspektif Sosiologi Hukum pada Undang-Undang Nomor 22 Tahun 2009. *Gunung Djati Conference Series*, 50, 52-64.
- Nasir, G. A. (2017). Kekosongan Hukum & Percepatan Perkembangan Masyarakat. *Jurnal Hukum Replik*, 5(2), 172-183.
- Noor, M. A. (2025). Penyalahgunaan Trotoar di Kawasan Perkotaan: Dampak dan Strategi Penanganan untuk Mewujudkan Ruang Publik yang Inklusif. *JUITECH: Jurnal Ilmiah Fakultas Teknik Universitas Quality*, 9(1), 98-104.
- Pebrian, A. Y. (2025). Mewujudkan Kota Smart City Melalui Peraturan Hukum Untuk Pejalan Kaki Dalam Perencanaan Transportasi Berkelanjutan. *Hukum dan Masyarakat Madani*, 15(2), 324-340.

- Rahmawati, A. N. (2023). Analisis Konsep New Urbanism Dan Dampak Pada Perilaku Mobilitas Masyarakat Perkotaan di Indonesia. *EKOMA: Jurnal Ekonomi, Manajemen, Akuntansi*, 3(1), 415-424.
- Razaob, N. A. (2020). Development and Validation of a Personal Care Modules for Older Adults with More Significant Disabilities. *Jurnal Sains Kesehatan Malaysia*, 18(02), 83-92.
- Roeroe, W. M. (2024). Perlindungan Hukum Terhadap Pejalan Kaki Di Area Zebra Cross Menurut Uu Lalu Lintas Dan Angkutan Jalan. *Lex Privatum*, 14(2).
- Shin, G. W. (2018). Personal mobility device and user experience: A state-of-the-art literature review. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 62(1), 1336-1337.
- Sugiarto, U. S. (2021). *Pengantar Hukum Indonesia*. Jakarta: Sinar Grafika.
- Suseno, D. P. (2024). *Transportasi Darat Dan Smart Mobility System*. Yogyakarta: Deepublish.
- Yunus, M. M. (2024). *Investasi dan Reformasi Transportasi Kota*. Banda Aceh: Syiah Kuala University Press.