

Risky Riding Behaviors and Safety Challenges in Malaysia's Gig Economy: A Comprehensive Review

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ABSTRACT

The rapid growth of the gig economy, particularly in Malaysia's P-hailing sector, has brought with it significant safety challenges, as evidenced by the prevalence of risky riding behaviors among delivery riders. This review synthesizes findings from recent literature to identify key determinants of these behaviors, including individual factors such as impulsivity and emotional regulation, economic pressures tied to delivery quotas, and work environments shaped by algorithmic management. These challenges differ notably from those in other sectors of the gig economy, such as ride-hailing or freelance platforms. For instance, in ride-hailing, safety concerns often revolve around vehicle maintenance, passenger interactions, or route optimization, while freelance platforms prioritize data security and work-hour regulation. In contrast, P-hailing uniquely emphasizes high-speed navigation through dense traffic under stringent time constraints, highlighting the distinct operational pressures and safety implications within this sector. The implications of these behaviors are far-reaching, impacting public health, urban mobility, and platform ethics. High accident rates and environmental inefficiencies highlight the urgent need for intervention. To mitigate these challenges, this paper proposes a multifaceted strategy encompassing platform-level changes, such as algorithm redesign and rider incentives; policy-level reforms, including mandated rest periods and improved urban infrastructure; and technological advancements like AI-driven safety tools and drone deliveries. Despite these efforts, research gaps remain, particularly in understanding regional variations and long-term behavioral trends. Addressing these gaps through interdisciplinary and longitudinal studies is critical to fostering a safer and more sustainable gig economy. This review provides actionable insights for policymakers, gig platforms, and researchers aiming to enhance rider safety and operational efficiency.

Keywords: Risky Riding Behavior, P-hailing, Gig Economy, Rider Safety, Algorithmic Management

INTRODUCTION

The gig economy has redefined traditional employment structures, enabling flexible, on-demand work arrangements across diverse sectors. In Malaysia, the P-hailing (parcel and food delivery) industry represents a cornerstone of this transformation, driven by rapid urbanization, technological innovations, and evolving consumer habits (Syahril, Daud, & Junos, 2024). Over the past decade, P-hailing services have become indispensable to urban lifestyles, offering convenience and accessibility to customers and income opportunities for workers (Imanaga et.al, 2021; Ahmad & Karuppiah, 2022; Radzlan & Othman, 2023; Nguyen-Phuoc et.al, 2023). The COVID-19 pandemic significantly accelerated the growth of the P-hailing sector. Lockdowns and social distancing measures heightened demand for contactless delivery services, prompting a surge in the number of delivery riders joining the workforce. Platforms like Grab, Foodpanda, and Lalamove capitalized on this demand, further entrenching P-hailing as a critical component of Malaysia's economy (Chan, 2022; Salleh, Shukry, & Jokinol, 2023; Syahril, Daud, & Junos, 2024). However, this exponential growth has exposed a plethora of challenges, particularly concerning rider safety.

Unlike many other global gig platforms that often rely on cars or bicycles, Malaysia's P-hailing system is dominated by motorcycle-based deliveries, which amplifies safety concerns due to congested traffic, variable road infrastructure, and limited enforcement of road regulations (Leong & Shafie, 2021; Malik & Rusli, 2023).

This local reliance on motorcycles, combined with high urban densities and culturally specific attitudes toward traffic laws, makes rider safety in Malaysia uniquely vulnerable compared to other settings (Setoodehzadeh et al., 2021; Anwar, Otieno, & Stein, 2022). As a result, the P-hailing sector faces particular operational pressures and logistical barriers that call for targeted research and interventions (Nguyen-Phuoc et al., 2023; Muldoon & Raekstad, 2022). The P-hailing sector also uniquely contrasts with ride-hailing or traditional logistics services relying on cars or vans (Syahril, Daud, & Junos, 2024). This distinction intensifies the safety challenges riders face, such as navigating through congested urban traffic, dealing with unpredictable road conditions, and adhering to stringent delivery timelines. Studies, such as those by Hang Tuah and Kamaluddin (2022), highlight the physical and mental toll of these conditions, which can lead to risky riding practices as riders try to meet performance metrics or economic targets.

Road traffic accidents (RTAs) among delivery riders are alarmingly high. For instance, a recent study by Nurain and Razelan (2022) noted that P-hailing riders account for a significant percentage of motorcycle-related accidents in urban areas, with nearly 25% of these incidents resulting in severe injuries. This statistic underscores the critical safety risks faced by riders operating under high-pressure conditions. Moreover, the rapid expansion of the gig economy has outpaced the development of policies and infrastructure needed to support it effectively. Existing road systems in many urban areas, including Kuala Lumpur, are not designed to accommodate the surge in motorcycle traffic associated with P-hailing. This mismatch has exacerbated accident rates among riders, as documented by Nurain and Razelan (2022), making safety an urgent concern for stakeholders. Additionally, the algorithmic management systems employed by gig platforms often emphasize speed and efficiency, pressuring riders to engage in behaviors that compromise their safety (Imanaga et.al, 2021; Muldoon & Raekstad, 2022; Allon, Cohen, & Sinchaisri, 2023).

P-hailing riders often operate under high-pressure conditions, navigating dense traffic and tight delivery schedules (Haworth, Schramm, & Twisk, 2021). These demands, compounded by algorithmic management practices, have contributed to the prevalence of risky riding behaviors such as speeding, abrupt lane changes, and distracted driving (Muldoon & Raekstad, 2022; Malik & Rusli, 2023; Nguyen-Phuoc et.al, 2023). Additionally, Malaysia's unique urban environment, characterized by high population density and varied road conditions, exacerbates these safety concerns. Studies have reported an alarming rise in traffic accidents involving P-hailing riders, underscoring the urgency of addressing these behaviors (Leong & Shafie, 2021). The safety of delivery riders in the gig economy is a critical concern due to the prevalence of risky behaviors that compromise both individual and public well-being. These safety issues are multifaceted, stemming from systemic pressures, infrastructure challenges, and behavioral tendencies influenced by the unique demands of the gig economy (Haworth, Schramm, & Twisk, 2021; Chalermpong et.al, 2023).

Statistics indicate that motorcycle delivery riders account for over 30% of urban traffic-related accidents in Malaysia, with fatalities and severe injuries disproportionately affecting this group (Leong & Shafie, 2021). These incidents often occur due to speeding, abrupt lane changes, and distracted riding, all exacerbated by algorithm-driven performance metrics (Chan, 2022; Muldoon & Raekstad, 2022; Nguyen-Phuoc et.al, 2023; Allon, Cohen, & Sinchaisri, 2023). Customer expectations for rapid deliveries further compound these risks, creating an environment where risky riding is normalized (Salleh, Shukry, & Jokinol, 2023). The infrastructure in urban centers like Kuala Lumpur often lacks dedicated motorcycle lanes, forcing riders to compete with larger vehicles in congested traffic conditions. Poorly maintained roads and insufficient lighting further heighten the danger (Syahril, Daud, & Junos, 2024; Zhang & Liu, 2024). Nurain and Razelan (2022) reported that the mismatch between the rapid growth of the gig economy and existing urban infrastructure has led to an increase in traffic accidents involving delivery riders.

Additionally, the physical and psychological toll on riders contributes to unsafe practices. Fatigue, a result of long working hours and inadequate rest, impairs judgment and reaction times, significantly increasing accident risks (Haworth, Schramm, & Twisk, 2021; Malik & Rusli, 2023). Stress induced by financial insecurity and job instability exacerbates these issues, as riders often feel compelled to prioritize earnings over safety (Oviedo-Trespacios, Rubie, & Haworth, 2022; Djunaidi & Khaliwa, 2024). Cultural attitudes toward traffic laws also play a role. In some regions, riders may perceive adherence to regulations as secondary to meeting job demands, further complicating efforts to improve safety (Setoodehzadeh et.al, 2021; Anwar, Otieno, &

Stein, 2022). Moreover, peer influence within informal rider communities can normalize unsafe practices, such as weaving through traffic or bypassing red lights, as acceptable strategies to meet performance targets (Triyanti, 2024).

These interconnected factors highlight the complexity of safety issues in the P-hailing sector. Understanding the systemic, environmental, and cultural drivers of these challenges is essential for stakeholders seeking to improve rider well-being and public safety.

OBJECTIVES

This review synthesizes findings from recent literature to:

- i. Identify patterns and determinants of risky riding behaviors among P-hailing riders:

Understanding the root causes and behavioral patterns of risky riding is foundational to addressing the safety challenges faced by P-hailing riders. This includes examining factors such as rider demographics, personality traits, emotional states, and external pressures like customer expectations and economic targets. By categorizing these determinants, the review seeks to establish a comprehensive framework for analyzing the motivations and circumstances that lead to risky behaviors.

- ii. Examine the broader implications of these behaviors on health, safety, and urban systems:

Risky riding behaviors have cascading effects beyond the immediate risks posed to riders themselves. These behaviors contribute to traffic accidents, strain healthcare systems, disrupt urban mobility, and influence public perceptions of the gig economy. By assessing these implications, the review aims to contextualize the significance of addressing rider safety within the broader framework of public health, urban planning, and sustainable development.

- iii. Propose evidence-based strategies for mitigating risky riding behaviors through policy interventions, platform adjustments, and technological innovations:

Effective mitigation requires a multidimensional approach that integrates policies, technology, and platform-driven initiatives. This includes recommendations for stricter regulatory frameworks, enhanced safety training programs, and leveraging technological advancements such as wearable safety devices and AI-powered route optimization. By offering actionable strategies, the review aims to guide stakeholders in implementing practical solutions to improve safety standards in the P-hailing sector.

LITERATURE REVIEW

Risky Riding Behaviors in the Gig Economy

Risky riding behaviors are defined as deliberate or unintentional actions that compromise the safety of the rider and others on the road. This definition aligns with existing literature that emphasizes the impact of cognitive and emotional factors on rider behavior. For instance, Shafie and Goh (2023) demonstrate how impulsivity and frustration contribute to hazardous decision-making among riders. Leong and Shafie (2021) add that distracted riding, commonly induced by simultaneous navigation and communication tasks, increases accident susceptibility. However, it contrasts with research such as that by Chan (2022), which categorizes these behaviors purely as traffic law violations without accounting for systemic factors like algorithmic management and economic pressures that shape rider actions. Common examples include excessive speeding, abrupt lane changes, failure to adhere to traffic signals, distracted riding (e.g., using mobile phones while riding), and aggressive overtaking maneuvers (Leong & Shafie, 2021; Malik & Rusli, 2023; Oviedo-Trespalacios, Rubie, & Haworth, 2022). These behaviors often stem from the unique pressures and operational demands of the gig economy, such as stringent delivery deadlines and performance metrics enforced by algorithmic systems. Regional differences in cultural attitudes toward road safety and urban density also influence the prevalence

and nature of these behaviors, with densely populated cities reporting higher rates of such incidents (Anwar, Otieno, & Stein, 2022).

The operational demands of the gig economy, particularly the need to meet stringent delivery deadlines, are key drivers of these behaviors. Chan (2022) and Muldoon and Raekstad (2022) argue that algorithmic management systems exacerbate this issue by prioritizing speed over safety, pushing riders toward practices such as speeding, abrupt lane changes, and illegal shortcuts. This systemic issue is compounded by socio-economic pressures, as riders dependent on per-delivery payments often sacrifice safety for higher income.

Demographic and Contextual Factors

Demographic factors, such as age, gender, and riding experience, significantly influence the likelihood of engaging in risky behaviors. Younger riders, often with less road experience, are more prone to taking risks compared to older and more seasoned individuals (Ali & Razelan, 2021; Ahmad & Karuppiah, 2022). Additionally, male riders, who dominate the P-hailing workforce, statistically exhibit higher risk-taking tendencies than their female counterparts.

Contextual factors, such as urban density and socio-economic pressures, further exacerbate these behaviors. Riders operating in high-traffic zones often adopt aggressive riding tactics to navigate congested roads and meet delivery deadlines. For instance, densely populated cities like Kuala Lumpur see a higher frequency of abrupt lane changes and risky overtaking due to the necessity of maintaining strict delivery schedules. Socio-economic pressures, including the need to meet daily income targets, create an environment where riders feel compelled to prioritize speed over safety. Many riders are financially dependent on per-delivery payments, meaning that any delays directly impact their earnings and customer ratings (Daud et.al, 2023). This dynamic fosters a competitive atmosphere where adherence to traffic laws may be perceived as secondary to economic survival (Triyanti, 2024; Salleh, Shukry, & Jokinol, 2023). Furthermore, the lack of dedicated infrastructure for motorcycles, such as exclusive bike lanes, further complicates their navigation through congested urban settings, amplifying the risks associated with these behaviors.

Cultural and Regional Variations

Cultural norms and regional contexts significantly influence the prevalence of risky riding behaviors. Studies by Setoodehzadeh et.al (2021) reveal that in regions with lax traffic enforcement, riders are more likely to bypass safety regulations, viewing them as secondary to economic survival. Similarly, in densely populated cities like Kuala Lumpur, the lack of dedicated motorcycle lanes forces riders to adopt high-risk maneuvers to navigate congested traffic (Ahmad & Karuppiah, 2022; Zhang & Liu, 2024).

Psychological and Behavioral Dimensions

Behavioral psychology offers insights into the cognitive and emotional underpinnings of risky riding. Riders experiencing stress or anxiety, often driven by financial insecurity or job instability, are more prone to errors and accidents. Djunaidi and Khaliwa (2024) highlight the role of chronic stress in diminishing riders' cognitive capabilities, leading to lapses in judgment. Malik and Rusli (2023) and Zaigham, Chin, and Dasan (2022) emphasize fatigue as another critical factor, noting that extended work hours impair riders' reaction times and decision-making accuracy.

Statistical Evidence of Risk

Quantitative data underscores the gravity of these safety concerns. Nurain and Razelan (2022) reported that motorcycle delivery riders account for approximately 30% of urban traffic-related accidents in Malaysia, with a significant proportion resulting in severe injuries or fatalities. In comparison, Leong and Shafie (2021) identified that over 60% of P-hailing riders admit to engaging in at least one risky riding behavior during their daily operations. These statistics highlight the urgent need for interventions targeting both individual behaviors and systemic issues within the gig economy.

Peer Influence and Social Norms

Peer networks within the gig economy also shape rider behaviors. Triyanti (2024) discusses how informal communities of riders often propagate unsafe practices, such as weaving through traffic or ignoring traffic signals, as acceptable norms to meet collective performance benchmarks. Such normalization of risk further complicates efforts to improve safety standards.

Implications for Rider Safety

The interplay of these factors creates a challenging environment for P-hailing riders, where systemic pressures and individual tendencies converge to elevate accident risks. Addressing these multifaceted challenges requires a nuanced understanding of the cultural, economic, and psychological dimensions that drive risky behaviors. This literature review underscores the importance of targeted research and intervention strategies to mitigate safety risks in the gig economy.

METHODOLOGY OF THE REVIEW

This review employs a systematic and rigorous methodology to synthesize existing literature on risky riding behaviors within the gig economy. The approach integrates comprehensive database searches, strict inclusion criteria, and thematic categorization to ensure depth and reliability in findings.

Search Strategy

The literature search was conducted across three major academic databases: PubMed, Scopus, and Google Scholar. Boolean operators and specific keywords, such as "risky riding behaviors," "gig economy safety," "P-hailing riders," and "motorcycle delivery safety," were utilized to maximize relevant article retrieval. The search targeted peer-reviewed journal articles published between 2021 and 2024 to focus on recent and relevant findings. Additional sources were identified through manual searches of references cited in key articles.

Inclusion and Exclusion Criteria

The inclusion criteria encompassed studies that:

1. Focus on risky riding behaviors among gig economy workers, particularly motorcyclists.
2. Explore systemic, environmental, or behavioral factors influencing safety.
3. Provide empirical evidence or comprehensive theoretical analysis.

Studies were excluded if they:

1. Concentrated exclusively on non-gig economy contexts.
2. Lacked empirical rigor or theoretical relevance.
3. Were inaccessible or published in languages other than English.

Screening and Categorization

The initial database search yielded 115 articles. After screening titles and abstracts for relevance, 67 articles underwent full-text review, resulting in a final selection of 35 articles. These were categorized into three thematic areas:

1. Determinants of risky riding behaviors.
2. Implications for health, safety, and urban systems.
3. Mitigation strategies and interventions.

Database Contributions

A breakdown of the articles sourced from each database is provided in Table 1 below:

Table 1 Articles Sourced From Databases

Database	Articles Retrieved	Articles Included
PubMed	40	12
Scopus	35	15
Google Scholar	40	8
Total	115	35

Thematic Analysis

Thematic analysis was conducted to identify patterns and gaps across the selected studies. This process involved coding key concepts, comparing findings, and synthesizing insights to construct a comprehensive framework addressing the determinants, implications, and potential solutions for risky riding behaviors.

This robust methodological approach ensures that the review captures diverse perspectives, aligns with the study's objectives, and provides actionable insights for stakeholders in the gig economy.

The inclusion criteria focused on studies that examined risky riding behaviors among gig economy workers, with particular emphasis on motorcyclists operating in urban settings. Additionally, articles exploring the broader dynamics of gig economy safety and its implications for public health were included. Studies that lacked empirical evidence, focused exclusively on non-gig workers, or addressed safety concerns unrelated to riding behaviors were excluded.

In total, 35 articles were reviewed and categorized into three thematic areas: determinants of risky riding behaviors, implications for health and safety, and mitigation strategies. The thematic framework provided a structured approach for analyzing and synthesizing insights, enabling a comprehensive understanding of the multifaceted nature of risky riding behaviors. This methodology ensures the inclusion of diverse perspectives and supports the development of actionable recommendations for stakeholders in the gig economy.

RESULTS

Risky riding behaviors among P-hailing riders are influenced by a combination of individual, economic, and environmental factors, which interconnect and compound each other to create complex challenges for rider safety.

Individual-Level Factors

Individual-level determinants such as personality traits, cognitive abilities, and emotional regulation play a crucial role in shaping risky riding behaviors (Idug et.al, 2023). Riders with impulsive tendencies are more likely to engage in hazardous behaviors, such as speeding or overtaking in tight traffic, due to their preference for immediate rewards over long-term safety considerations (Shafie & Goh, 2023). Impulsivity often correlates with a lack of situational awareness, which increases the likelihood of accidents.

Additionally, risk tolerance varies among riders, with some exhibiting a higher threshold for unsafe practices. Riders accustomed to high-pressure situations may normalize behaviors like running red lights or weaving between vehicles (Idug et.al, 2023). Emotional regulation is another critical factor; riders experiencing

frustration, anxiety, or anger are more prone to aggressive actions, especially when dealing with difficult traffic conditions or delays (Leong & Shafie, 2021).

Cognitive workload and multitasking further influence individual behaviors. Riders often juggle navigation apps, communication with customers, and route planning simultaneously, which can lead to distraction. Studies highlight that cognitive overload diminishes reaction times and decision-making accuracy, significantly increasing accident risks (Idug et.al, 2023; Useche & Robayo, 2024).

Economic Pressures

Economic demands are a pervasive driver of risky riding behaviors. Many riders operate under financial constraints, relying on per-delivery payments as their primary income source. Riders aiming to meet daily income targets frequently compromise safety by exceeding speed limits or ignoring traffic signals to maximize delivery counts (Djunaidi & Khaliwa, 2024). Financial incentives tied to platform performance metrics exacerbate this pressure, encouraging riders to prioritize efficiency over caution.

Customer expectations also play a significant role. Riders are often rated based on punctuality, leading to a culture where delays are penalized through lower ratings or reduced future job opportunities (Daud et.al, 2023). This dynamic fosters a "time is money" mindset, compelling riders to take shortcuts or engage in unsafe practices, such as riding on sidewalks or making illegal turns (Saksida et.al, 2024; Najiha & Herman, 2024).

Economic insecurity further compounds these issues. Riders who lack stable income or savings may push themselves to work extended hours, leading to physical fatigue. Fatigue impairs judgment and reaction times, making riders more vulnerable to errors and accidents. Studies have shown that fatigue-induced lapses are a leading cause of near-misses among P-hailing riders (Malik & Rusli, 2023; Huang et.al, 2023).

Work Environment

The work environment, shaped largely by gig platforms, imposes unique challenges that influence rider behavior. Algorithmic management systems often prioritize speed and efficiency, setting unrealistic delivery times that incentivize riders to adopt unsafe practices. For instance, "dynamic routing" algorithms may suggest routes that prioritize shorter travel times over safer paths, placing riders in high-risk traffic conditions (Muldoon & Raekstad, 2022). Limited access to formal safety training exacerbates these risks. Many riders lack proper education on defensive riding techniques or traffic law adherence (Saksida et.al, 2024). The absence of onboarding programs that emphasize safety creates a knowledge gap, leaving riders ill-prepared for complex urban traffic scenarios (Salleh, Shukry, & Jokinol, 2023).

Infrastructure deficiencies also contribute to environmental pressures. Riders frequently navigate poorly maintained roads, insufficient lighting, and a lack of dedicated motorcycle lanes, which heightens their exposure to accidents. Urban planners often prioritize vehicles and public transport systems over motorcycle-friendly designs, further marginalizing this critical workforce (Zhang & Liu, 2024). Peer influence within the work environment can also shape risky behaviors. Riders often form informal networks or groups, and the norms within these communities may normalize unsafe practices, such as speeding or ignoring traffic signals, to meet collective performance benchmarks or schedules (Saksida et.al, 2024; Najiha & Herman, 2024).

DISCUSSIONS

Implications of the Study

The implications of risky riding behaviors among P-hailing riders extend far beyond individual risks, affecting public health, urban systems, and the sustainability of the gig economy. The following consequences highlight the need for immediate intervention by stakeholders at various levels:

Health and Safety Impacts

Risky riding behaviors have a profound impact on the health and safety of riders and other road users. High rates of accidents among P-hailing riders result in significant physical injuries, such as fractures, head trauma, and musculoskeletal disorders (Louzado-Feliciano et.al, 2022; Zaigham, Chin, & Dasan, 2022; Huang et.al, 2023). These injuries not only compromise the well-being of the riders but also place a considerable burden on healthcare systems, which must manage the treatment and rehabilitation of injured individuals (Radzlan & Othman, 2023). Psychological health is also affected, as the constant pressure to meet delivery deadlines and customer expectations creates chronic stress. Riders frequently report symptoms of anxiety, burnout, and depression, which further impair their ability to make safe decisions on the road. Stress-induced distractions and emotional outbursts can exacerbate unsafe practices, increasing the likelihood of accidents (Louzado-Feliciano et.al, 2022; Shafie, Goh, & Leong 2023; Huang et.al, 2023).

Urban and Environmental Impacts

The ripple effects of risky riding behaviors are felt across urban environments. Unsafe riding practices exacerbate traffic congestion, particularly in densely populated cities like Kuala Lumpur, where delivery motorcycles often compete with larger vehicles for limited road space (Zaigham, Chin, & Dasan, 2022; Najiha & Herman, 2024). Traffic disruptions caused by accidents involving P-hailing riders add to the congestion, delaying the flow of goods and people across urban centers (Daud et.al, 2023; Zhang & Liu, 2024). From an environmental perspective, the inefficiencies driven by risky behaviors undermine efforts to achieve sustainability. For example, speeding and frequent braking—common practices among riders aiming to meet tight deadlines—increase fuel consumption and carbon emissions. These patterns conflict with broader goals of reducing the environmental impact of urban logistics and creating greener cities (Naumov & Keith, 2022).

Ethical Concerns

Risky riding behaviors also raise ethical questions about the treatment of gig workers in the P-hailing industry. Many platforms use surveillance technologies, such as GPS tracking and wearable devices, to monitor rider performance and adherence to safety protocols. While these tools aim to enhance accountability, they often infringe on rider privacy and autonomy, sparking debates about the ethical boundaries of such practices (Chan, 2022; Najiha & Herman, 2024). Additionally, the prioritization of efficiency over safety by gig platforms shifts the burden of risk onto riders, who must navigate the trade-offs between meeting platform demands and protecting their well-being. This imbalance highlights a broader ethical issue: the need to create a work environment that values human safety as much as operational performance.

RECOMMENDATIONS

By understanding the implications discussed earlier, stakeholders, including government authorities, platform operators, and the riders themselves, can better appreciate the urgency of addressing risky riding behaviors. Mitigating these impacts requires coordinated efforts across public policy, platform management, and technological innovation to safeguard riders and urban communities alike. Thus, to effectively mitigating risky riding behaviors requires a multifaceted approach that encompasses interventions at the platform, policy, and technological levels as recommended below;

Platform-Level Interventions

Gig platforms play a pivotal role in shaping rider behavior through their algorithms and policies. Revising algorithmic designs to prioritize safety can significantly reduce the prevalence of risky practices. For instance, platforms could extend delivery time windows and de-emphasize speed-based performance metrics. Comprehensive safety training programs tailored to the specific challenges faced by P-hailing riders can also enhance compliance and skill levels (Leong & Shafie, 2021). Additionally, platforms should incentivize safe riding practices by integrating reward systems that acknowledge adherence to traffic laws and safe delivery

practices. Providing accident insurance and mental health support for riders can further demonstrate platform commitment to rider welfare.

Policy-Level Recommendations

Government intervention is critical to ensuring that safety becomes a priority in the gig economy. Policies mandating the use of personal protective equipment (PPE), such as helmets and reflective jackets, can reduce injury severity in accidents. Governments should also implement regulations requiring platforms to enforce rest breaks and set maximum working hours to combat rider fatigue (Dang & Cao, 2021; Xu, 2024). Urban planning initiatives, such as dedicated motorcycle lanes and improved road infrastructure, can create safer conditions for P-hailing riders (Lee et.al, 2022). Public-private partnerships could facilitate the development of safe delivery zones in high-traffic areas, minimizing exposure to accident-prone environments (Xu, 2024).

Technological Innovations

Technological advancements hold significant potential for addressing safety challenges. AI-powered predictive analytics can identify high-risk routes and provide riders with safer alternatives. Wearable technology that monitors rider health and provides real-time alerts on fatigue or stress levels can preempt accidents (Lee et.al, 2022). Drone delivery systems represent a long-term solution to mitigate risks associated with on-road deliveries. By integrating drones for last-mile deliveries, platforms can reduce the dependence on motorcycles in high-risk urban areas (Xu, 2024; Sulaiman et.al, 2024).

Such recommendations have been successfully implemented in other countries. For example, cities like Amsterdam have successfully implemented public-private partnerships to create dedicated motorcycle lanes, improving rider safety while reducing traffic congestion (Saini, Chouhan, & Kathuria, 2022). Similarly, collaborative programs between platforms and governments in Singapore have introduced mandatory safety training for gig workers, ensuring better compliance with traffic laws (Tan, Yang, & Li, 2022; Xu, 2024). Given the structural similarities in urban transportation challenges and the growing gig economy across Southeast Asian countries, these recommendations are likely to be equally successful in Malaysia, where similar digital platform ecosystems and motorcycle-dependent delivery networks exist.

CONCLUSION

In conclusion, this study highlights the complex interplay of factors contributing to risky riding behaviors among P-hailing riders in Malaysia. Key determinants include individual traits, economic pressures, and work environment dynamics, all of which interact to create significant safety challenges. The implications of these behaviors extend to public health, urban mobility, and platform sustainability, underscoring the urgency of implementing effective mitigation strategies. Addressing these challenges requires a coordinated effort across stakeholders. Platforms must prioritize safety through algorithmic adjustments and rider support programs, while policymakers should enforce regulations that protect riders and incentivize safe practices. Technological innovations, such as wearable safety devices and drone delivery systems, offer promising solutions to long-standing issues. Meanwhile, future research should address existing gaps by adopting longitudinal designs and exploring interdisciplinary approaches. For example, integrating urban planning with behavioral psychology and leveraging advancements in wearable safety technology could offer comprehensive insights and solutions. Such approaches could examine how infrastructure changes influence rider behaviors while assessing the psychological factors that underpin risky decision-making. By focusing on sustainable and inclusive strategies, stakeholders can create a safer and more equitable gig economy for all participants.

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