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Factors Influencing Risky Riding Behaviors among P-Hailing Riders in Malaysia

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Abstract: The impact of the COVID-19 pandemic has increased the demand for food delivery services and riders' jobs. This increases the trend of motorcycle crashes among p-hailing riders. This research seeks to determine the factors influencing risky riding behaviors among p-hailing riders in Kajang, Selangor. A novel model framework is proposed by adopting Ajzen's theory of planned behavior. We modified the theory of planned behavior by adding two new constructs: conformity tendency and traffic environment. The respondents in this study were 211 riders from Kajang, Selangor. The data were analyzed using multiple linear regression models and showed that the main attitudinal constructs, namely attitudes, subjective norms, and perceived behavioral control, had a significant positive and direct influence on the riders in behavioral intention, but attitude showed a stronger significant value than the other two. In addition, the conformity tendency and traffic environment have a positive impact on behavioral intention with a strong significant value ($P \leq 0.001$). Perceived behavioral control has the least influence on behavioral intention. However, behavioral intention has a profound positive and direct effect on risky riding behavior with strong significance. It also contributes beneficial information that authorities, policymakers, planners, and researchers can use to develop effective strategies to avoid the rise in p-hailing crashes in Malaysia.

Keywords: p-hailing, theory of planned behavior, food delivery, road safety.

影响马来西亚网约车乘客危险乘车行为的因素

摘要：新冠肺炎大流行的影响增加了对送餐服务和骑手工作的需求。这增加了网约车骑手中摩托车事故的趋势。本研究旨在确定影响雪兰莪州加影市网约车乘客危险骑行行为的因素。采用阿杰森的计划行为理论提出了一种新颖的模型框架。我们通过添加两个新的概念来修改计划行为理论：从众倾向和交通环境。这项研究的受访者是来自雪兰莪加影的 211 名骑手。采用多元线性回归模型对数据进行分析，结果表明，主要态度建构，即态度、主观规范和感知行为控制，对骑手的行为意向具有显着的正向直接影响，但态度比态度表现出更强的显着价值。另外两个。此外，从众倾向和交通环境对行为意向有正向影响，且显着性较强（磷≤0.001）。感知行为控制对行为意图的影响最小。然而，行为意向对危险骑行行为具有深远的正向直接影响，具有很强的意义。它还提供了有益的信息，当局、政策制定者、规划

者和研究人员可以利用这些信息来制定有效的策略，以避免马来西亚网约车事故的增加。.

关键词：打车、计划行为理论、送餐、道路安全.

1. Introduction

The worldwide impact of post-COVID-19 has increased dependency on meal delivery apps by twofold. According to prior research, most users who place orders using the application are happy with the food delivery services because of the platform's effective delivery times, costs, and promotions [1]. According to [2], there was an increase in the number of customers using FDAs during the COVID-19 pandemic period in China, averaging 71% between February and March 2020. The pandemic changed many customers' eating habits, accelerating the need for online food delivery services. Additionally, Covid-19's effects have increased people's reliance on internet meal delivery services. Due to the growth of this occupation, drivers everywhere now must contend with a constant stream of food delivery riders [3]. However, many young consumers are increasingly becoming unwilling to stand in queues in restaurants for food services. Food apps offer a solution to changing consumer behavior and promote the convenience of eating at home [4].

As a result, the employment rate of food delivery riders has increased. This is because online-to-offline (O2O) based has created a good job opportunity for the riders because they could gain money by being part of the service team instead of being involved in the whole process of the restaurant policies. Thus, an increase in the number of riders increases the number of road collisions involving P-hailing users. According to research, there were more than 3,000 incidents involving delivery riders in Nanjing in the first half of 2017. Similarly, there were 76 fatal accidents involving delivery riders in Shanghai in the first half of 2017, with nearly one delivery rider dying every 2.5 days [5].

This research was conducted to investigate the factors leading to risky riding behavior among p-hailing riders. This research aimed to identify the answer to particular research questions, namely (i) What is the relationship between psychological factors and risky driving behavior among p-hailing riders? (ii) What are the factors that cause p-hailing riders to make decisions that put their lives at risk while riding? and (iii) What is the best solution to reduce the impact of risky driving behavior on society? To answer these questions, the theory of planned behavior was modified using additional conformity tendency and traffic environment constructs. The structural equation model (SEM) was developed using survey data from 211 individuals working as p-hailing riders. The Klang Valley (Bangi, Kajang, Seri Kembangan, Subang Jaya, Kuala Lumpur) was the study area selected to apply the proposed method. This study aimed to identify and examine the relationship between attitude, subjective norms, and behavioral control on risky driving behavior among p-hailing riders. This study also seeks to investigate the influence of attitude, subjective norms, and behavioral control on risky driving behavior among p-hailing riders. Furthermore, it proposes solutions to reduce the impact of risky driving behavior on society. It is crucial to emphasize that this study is now restricted to Malaysia to draw the attention of academics from many nations, including the United States, United Kingdom, and other countries. The results and understandings from this study in Malaysia may still be useful and applicable to situations of a similar nature in other nations. To develop a more thorough grasp of the subject, it is important to consider the possibility for future studies to broaden the focus and conduct comparison studies across various nations.

This section of the article is followed by Section 1, which presents the literature review and hypothesis formulation. Section 2 presents a discussion of the methodology applied in this study. Section 3 presents the findings, followed by a discussion and policy implementation. This article concludes in Section 4.

2. Literature Review

2.1. Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is a social psychology theory that aims to explain and predict human behavioral intentions [6]-[8]. In this research, two more constructs have been added: conformity tendency and traffic environment.

A person's attitude (AT) is how they see a particular behavior, whether positively or negatively. In other words, attitude represents how someone feels when performing a specific action, whether they feel positive or negative [6]. Positive attitudes can influence a rider's behavior, such as wearing a helmet or following traffic regulations. Negative attitudes, such as thinking that wearing a helmet is cumbersome and uncomfortable, can, on the other hand, have a negative effect on behavior. Since attitudes mold people's views and propensities for particular behaviors, they have a considerable impact on how people behave [9]-[10].

Subjective norms (SN) are the social pressure or influence that one's environment exerts on one to behave in a certain way. It includes the impact of social groups such as friends, family, and classmates and

cultural norms. Subjective norms play a role in influencing one's behavior based on the perceived expectations and opinions of others, and they can alter an individual's perspective of what is socially acceptable or expected in a certain environment [8], [11].

A rider's intention to ride safely can also be affected by perceived behavioral control (PBC), such as their confidence in their ability to do so or their access to safe riding gear. Riders may be more likely to act in such a way if they believe that they have the tools and knowledge needed to ride safely. A person's decision to engage in safe riding practices can be greatly influenced by their perception of their ability to regulate their behavior and the availability of the tools needed to ensure safety [3].

According to [12], attitude has the strongest influence on behavioral intention compared with the other four constructs, followed by conformity tendency and traffic environment. All of these constructs strongly influence risk-taking behavior. According to the TBP, intentions and subsequent behaviors are influenced by information or salient beliefs through attitudes and subjective norms. Attitudes toward behaviors are formed according to the connection between a behavior and various outcomes and characteristics. Subjective norms can be defined as representing a person's view of certain behavior, and this view is affected by the expected judgment of important people [12] supported by [13]. Therefore, several hypotheses were developed according to a comprehensive literature review.

Hypothesis 1 (H1): Attitude has a significant and positive effect on the intention to engage in risk-taking behavior.

Hypothesis 2 (H2): Subjective norms have a significant and positive effect on the intention to engage in risk-taking behavior.

Hypothesis 3 (H3): Perceived behavioral control has a significant and positive effect on the intention to engage in risk-taking behavior.

Hypothesis 4 (H4): The tendency for compliance has a significant and positive effect on the intention to engage in risk-taking behavior.

Hypothesis 5 (H5): The traffic environment has a significant and positive effect on the intention to engage in risk-taking behavior.

Hypothesis 6 (H6): Behavior intention has a significant and positive effect on the intention to engage in risk-taking behavior.

2.2. Theoretical Framework

Based on a comprehensive literature review, the current research proposed a theoretical model to explore the relationship between seven constructs, namely attitude (AT), subjective norms (SN), perceived behavior control (PBC), conformity tendency (CT), traffic environment (TE), behavioral intention (BI), and risk-taking behavior (RTB), as illustrated in Figure 1.

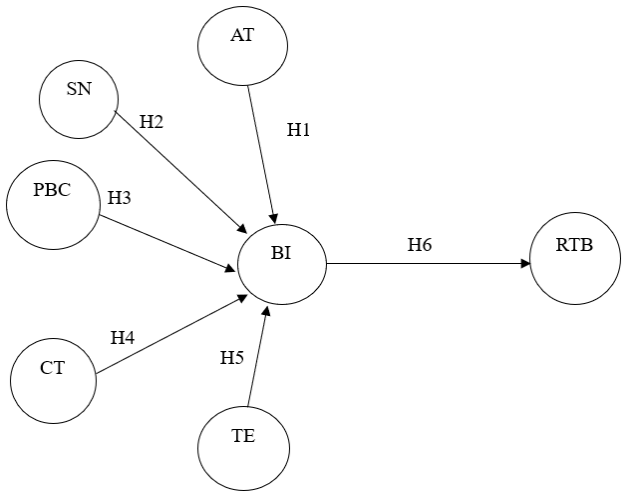

Fig. 1 Framework of the proposed model (Developed by the authors)

3. Research Methodology

This section describes the method used in the study to identify the factors that influence risky riding behavior among p-hailing riders to develop an effective strategy to identify the factors that influence risk-taking behavior and to propose a policy to prevent road fatalities involving p-hailing riders. The following sections describe the research topic, questionnaire design, data collection, and data analysis.

3.1. Research Area

This study was conducted in the Klang Valley area, specifically in Kajang, Selangor, Subang Jaya, located in peninsular Malaysia, as shown in Figure 2.

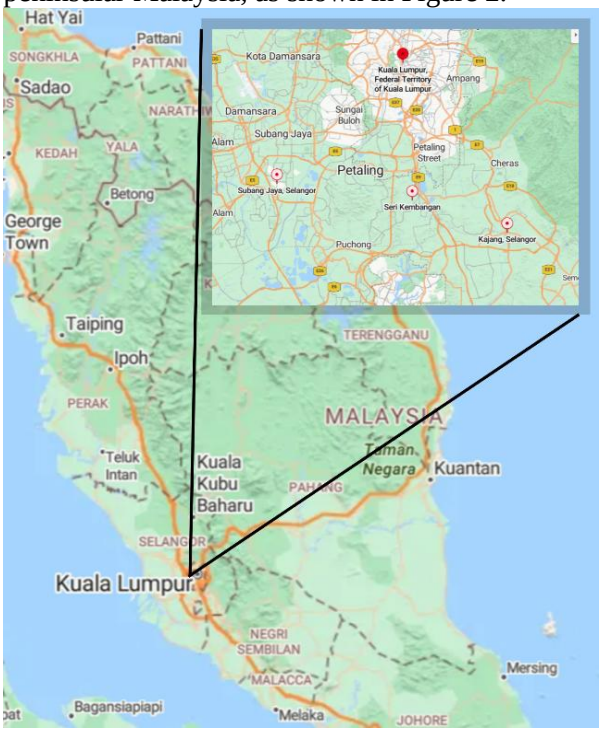

Fig. 2 Study area (Developed by the authors)

3.2. Measurement

A pilot test was performed, in which a questionnaire was distributed to 30 P-hailing riders at Kajang,

Selangor, chosen at random from April 17 to 22, 2023. The final questionnaire used in the actual survey was separated into two sections after the reliability analysis of the pilot research is presented in Table 1.

Table 1 Questionnaire sections (Developed by the authors)

Section	Construct	Number of items	Ref.
A	Demographic Factor	10	[14]
B	Attitude	5	
	Subjective Norm	3	
	Perceived Behavior Control	6	[14]-[16]
	Conformity Tendency	5	
	Traffic Environment	4	
	Behavioral Control	3	
	Risk-Taking Behavior	3	

Ten questions about the respondents' sociodemographic characteristics were specifically addressed in section A. These questions covered gender, marital status, age, educational level, license ownership, involvement in accidents, employment status, wage, work experience, and working hours. The factors that influence riders' risk-taking behaviors were measured in the following section using the seven constructs in Table 2. Section B of the questionnaire was rated using a five-point Likert scale, with 1 being the strongest disagreement and 5 being the strongest agreement. In essence, higher scores represented a greater level of interest in a certain measure.

3.3. Data Collection

To collect the necessary data for this study, a questionnaire will be given to all riders between April 24 and May 27, 2023. By addressing the riders at specific locations, 250 self-administered questionnaires were delivered. The poll objectives were briefly explained to possible respondents before the survey, and they were then asked if they were okay to participating. Notably, only those respondents who agreed to take part in the survey received the questionnaire, ensuring that each question would receive a precise and reliable response. Thus, 31 surveys were discarded after they were returned because they contained inaccurate or partial answers, leaving 211 questionnaires with an 84.4% response rate to be used in the study. Table 2 provides a summary of the sociodemographic traits of the 211 respondents.

Table 2 Profile of the respondents (Developed by the authors)

Category	Answers	Frequency (n)	Percentage (%)
Gender	Male	170	80.6
	Female	41	19.4
Age	18-20	14	6.6
	21-25	70	33.2
	26-30	88	41.7
	31-35	25	11.8
	36-40	10	4.7
	41 and above	4	1.9
Marriage status	Single	110	52.1
	Married	101	47.9
Monthly salary (RM)	< 1000	32	15.2
	1001-2000	92	43.6
	2001-4000	70	33.2
	> 4000	17	8.1
Employment status	Full Time	102	48.3
	Part-time	109	51.7
Working experience	< 6 months	34	16.1
	6-12 months	29	13.7
	1-2 years	46	21.8
	2-3 years	48	22.7

	Continuation of Table 2		
	> 3 years	54	25.6
Level of study	Sijil Pelajaran, Malaysia	111	52.6
	Matrikulasi/Tingkatan 6/O-Level/A-Level/Asasi	40	19.0
	Ijazah Sarjana Muda (Degree)	58	27.5
	Ijazah Sarjana (Master)	2	0.9
Working hours per day (hours)	< 3	10	4.7
	3-6	67	31.8
	6-9	99	46.9
	> 9	35	16.6
License ownership	Yes	200	94.8
	No	11	5.2
Accidents involvement	Yes	92	43.6
	No	119	56.4

3.4. Tools and Procedure for Data Analysis

Statistical Package for Social Sciences Software (SPSS) 22.0 and Microsoft Excel were used to analyze the data. Using SPSS, the respondent's sociodemographic profile, which is displayed in frequency and percentage in Table 3, was examined. Using SPSS, the mean and standard deviation values for each item, as shown in Appendix A, were also determined. The results of the normality test demonstrated that the data used in this study are considerably normally distributed.

4. Results and Discussion

To ensure that the actual data and assumptions are acceptable, the measurement model fit criteria were evaluated. In this study, the data were analyzed using SPSS 22.0 and Microsoft Excel. Both of these models were used to find correlations between attitude, subjective norms, perceived behavioral control, conformity tendency, and traffic environment factors on risky driving behavior among p-hailing riders. The results are shown in Table 3.

Table 3 Pearson's correlation results (Developed by the authors)

	AT	**SN**	**PBC**	**CT**	**TE**	**BI**	**RRB**
AT	1						
SN	0.571	1					
PBC	0.817	0.601	1				
CT	0.690	0.523	0.645	1			
TE	0.793	0.671	0.793	0.605	1		
BI	0.827	0.622	0.766	0.690	0.793	1	
RRB	0.806	0.637	0.752	0.546	0.826	0.824	1

The validity of the constructs in this study was then evaluated using the correlation values from the coefficient value between 1 and 1 ($-1 \leq r \leq 1$). A value of 1 indicates a perfect positive linear relationship, a value of -1 indicates a perfect negative linear relationship, and a value of 0 indicates no linear relationship between the variables.

4.1. Relationship among the Constructs

The validity of the constructs in this study was then evaluated using the correlation values from the coefficient value between -1 and 1 ($-1 \leq r \leq 1$). A value of 1 indicates a perfect positive linear relationship, a value of -1 indicates a perfect negative linear relationship, and a value of 0 indicates no linear relationship between the variables.

4.2. Factors Influencing Risky Riding Behavior

After establishing a correlation between the constructs, we determined whether the positive

correlation value had any bearing on risk-taking behavior by investigating the influence of attitude, subjective norms, perceived behavioral control, conformity tendency, and traffic environment factors in regression analysis. The construct's importance will also be assessed by looking at the significant relationship between the independent variables and the dependent variable (RRB), as depicted in Table 4.

Table 4 Multiple linear regression results (Developed by the authors)

Coefficients						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	-0.175	0.113		-1.551	0.122
	A	0.427	0.075	0.39	5.675	0.000
	SN	0.099	0.052	0.09	1.9	0.059
	PBC	0.091	0.075	0.08	1.216	0.226
	CT	0.172	0.051	0.165	3.379	0.001
	TE	0.275	0.070	0.260	3.924	0.000

a. Dependent variable: BI

Table 4 shows attitude (β= 0.427, $p<0.001$), subjective norms (β= 0.099, $p=0.024$), PBC (β= 0.091, $p=0.464$), conformity tendency (β= 0.172, $p<0.001$), traffic environment (β= 0.275, $p<0.001$) and behavior intention (β= 0.793, $p<0.001$). Hypotheses 1 through 6 were accepted under the condition except Hypotheses 3, these constructs not significantly and directly affect drivers' risk-taking behaviors. The attitude constructions had the greatest impact on behavior intention and risk-taking among the five items. In conclusion, the SPSS program was used for the descriptive analysis, the Pearson correlation test, and the linear and multiple linear regression models in the analysis and conclusions of this study. In this chapter, five independent variables—attitude, subjective norms, perceived behavioral control, conformity tendency, and traffic environment—and one dependent variable—the intention to engage in risk-taking behavior—were tested. The analysis findings can be summarized as follows: Attitude has the strongest influence on behavioral intention compared with the other four constructs, followed by conformity tendency and traffic environment. All of these constructs strongly influence risk-taking behavior.

Correlation, linear, and multiple regression analyses have been conducted to investigate the relationship between attitude, subjective norms, perceived behavior control, and additional constructs, namely conformity tendency and traffic environment toward behavioral intention, to determine i) the correlation between the independent variables and ii) how strong the independent variables would influence risk-taking behavior. In this study, AT had the highest influence on behavior intention, followed by traffic environment and conformity tendency, with a positive and strong significant value ($p<0.001$). Meanwhile, PBC showed the least significant ($p>0.1$) towards behavior intention and risk-taking behavior; thus, these two constructs have a weak influence on risk-taking behavior. Thus, the model generated from this analysis is 0.427(S) + 0.099(NS) + 0.172(KP) + 0.275(PT), while for regression linear generates 0.339 + 0.79(NTL).

A result from [17] shows that young, full-time, experienced drivers, and those who travel equal to or>100 km daily are more likely to be involved in road traffic crashes. Food delivery riders are considered freelance workers and are not regulated by the Employment Act of 1995 (Act 265). Under the provisions of the Self-Employment Social Security Act 2017 (Act 789), the Social Security Organization (SOCSO) offers the Self-Employment Social Security Scheme (SKSPS) to protect self-employed individuals. On the other hand, the Philippines proposed that the government and private sector should establish various programs that focus on and cater to the psychological aspects of food delivery riders, and these programs should be legally protected. Platform algorithms for food delivery companies should be improved [3]. Platform algorithms for food delivery companies should be improved. Finally, private companies should plan activities and events for food delivery riders to raise their awareness and guide them in this type of work sector. This may also aid riders in developing relationships with one another and coping by exchanging experiences.

The findings reveal that perceived behavior control does not affect behavior intention. In line with [18], PBC had no significant impact on behavioral intention or actual behavior, indicating that PBC is an insignificant factor in rear seat belt use behavior. Similarly, as posited in [19], PBC implied a negative relationship with intention in the presence of the attitude component when investigating the users' intention to use autonomous vehicles. The findings

highlighted that attitude was the most significant predictor of intentions, whereas SN and PBC had extremely low effects on intention. Besides, this outcome of the study claimed that attitude has a significant and positive effect on risky riding behavior. As claimed in [20], the strong influence of attitudes on using e-bikes among students indicates that if students believe that using an e-bike for each of them personally is easy, simple, exciting and relaxing, their intention to use e-bikes would increase.

5. Conclusion

In a nutshell, the present study examines the factors influencing P-hailing riders to engage in risky riding behaviors in Kajang, Selangor. Nonetheless, this study adds to the current understanding of the relationship between attitude, subjective norms, perceived control behaviors, conformity tendency, and traffic environment, as well as its impact on behavior intention and risk-taking behavior among P-hailing riders.

This is one of the few road safety studies that analyzes various countries and validates the TPB by incorporating two new constructs to determine factors impacting risky riding behavior among Malaysian P-hailing riders. This contradictory outcome warrants additional research to explain the specific factors in the study areas. Theoretical implications include a deeper understanding of the precise consequences of P-hailing riders engaging in unsafe riding behavior as well as the underlying factors that contribute to those risks. This knowledge can then be used to guide the establishment of measures and policies targeted at mitigating such risks and enhancing the overall safety of the sector. A proactive strategy to detect and resolve the risks and dangers that their deliverers encounter is one of the managerial implications that P-hailing businesses must consider. This may entail executing policies and procedures to protect riders, such as providing proper training and awareness on safe riding techniques. It may also include deploying technological solutions, such as GPS tracking and communication systems, that enhance rider safety.

On the other hand, the authors believe that this study encompasses both theoretical and practical implications. Therefore, future research can emphasize on the larger population and from multitude locations to examine regional disparities, as well as riveting on supplemental aspects such as occupation safety and health issues relevant to the P-hailing sector. Nonetheless, traffic accidents and serious injuries could be avoided by providing proper personal protective equipment to food/parcel delivery riders to ensure a safe working environment.

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