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Overworked and Unsafe: A Comparison of Driving Behaviour and Safety Culture According to Driver Types and Working Hours

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ABSTRACT

Much debate on e-hailing and ride-sharing has been focused on the legality of their services, with systematic investigation into the differences in the perception, attitude, behaviour, and working hours among the drivers has only been marginally explored. This study addresses this gap using data from a survey of 80 drivers (Taxi: n = 40; E-hailing: n = 40). The Manchester Driver Behaviour Questionnaire (MDBQ) and the Safety Climate Questionnaire (SCQ) scores revealed that the e-hailing drivers reported a significantly higher safety climate perception than taxi drivers but no significant difference was obtained for unsafe driving behaviour. Age was a significant covariate only for safety climate perception. In terms of working hours, the results demonstrate that: (i) drivers who worked less than 12 hours per week reported significantly more unsafe driving behaviour than those who worked between 13 to 36 hours and 61 hours or more; (ii) drivers who worked less than 12 hours per week reported more positive safety climate perception compared to those who worked 61 hours or more; and (iii) drivers who worked between 13 to 36 hours had significantly higher safety climate perception scores than those who worked 61 hours or more. Further general linear model analyses showed a significant main effect of hours worked and an interaction effect of driver types and hours worked on unsafe driving behaviour scores. No main and interaction effects were found for safety climate perception scores. Possible explanations of the results and the implications of the study are discussed within the limitations of the data. Recommendations for addressing future trends in shared mobility are also offered.

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1. Introduction

Innovations, such as ride-hailing services, car- and bicycle-sharing systems, mobile trip-planning and ticketing applications, as well as other new mobility services, have revolutionised the transportation of people and goods. With the advent of e-hailing companies, like Grab, Uber, GoJek, Lyft, Didi Chuxing, Ola, and others, ride-hailing services have undergone a significant transition, from the traditional street-hailing and dispatched taxi services to on-demand ride-hailing systems. As of December 2019, there were close to 358,944 active public service vehicle (PSV) licence holders in Malaysia, of which 91,978 were registered as active e-hailing drivers, and 28,860 were taxi drivers providing both e-hailing and normal taxi services (Kaur, 2019). With 42 companies authorised to operate e-hailing services in the country (Choong & Lai, 2019), the number of e-hailing trips increased from six million a month in 2016 to 18 million in 2018 (Abas & Abd Mutalib, 2018). Given this development, it would be natural that e-hailing services are considered as a bane to the taxi industry, primarily due to their fierce competition for the same customers.

While taxi services have always been classified as public transportation, e-hailing service providers, notably Uber and Grab, regard themselves as a technology company (Grab, 2020a) or a transportation network company (Texas A&M Transportation Institute, 2020), rather than as public transportation operators; hence, they opine that they are not liable to the regulations that taxi drivers and operators have to abide by. This scenario has led to widespread protests and legal actions by the taxi industry not only in Malaysia but also worldwide (for a list of the protests against e-hailing and ride-sharing companies, see "Legality of Ridesharing Companies by Jurisdiction", 2020), forcing the governments to institute legal measures. This led to all ride-hailing services in Malaysia to be regulated by the government in July 2018, which came into full effect on October 2019 (Anand, 2018). Accordingly, both the taxi and e-hailing services must adhere to the Land Public Transport (Amendment) Act 2017 and the Commercial Vehicle Licensing Board (Amendment) Act 2017, in terms of licence and registration, vehicle inspection, and operational requirements.

Currently, the debate is focused on the legality of the e-hailing services, with very little evidence available on the systematic investigation of the differences in the perception, attitude, behaviour, and working conditions among ride-hailing drivers. A review of studies in the wider literature has shown that public transport drivers, in general, are more likely to commit traffic violations (Rosenbloom & Shahar, 2007); be involved in more accidents (Sawamoto, 2018; Tan, 2018); and have lower priorities with regards to road traffic safety (Nordfjærn et al., 2012). However, they are also exposed to more

harmful environmental and task conditions, such as adverse health outcomes, poor ergonomic conditions, work-related fatigue, and occupational stress (Crizzle et al., 2017; Tsoi & Tse, 2012; Useche et al., 2017), compared to non-professional drivers.

In contrast, Wu (2014) found that taxi drivers have a lower crash rate compared to non-professional drivers. They are also more conservative in the basic vehicle control level and are more inclined to turn the steering wheel to avoid a possible crash, hence potentially reducing the risk of crash involvement (Wu, 2014). One explanation for this different finding might be that the drivers' work conditions (e.g., driving experience, hours spent on the job, the number of daily trips, and duration of employment), could influence the perception, attitude, and behaviours of the drivers. Studies, such as those by Ma et al. (2010), Vahedi et al. (2018), and Wu (2014), have all shown that drivers' work conditions are positively associated with accident involvement and traffic violations. Therefore, it can be implied that the perception of, and attitude and behaviour towards driving and safety, would be different among ride-hailing drivers, considering the nature of their working conditions.

In Malaysia, however, little has been done to investigate how perception, attitude, and behaviour would be manifested differently by hailing services drivers, given the hours they spend on the job. Since an overwhelming number of issues concerning driving behaviour and safety of ride-hailing services have been reported (for a list of incidents involving these services, see Who's Driving You, 2018 and "Incidents Grab (company)", 2020), it is argued that most customer dissatisfaction may stem, at least in part, from drivers' perception of, and behaviour and attitude toward safety. More importantly, there is a lack of understanding about which driver group has the greater tendency to display unsafe driving behaviour and which one has a more positive safety climate perception. Understanding the differences between these two groups is crucial as it can make a significant contribution to changing drivers' attitude and behaviour toward safe driving. Therefore, the present study compares unsafe driving behaviour and safety climate perception of taxi and e-hailing drivers, while taking into account the hours they spend on the job.

Unsafe driving behaviour and safety climate perception are selected as the variables in this study because these two factors have been identified in past studies as having a significant effect on drivers and driving performance. Driving behaviour refers to all overt actions and covert or mental operations that a driver performs when driving (Sagberg et al., 2015). These types of behaviour, which may include seat belt use, basic vehicle control, speeding, overtaking, tailgating, lane changing, and others, can become a habit when demonstrated over time (Kleisen, 2011). Driving behaviour can be influenced by various factors, including internal (e.g., driver's skill, driving experience, physiological status, and psychological state), as well as external (e.g., traffic density, local weather, road conditions, and culture) factors, among others (Sagberg et al., 2015). Together, these factors could shape one's driving style.

There is also considerable evidence connecting driving behaviour with crash risk and crash involvement. In their review, Sagberg et al. (2015) reported numerous studies that have indicated different types of behaviour, such as frequent speeding and abrupt acceleration/deceleration, resulted in higher crash involvement. Similar results have also been obtained in an earlier research by Tillmann and Hobbs (1949) who found that taxi drivers with a high accident frequency tend to be easily distracted while driving and readily annoyed at other motorists, as well as showed a disposition for horn honking and racing other cars away from a traffic light when compared to those with a low accident frequency. In another research, Rowland et al. (2009) reported that taxi drivers are more likely to engage in unsafe driving behaviour, such as speeding violation, aggressive actions, and making driving errors. These types of unsafe behaviour, in turn, could considerably increase the risk of accidents.

Meanwhile, safety climate is defined as shared perception of employees about the importance of safety within their organisation, including their perception of management's commitment towards safety (DeJoy et al., 2004). While studies conducted in other industries have established that safety climate is an influential factor in predicting safety behaviour (Clarke, 2006; Leitão & Greiner, 2016), very few studies have been conducted on public transport drivers. Nevertheless, even within the limited literature available, it has been found that safety climate perception is associated with drivers' safety behaviour and outcomes, such as speeding, inattention, rule violations, and driving while tired (Amponsah-Tawiah & Mensah, 2016), as well as with accidents and injuries (Beus et al., 2010). In another research by Machin and De Souza (2004), a high safety climate perception has been reported to be associated with more positive emotional well-being and less unsafe behaviour among taxi drivers. Most previous studies on unsafe driving behaviour and safety climate perception in the Malaysian transportation setting, however, have been conducted on private car drivers in general (e.g., Ang et al., 2018; Rosli et al., 2017; Nazlin & Siti Zawiah, 2016). Relatively few studies are available on public transport drivers; hence, little is known about how these variables would differ within this group, particularly among ride-hailing drivers.

Given the importance of understanding these differences in the occupational context, the present study has three aims:

(i) to test the differences in unsafe driving behaviour and safety climate perception between taxi and e-hailing drivers; first, by direct differences, followed by including age as a covariate;
(ii) to examine unsafe driving behaviour and safety climate perception of drivers working at different duration of working hours; and
(iii) to assess the extent to which variations in unsafe driving behaviour and safety climate perception are attributable to the interaction between driver types and hours worked.

Due to the exploratory nature of the study and limited research available on this topic, our work does not seek statistical generalisation of the findings. Instead, it investigates unsafe driving behaviour and safety climate perception among the ride-hailing drivers so that potential ideas for future research can be derived and appropriate interventions can be suggested.

2. Method

2.1. Participants

A cross-sectional, self-report survey was carried out to investigate the differences between taxi drivers (n = 40) and e-hailing drivers (n = 40) and hours they spent on the job. Taxi drivers, who exclusively pick up passengers at taxi stands or by street hailing, were recruited through the snowballing technique, where referrals from initial drivers generated additional participants. Using a similar technique, the e-hailing drivers were recruited via social media sites specifically for e-hailing drivers and by personal networking. Power analysis using G*Power version 3.1 (Erdfelder et al., 2007) showed that based on an effect size of .40, a minimum sample size of 76 would suffice to conduct ANOVA analyses with a statistical power of .80 and an alpha of .05. Taking cognizance that our sample size, though exceeding this requirement, is relatively small, we qualified our results by interpreting and discussing it only within the scope of this study.

The majority of participants are Malay (91.3%), male (86.3%), and married (58.8%). Fewer female participants are expected due to the nature of the taxi industry, which is dominated by males. Taxi drivers are mostly older (i.e., 90% are 40 years old and above) compared to 92.5% of e-hailing drivers who are between 20 to 39 years of age. In addition, 26 taxi drivers (65%) have worked for ten years or more; this is in contrast to e-hailing drivers, 60% of whom have worked for one year or less. The majority of the taxi drivers (92.5%) also worked for 37 hours or more per week, whereas 87.5% of e-hailing drivers worked for 36 hours or less per week. Table 1 presents the demographic characteristics of the participants.

Table 1: Participants' demographic characteristics

Demographic Characteristics		Taxi (*n* = 40)	E-hailing (*n* = 40)
Gender	Male	40	29
	Female	0	11
Age	20 - 29 years old	0	29
	30 - 39 years old	4	8
	40 - 49 years old	18	3
	50 years old and above	18	0
Ethnicity	Malay	37	36
	Indian	2	4
	Chinese	1	0
Marital Status	Single	2	31
	Married	38	9
Working Experience	1 year or less	0	24
	1 - 5 year	0	15
	6 - 9 year	14	1
	10 years or more	26	0
Working Hours Per Week	12 hours or less	1	20
	13 - 36 hours	2	15
	37 - 60 hours	20	2
	61 hours or more	17	3

2.2. Materials and Measures

Data were collected using a questionnaire comprising three parts. The first part asked demographic questions on participants' gender, age, ethnicity, marital status, working experience, and working hours per week. The second part included the short version of the Manchester Driver Behaviour Questionnaire (MDBQ: Reason et al., 1990), which measures a person's unsafe driving behaviour. This scale has 24 items and responses are rated on a six-point Likert-type scale, ranging from 0 (Never) to 5 (Nearly all the time). The total score ranges from 0 to 120, with a higher score indicating more unsafe behaviour. In the current study, the scale showed an excellent internal consistency with a Cronbach's alpha of .90.

The third part of the questionnaire consisted of the Safety Climate Questionnaire (SCQ) scale by Glendon and Litherland (2001) that measures perception of safety climate. This scale, which has 35 items, is frequently used in road safety research to measure how individuals perceive the organisational safety culture and practices of their company (Glendon & Stanton, 2000). Each item in this scale has five response options, ranging from 1 (Never) to 5 (Always). The total score ranges from 35 to 175, with higher scores reflecting more positive perception of safety climate. In this study, a good internal consistency was obtained, with a Cronbach's alpha of .89.

2.3. Procedure

Ethics approval was granted prior to the commencement of this study by the Research, Publications, and Innovations Committee of the Department of Psychology, International Islamic University Malaysia. Permission to use the scales was also sought and obtained from the authors of both scales. The data collection procedure for this study was then carried out in two phases.

First, a pilot survey was conducted to test the functionality of the questionnaire and to assess the effectiveness of the data collection process. A total of 13 taxi and e-hailing drivers within the Klang Valley responded to the questionnaire that was personally distributed to them. Responses from the participants indicated that the items in the questionnaire are understandable and easy to complete. However, they suggested that the items should be presented in a dual-language format (i.e., Malay and English) and be distributed through both online and field surveys.

Following these suggestions, all items in the questionnaire were translated into the Malay language using the forward-only translation by a certified professional translator. This technique was used because it could ensure that the meaning of the translated text would be maintained and have a cross-cultural and conceptual focus, rather than a focus on linguistic or literal equivalence (Maneesriwongul & Dixon, 2004). Hence, the final version of the questionnaire was prepared using a dual-language format so that participants who are not familiar with the English language, would still be able to understand the items. In line with the feedback from the pilot study as well, an online version of the questionnaire was developed and carried out in the second phase to reach a wider range of participants, particularly the e-hailing drivers.

In the second phase of the study, participants responded to the questionnaire by completing and returning it in person or electronically through the use of the online survey method via Google form. Before completing the questionnaire, all participants were required to read the participant's information sheet that described the purpose of the study and the nature of their research participation. They also provided their informed consent either online or in written form. The data collection for the second phase lasted for one month, and all participants were given a small, non-monetary gift in return for their time, commitment and participation in this study.

2.4. Data Analysis

All data were analysed using IBM SPSS Statistics version 21, first by independent-samples t-tests, and then by analysis of covariance (ANCOVA), a series of one-way analysis of variance (ANOVA), as well as by General Linear Model with two-way ANOVA to locate significant differences.

3. Results

To examine whether there are differences in unsafe driving behaviour scores between the taxi drivers (M = 28.85, SD = 16.52) and e-hailing drivers (M = 35.83, SD = 16.55), an independent samples t-test was conducted. As the Levene's test found that the assumption of homogeneity of variance was met, p = .214, the results of the t-test based on equal variances are reported. No significant differences in unsafe driving behaviour scores were found between the two groups, $t(78)$ = -1.89, p = .063. Another independent samples t-test was conducted to compare the safety climate perception scores between the taxi drivers and e-hailing drivers. Given a violation of Levene's test for homogeneity of variances, p = .003, a t-test not assuming homogeneous variances was calculated. The results of this test indicated that there is a significant difference in safety climate scores between the two groups, $t(64.86)$ = -3.25, p =.002. These results suggest that the e-hailing drivers (M = 122.33, SD = 14.44) reported a significantly higher safety climate scores than the taxi drivers (M = 108.20, SD = 23.44), Cohen's d = .73. These results are presented in Table 2.

Next, two ANCOVA analyses were carried out to test whether or not age may confound these results. Results show that driver types ($F(1, 77)$ = .11, p = .74) and age ($F(1, 77)$ = .64, p = .43) have no significant effect on unsafe driving behaviour. However, age is a significant covariate for safety climate perception ($F(1, 77)$ = 15.59, p < .001), with driver types no longer significant as a determinant of safety climate perception, $F(1, 77)$ = 2.07, p = .15.

Two separate ANOVA was conducted to determine if there exist significant differences in unsafe driving behaviour and safety climate perception scores in relation to total hours worked per week. The results of the first ANOVA revealed a significant difference in the unsafe driving behaviour scores, $F(3, 76)$ = 5.09, p = .003. Tukey's HSD tests showed that drivers who had worked for 12 hours or less per week (M = 43.29, SD = 21.29) reported significantly more unsafe driving behaviour than those who had worked between 13 to 36 hours (M = 25.65, SD = 14.69), p = .005 and 61 hours or more (M = 27.70,

SD = 12.58), *p* = .011. Results of other comparisons are not significant (*ps* > .06).

Table 2: Descriptive statistics and *t*-test results for unsafe driving behaviours and safety climate perception

	Driver	Hours worked	*n*	*M*	*SD*	*t*
Unsafe driving behaviours	Taxi	0-12	1	102.00	.	
		13- 36	2	7.00	9.89	
		37 - 60	20	29.00	9.82	
		61 and above	17	26.94	12.09	
		Total	**40**	**28.85**	**16.52**	-1.89
	E-hailing	0-12	20	40.35	16.93	(*p* = .063)
		13- 36	15	28.13	13.54	
		37 - 60	2	54.00	8.49	
		61 and above	3	32.00	17.35	
		Total	**40**	**35.83**	**16.55**	
Safety climate perception	Taxi	0-12	1	136.00	.	
		13- 36	2	137.00	4.24	
		37 - 60	20	111.20	21.01	
		61 and above	17	99.65	23.95	
		Total	**40**	**108.20**	**23.44**	-3.25
	E-hailing	0-12	20	119.80	14.64	(*p* =.002)
		13- 36	15	126.20	14.67	
		37 - 60	2	116.00	1.414	
		61 and above	3	124.00	17.32	
		Total	**40**	**122.33**	**14.44**	

The results of the second one-way ANOVA also showed that total hours worked per week had a significant effect on safety climate perception scores, $F(3, 76) = 5.83$, $p = .001$. In particular, the drivers who had worked less than 12 hours per week ($M = 120.57$, $SD = 14.69$) reported significantly more positive safety climate scores compared to those who had worked for 61 hours or more ($M = 103.30$, $SD = 24.38$), $p = .023$. Safety climate perception scores for the drivers who had worked between 13 to 36 hours ($M = 127.47$, $SD = 14.23$) were also significantly higher than those who had worked for 61 hours or more, $p = .001$. All other comparisons were not statistically significant ($p > .06$). See Table 3 for a summary of the one-way ANOVA results.

Table 3: One-Way ANOVA summary for unsafe driving behaviour and safety climate perception scores with total hours worked per week

Hours worked	Unsafe driving behaviours		Safety climate perception	
	M	*SD*	*M*	*SD*
0-12	43.29	21.29	120.57	14.69
13-36	25.65	14.69	127.47	14.23
37-60	31.27	12.03	111.64	20.03
61 and above	27.70	12.58	103.30	24.38
Total	32.34	16.80	115.26	20.61
F (3, 76)	5.09		5.83	
p (η^2)	.003 (.45)		.001 (.48)	

Further General Linear Model analyses by two-way ANOVA were conducted to examine the effect of driver types (i.e., taxi drivers and e-hailing drivers) and total hours worked (i.e., 0-12 hours, 13-36 hours, 37-60 hours, and 61 hours and above) on both variables. No main and interaction effects of driver types and hours worked on safety climate perception scores were found to be statistically significant.

However, different results were obtained for unsafe driving behaviour. From Figure 1, it can be seen that there is a statistically significant main effect of total hours worked on unsafe driving behaviour, $F(3, 72) = 14.36$, $p < .001$, and a significant interaction effect of driver types and hours worked on this variable, $F(3, 72) = 10.04$, $p < .001$. Simple main effects analysis showed that the taxi drivers who had worked 12 hours or less per week ($M = 102.00$) reported significantly higher unsafe driving behaviour scores than the e-hailing drivers ($M = 40.35$) who had worked for the same period, $M_{difference} = 61.65$, $p < .001$. In contrast, the taxi drivers who had worked between 13 to 36 hours per week ($M = 7.00$) reported significantly lower unsafe driving behaviour scores than the e-hailing drivers ($M = 28.13$) who had worked for the same period, $M_{difference} = 21.13$, $p = .04$. Similarly, the taxi drivers who had worked between 37 to 60 hours per week ($M = 29.00$) reported significantly lower unsafe driving behaviour scores than the e-hailing drivers ($M = 54.00$) who had worked for the same period, $M_{difference} = 25.00$, $p = .014$. There were no differences between driver types when they had worked more than 61 hours per week, $M_{difference} = 5.06$, $p = .55$. Table 4 provides a summary of these results.

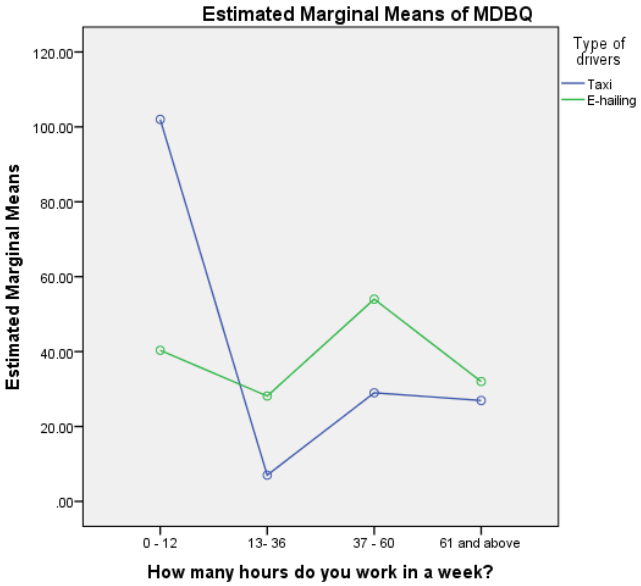

Figure 1: Interaction effects between driver types and hours worked on unsafe driving behaviours

Table 4: Pairwise comparisons of driver types, hours worked, and unsafe driving behaviour

Hours worked	(I) Type of drivers	(J) Type of drivers	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
0 - 12	Taxi	E-hailing	61.65*	13.745	.000	34.249	89.051
	E-hailing	Taxi	-61.65*	13.745	.000	-89.051	-34.249
13- 36	Taxi	E-hailing	-21.13*	10.098	.040	-41.263	-1.004
	E-hailing	Taxi	21.13*	10.098	.040	1.004	41.263
37 - 60	Taxi	E-hailing	-25.00*	9.948	.014	-44.831	-5.169
	E-hailing	Taxi	25.00*	9.948	.014	5.169	44.831
61 and above	Taxi	E-hailing	-5.06	8.400	.549	-21.804	11.687
	E-hailing	Taxi	5.06	8.400	.549	-11.687	21.804

Based on estimated marginal means

* The mean difference is significant at the .05 level.

[b] Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

4. Discussion

This study sets out to investigate whether there are differences in unsafe driving behaviour and safety climate perception between taxi drivers and e-hailing drivers. It further examined whether or not these differences also exist when hours worked were looked into. While no differences in unsafe driving behaviour were found between the taxi and e-hailing drivers, the findings reveal a higher safety climate perception among the e-hailing drivers compared to the taxi drivers. It is likely that factors, such as perception of management commitment toward safety processes, corporate culture, leadership, and leader-member exchange, among others (Shen et al., 2015; Zohar, 1980), might play a role in forming employees' safety climate perception. Perception of management commitment, in particular, is found to be the most influential in determining safety climate (Michael et al., 2005; Zohar, 1980), and given the nature of the management of the e-hailing company that focusses on flexible working hours, high growth opportunities, as well as an open working and learning culture (see Grab, 2020b), it is possible that these factors may have influenced their drivers' safety climate perception.

Our ANCOVA results, however, suggest that age does play a role in the drivers' perception of safety climate, but not for unsafe driving behaviour. Studies on general safety climate have established that safety climate perception increases with age (Cooper & Phillips, 2004; Vinodkumar & Bhasi, 2009), with younger people reporting significantly lower safety climate ratings (Sønderstrup-Andersen et al., 2011). There is also an agreement in road safety studies that young drivers have reported a higher incidence of vehicle crashes and a greater propensity for adopting unsafe behaviour and practices than older drivers (Hanna et al., 2010; Maasalo et al., 2017). However, our results are contrary to these findings, showing that older drivers (i.e., 50 years and above) have a lesser safety climate perception score than the other age groups. One possible explanation could be that older drivers have relatively worked for more years in the profession, and hence, are more likely to have hands-on job experience as well as familiarity with the roads and surroundings. When most information about the job and roads are wholly acquired and familiarised, older drivers may be habituated to a given level of driving performance, leading to complacency, and resulting in a poorer safety culture norm than expected. This premise is indeed plausible as Sticher and Sheehan (2006) and Intini et al. (2016), among others, suggested that overfamiliarity and possible complacency associated with reduced attention contribute to the higher incidence of road crashes. Therefore, we are cautious over interpreting our results as it is likely that age is an important determinant of safety climate perception. Consequently, we suggest future studies define specific age groups of the drivers for their respective study samples.

Meanwhile, the findings of one-way ANOVA suggest that those who had worked fewer hours per week, be they the taxi or e-hailing drivers, tended to report more unsafe driving behaviour than those who had worked more hours. Interestingly, these drivers, i.e., those who had worked less than 12 hours and between 13 to 36 hours per week, also reported a significantly more positive safety climate perception compared to those who had worked for 61 hours or more. Theories, such as the Theory of Planned Behaviour (Ajzen, 1991), Technology Acceptance Model (Davis, 1989), and Norm Activation Model (Schwartz, 1994), have established that the relationship between perception, attitude, and behaviour, is not entirely direct and can be influenced by many factors. In other words, although one's perception about some object might be positive, his/her behaviour towards it might not be so. Therefore, factors, such as personality, culture, values, and others, could moderate or mediate this relationship.

Besides, if we look from the perspective of alternative work arrangements (e.g., part-time, casual, flexible time, compressed workweek, and job sharing), a far more varied array of possible explanations may emerge. Studies in this area have shown that alternative work arrangements are associated with the loss of organisational identification and a sense of marginalisation (Guest, 2004) as well as impose negative effects on organisational behaviour such as work commitment (Bergström & Storrie, 2003) and other work-related attitudes (Sverke et al., 2000). Furthermore, individuals who work fewer hours are likely to have looser ties with their organisation, and thus, may receive less training on and off the job. This, in turn, could lead to decreased safety behaviour and safety knowledge, besides potentially placing the workers at higher risk for workplace accidents (Probst & Brubaker, 2001).

Interestingly, the findings of this study demonstrate the interaction effect of driver types and hours worked on unsafe driving behaviour. In particular, it is found that the taxi drivers who had worked for 12 hours or less per week reported higher unsafe driving behaviour scores than the e-hailing drivers who had worked for the same period. However, the same pattern is not observed among the taxi drivers who had worked between 13 to 60 hours per week, whereby they reported a lower unsafe driving behaviour than the e-hailing drivers who had worked for the same period. One possibility is that those taxi drivers who had worked for longer hours are more likely to adopt safe driving behaviour due to age (i.e., being older) and disincentives (i.e., committing unsafe driving behaviour could lead to a penalty as well as reduced net income).

Another possible explanation is that certain factors might reduce the adverse effects of long work hours. Extant literature has demonstrated that social support from family and colleagues as well as control or autonomy over work hours could moderate the relationship between work hours and well-being (Gray et al., 2004; Pereira & Coelho, 2013). Implying from these findings, it is likely that these factors may also influence or moderate safe driving behaviour. Nevertheless, the exact mechanism underlying these moderating relationships is still unclear. It would seem that there is a complex interrelationship between multiple factors (working hours and overall well-being), and exploring them may be an interesting area for further investigation.

Finally, there is a critical gap between how traditional taxi companies and e-hailing service providers select, monitor, and regulate their drivers. The former typically screen their drivers beforehand to ensure they will comply with their standards and strict licensing processes and regulations. In contrast, e-hailing drivers are monitored via streamlined screening systems, allowing customers to rate the service that the drivers have provided as well as enabling companies to monitor customer reviews, drivers' performance, and overall quality of service (Athey et al., 2019; McGinnis, 2018). These different mechanisms of monitoring and enforcement may produce different effects on drivers' safety attitude and behaviour. In particular, the individualised, real-time information in the form of ratings feedback, nudges, and incentives, are used to remind e-hailing drivers to perform well, which in turn, can decrease the likelihood of moral hazards, such as unsafe driving, overcharging, or overtreatment (Athey et al., 2019; Balafoutas et al., 2017; Liu et al., 2018). This aspect is not covered in this study, and for this reason, a comparison of the effects of different monitoring and enforcement mechanisms between the taxi and e-hailing drivers on driving behaviour and safety climate perception could be a promising avenue for further research.

As with any study that is based on cross-sectional, self-reported data, several limitations exist. For example, the number of participants included in this study is small, and they were recruited through snowballing methods, personal network, and requests or referrals via social media sites. This, in turn, may raise a question on the generalisability of the results. Understanding these limitations, we make no causal inferences or generalisation of the findings to the ride-hailing population as a whole. In other words, the perception and behaviour of the participants in this study are not expected to show the definite realities for all taxi and e-hailing drivers in Malaysia. Consistent with the exploratory nature of this study, it is the intention of this study to gather preliminary data on unsafe driving behaviour and safety climate perception among the ride-hailing drivers so that they can be used to design a larger study with greater power and stimulate discussions on the potential ways to improve the existing interventions.

5. Conclusion and Recommendations

In summary, between the two groups in this study, the e-hailing drivers reported a more favourable safety climate perception compared to the taxi drivers. However, driver types accounted for only part of the variation in safety climate perception, implying that other factors, such as age, are also involved. As safety climate relates to employees' perception of their management's commitment to safety, the findings suggest that future efforts to understand and make improvements in ride-hailing services, particularly in the taxi industry, would benefit by considering the organisational predictors of safety climate, primarily in terms of: (i) communication and organisational support; (ii) safety policies and practices; and (iii) working hours and work schedule characteristics. The present study also highlights the importance of hours worked to unsafe driving behaviour and safety climate perception in ride-hailing services. In particular, the findings that fewer hours spent on the job relate to more unsafe driving behaviour, seem to hold true, irrespective of the types of drivers.

What is more interesting is that those who had worked fewer hours also reported a higher safety climate perception than those who had worked longer hours. Since the scope of this study is limited by the cross-sectional nature of the data from a small sample of drivers, the explanation to these findings is as yet unknown, thus making it worthy of further investigation. Due to this nature too, a comprehensive examination of the components of unsafe driving behaviour, i.e., violations, errors, and lapses (Reason et al., 1990) and safety climate perception, i.e., communication and support, adequate procedures, work pressure, personal protective equipment, relationships, and safety rules (Glendon & Litherland, 2001), was not conducted. Future analyses on these components may provide further information about the nature and relationship of these two variables in the ride-hailing services. Finally, a wide range of interventions targeting work schedule and work characteristics should be considered in future research to enhance the safety of taxi and e-hailing services as part of a broader trend in shared mobility.

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Competing Interests

This study was self-funded, and the authors declared no competing interests for this work.

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