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Disentangling Determinants of Ride-Hailing Services among Malaysian Drivers

Maryum Zaigham [1], Christie Pei-Yee Chin [2,*] and Jakaria Dasan [1]

[1] Faculty of Business, Economics and Accountancy, Universiti Malaysia Sabah, Kota Kinabalu 88400, Malaysia
[2] Data Research Group, Faculty of Computing and Informatics, Universiti Malaysia Sabah, Kota Kinabalu 88400, Malaysia
* Correspondence: peiyee@ums.edu.my

Abstract: Ride-hailing has emerged as one of the progressive sharing economy platforms. As a digital platform, both riders and drivers are critical to achieving sustainable ride-hailing transactions. Previous studies have gained little insight into ride-hailing services from drivers' perspectives. This study investigates the salient factors that determine the usage of ride-hailing services among drivers in Malaysia by extending the technology acceptance model (TAM), introducing governmental regulations, and integrating perceived risk and trust into the model. We collected data from a total of 495 ride-hailing drivers across Malaysia. Our results suggest that a driver's intention to use ride-hailing services is determined by perceived ease of use, perceived usefulness, and governmental regulations, which lead to actual usage. However, unexpectedly enough, the results signify that perceived risk does not affect the intention to use ride-hailing unless there is trust among the drivers. Overall, this paper draws attention to the substantial contrast in its results from the majority of prior TAM literature and has thoroughly improved the exploratory power of TAM by introducing new variables into the model, particularly from the perspective of ride-hailing drivers. This study is expected to bring theoretical and practical contributions to improve the country's ride-hailing industry.

Keywords: ride-hailing; technology acceptance model; perceived risk; governmental regulations; trust

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1. Introduction

The emergence of sharing economy platforms in various industries has enabled people to share or rent underutilized assets, such as spaces, cars, skills, and other goods, over the past decade. One progressive sharing economy is the transportation industry, called ride-hailing, where revenue is projected to grow to USD 256,642 million in 2021 [1]. Prominent ride-hailing players include Uber in the United States of America, Grab in Malaysia, Ola in India, Didi in China, and Careem in the Middle East. In essence, a ride-hailing service refers to a transaction where a passenger books a ride to a specific location through their mobile phones anytime, anywhere, reciprocated by an available driver at an agreed price [2]. Therefore, a ride-hailing digital platform acts as an intermediary that connects individuals who provide transport services (i.e., drivers) to others who demand such services (i.e., riders). Hence, the digital platform, the riders, and the drivers are critical to achieving sustainable ride-hailing transactions. As the entry of these digital technology-driven services has disrupted major incumbent transport businesses and they have been recognized as significant generators of jobs and development; they have also given rise to other social inequalities, including regulatory inefficiencies, lack of trust, safety, price hikes, and a loss of drivers on the road [3,4].

Facing such implications, research on ride-hailing services has gained much attention, namely to understand people's (i.e., riders and drivers) acceptance and the psychological process influencing the behavioral intention to use the service. For instance, factors, such

as comfort and reliability [5,6], the brand image of the ride-hailing service providers [7], and the reliability and responsiveness of the drivers [8], are significant factors towards Malaysian riders' ride-hailing purchase intention. However, most prior empirical studies on ride-hailing in Malaysia have been keen on investigating its usage, majorly from riders' perspectives and lacking from the country's drivers' perspectives. While the number of Malaysian ride-hailing drivers on the road is reported to be consistently dropping [4,9], this study responds to calls for empirical studies to further investigate the acceptance and what motivates the drivers' intention for supplying ride-hailing services. Despite various technology acceptance models designed to understand an individual's reaction towards information technology, prior Malaysian ride-hailing literature has been ignoring the potential of the technology adoption model (TAM) model to understand what determines ride-hailing drivers to supply their services. To the best of our knowledge, only one research currently assumes TAM as its theoretical grounds and, similar to its counterparts, focuses mainly on ride-hailing rides and examines the adoption of ride-hailing services and not actual usage [10]. Thus, this study aims to address this gap.

In general, using new sharing economy services through a digital platform as an intermediary provides various risks among its users, such as privacy concerns, flexible qualifications of service providers, and insufficient accident compensation processing [11]. These perceived risks have been a significant barrier to using new technology such as ride-hailing [12]. Most studies have investigated risk in ride-hailing from riders' perspectives [11,13], but little from the drivers' perspective. In the current pandemic crisis, it is crucial to consider that the adverse effects of COVID-19, such as lack of economic movement and unemployment, can lead to risk perception among ride-hailing drivers. For this reason, we are incorporating risk into TAM to understand further the role of risk upon ride-hailing usage among drivers in the occurrence of a pandemic. Regulations are critical in the ride-hailing industry because they produce a mechanism to control the industry, maintain the well-being of the drivers and vehicles, and provide appropriate compensation to those affected by accidents [14]. However, stringent regulations may lead to a diminishing number of drivers, which causes a price hike and more extended waiting periods for riders [4]. As an adequate number of drivers is significant in sustaining the ride-hailing ecosystem, it is vital to carry out empirical research to investigate the impact of governmental regulations on ride-hailing drivers' intention to use the platforms. Thus, including governmental regulations in TAM introduces a new outlook on the technical factors that affect new technology usage, such as ride-hailing. Moreover, trust is fundamentally a critical determinant of ride-hailing services among riders [12,15]. When riders trust ride-hailing services, they intend to continue using them. However, prior studies have shown mixed views in the context of trust in the platform, partners, and user intention in the sharing economy [e.g., [15,16]. Hence, this study investigates the role of the trust itself and its mediating effect on the relationship between perceived technology, perceived risk, and government regulations towards drivers' intention to be a supplier.

The remainder of this paper is structured as follows. First, we discuss the theoretical background of the factors we incorporated in our extended TAM research model: perceived risk, trust, and governmental regulations, followed by the formulation of testable hypotheses. Secondly, we outline the methodological procedures for validating the research model via a survey. We then explain our results and conclude by highlighting theoretical and practical implications and outlining further research avenues.

2. Theoretical Background

2.1. Perceived Risk

Perceptions of risk could impact either drivers' or riders' intention to use ride-hailing services. Perceived risk is defined as the potential for loss in pursuing the desired outcome by using a certain digitally-run service [17,18]. Due to the complexity of digital transactions, the facets of perceived risk are becoming more advanced [11] and multidimensional [19] and thus need further investigation. In essence, perceived risk refers to the uncertainty of

possible adverse outcomes using a particular good or service and consists of two categories: performance (i.e., economic, temporal, and effort) and psychosocial (i.e., psychological and social) [20]. Featherman and Pavlou [17] argued that perceived risk would differ according to the nature of the product or service and proposed seven facets: performance, financial, time, psychological, social, privacy and overall risk. Performance risk refers to a possible malfunction of a product or service, which results in it not delivering and performing the promised outcomes [19]. Perceived financial risk is viewed as potential monetary losses resulting from purchasing or adopting a specific good or service [17,19,21]. Time risk is a potential loss of time due to a wrong purchase decision that does not deliver the promised outcomes and replaces it at the end [17]. Psychological risk includes a potential worry of users that using a specific good or service may not sit well with their self-image [22]. Social risk encounters a user's perception of potential loss of status in their social group due to using or adopting particular good or service [17]. Lastly, privacy risk includes the perception of a user's potential loss of control and misuse of personal information without the user's knowledge [17].

Previous studies have found that the perception of risk in service decisions regarding social, physical, and psychological risks is higher than in product decisions [12]. Research interested in the progression of ride-hailing suggests an increase in social concerns, including risk associated with user participation in such commercial exchanges [23]. Hong [11] implying that perceived risk related to such sharing economy services includes privacy concerns, flexible qualifications of service providers, and insufficiency of adequate accident compensation processing. However, these studies (e.g., [11,13]) have been questioned on several grounds, including the involvement of ride-hailing risk from riders' perspectives and limited attention paid to examining the risks from the drivers' perspective.

2.2. Trust

Trust is significantly a critical precondition of a successful ride-hailing transaction. Previously, the dynamics of trust in ride-hailing were commonly delineated by the institution-based trust, where researchers focused on determining the significance of trust on the platform on user trust and intention [24]. On the other hand, Mittendorf [15] posited that user trust in ride-hailing could be determined by two constructs: trust in the platform and partners. He concluded that trust in the platform insignificantly affects users' intentions, whereas [25] posited trust in the platform as the primary driver of user intention. Similarly, signifying ambiguous views on the relationship between trust in partner and user intention. Where some studies concluded a positive association between the two constructs, others found insignificant relationships between trust in partner and user intention [15]. These mixed views in the context of trust in the platform, partner, and user intention call for additional research to be carried out to confirm the actual effect of trust in the platform on user intention.

Furthermore, the conceptualization of trust based on ability, integrity, and benevolence is also limited in the current literature. A study by Yoga and Wanda [12] determined trust through the three dimensions and concluded positive relationships between trust and user intention. Previously, studies carried out that measured trust through ability, integrity and benevolence focused on other sectors of the sharing economy sector, such as accommodation (Airbnb), where the researchers focused on examining trust (ability, integrity, benevolence) on the platform, peer, and product (3P's) from perspectives of both the consumers and service providers at once [26]. However, since the main focus of these studies has been on other sharing economy platforms and not ride-hailing, this emphasizes the dire need for further research to be carried out to measure the trust of the drivers' peers, platform, and product through ability, integrity, and benevolence, which this paper aims to fulfil.

2.3. Governmental Regulations

All countries have their own governmental regulations for the operation of ride-hailing. However, there are generally two types of regulations for sharing economy firms, namely self-regulation and co-regulation. Self-regulation consists of regulatory policies developed by a group of experts from a specific field that aim to create rules and codes of conduct that guide the behaviors and actions of those within that group [27]. On the other hand, co-regulation involves the intervention of the government in developing regulations, and the latter often is proven a more feasible option when it comes to Internet regulations whereby the sole aim of the government is public welfare through the implementation of regulatory policies [27]. In late 2019, the Malaysian government initiated five-set new regulations for all ride-hailing platforms, including public service vehicle (PSV) permit, PuspaKom discs, ride-hailing stickers to be displayed on the vehicle's windscreen, ride-hailing insurance, and a ride-hailing vehicle permit. Drivers who have yet to acquire their PSV licenses cannot drive on the road until all the regulations are fulfilled. Alternatively, if they are caught with an offence of driving without licensing, they will be advised to comply with the new set of rules and be issued a strict warning [28]. Furthermore, the new set of regulations force the drivers to be subjected to rigid inspections, including background checks, a 6-h training course, driving test, car inspections, as well as health check-ups [4], and none of these regulations are free of monetary charges either. However, it was said that the PSV permit policy was the government's effort to ensure a safe riding industry for not just the riders, but also the drivers at the same time. While it was reported that the PSV licensing policy was directed at 150,000 ride-hailing drivers across the country, only 40% of them were successful in acquiring the permit and were allowed to drive [4]. Thus, it can be seen that the remaining 60% of the drivers were unsuccessful in retrieving their PSV licenses for reasons which are unknown. Possibly, this could be due to tedious tests, exams, or even background checks. However, these assumptions have not been confirmed by any empirical evidence to the best of the researcher's knowledge. Therefore, it is vital to carry out empirical research in order to comprehend the immediate effect of these regulations on the usage behavior of drivers.

3. Research Model and Hypotheses Formulation

Figure 1 shows our research model of the extended technology acceptance model (TAM) by integrating perceived risk and new construct of governmental regulations and trust as a mediator to understand what determines a ride-hailing driver to provide their services.

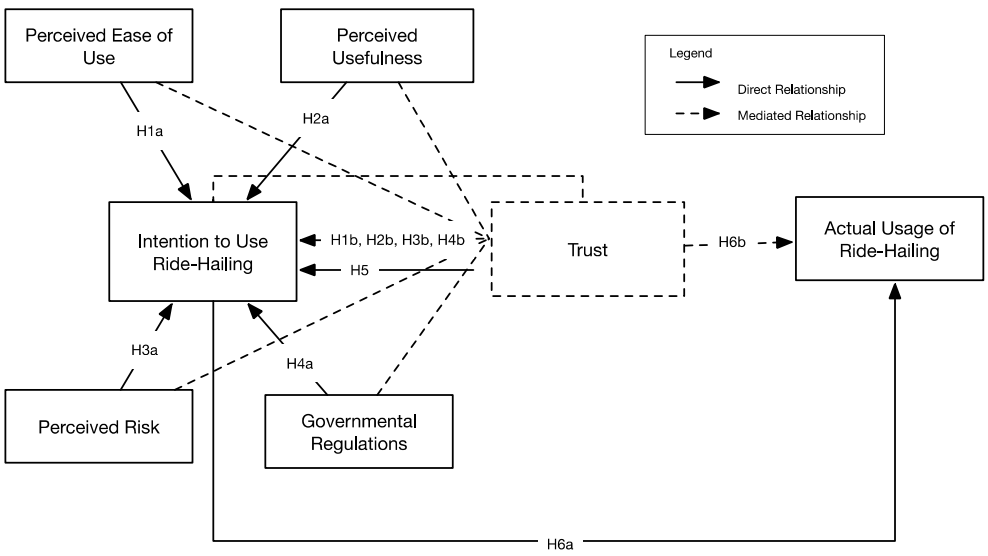

Figure 1. Our research model of extended TAM.

3.1. Perceived Ease of Use and Driver's Intention to Use Ride-Hailing, Mediated by Trust

Perceived ease of use is the degree of an individual's belief that using a specific information system would be free of effort and an application perceived to be more comfortable to use than others, accepted and frequently used by a user [29]. TAM postulates that perceived ease of use determines user intention to use a particular technology or a system, which then eventually leads to the actual usage of the system by a user [29]. Past studies have alluded to the significance of perceived ease of use and intention of use on technology acceptance, such as Hsiao et al. [30] for sharing economy services. Likewise, the ride-hailing literature indicates significant relationships between perceived ease of use and intention to use among riders [10,31]. Therefore, in line with TAM and previous empirical results, this study argues that when a driver perceives that the digital ride-hailing platform is easy and does not require a lot of effort, this will significantly affect their intention to become the supplier of the ride-hailing services. Moreover, this study also argues that the driver's perception of ease of use of the ride-hailing platform will impact his level of trust in the platform and, therefore, significantly affect the driver's intention to use the platform. In other words, the easier the ride-hailing platform is for the drivers, the higher their trust in the platform. This encourages their intention to use the platform and consequently significantly affects the overall actual usage of ride-hailing. Consequently, it is hypothesized that:

H1a. *Perceived ease of use has a significant effect on driver's intention to use ride-hailing.*

H1b. *Trust mediates the relationship between perceived ease of use and driver's intention to use ride-hailing.*

3.2. Perceived Usefulness and Driver's Intention to Use Ride-Hailing, Mediated by Trust

Perceived usefulness refers to the degree of a user's perception that using a specific system would enhance his or her task performance [29]. TAM argues that perceived usefulness influences behavioral intention to use a new technology, which significantly affects the actual usage of the new technology, and past empirical studies confirmed this relationship in mobile taxi-hailing application use [31] and wireless technology use [32]. Lim et al. [10] has also concluded that perceived usefulness positively affects a rider's adoption of ride-hailing applications in Malaysia. In that vein, this study argues that drivers' perceived usefulness of ride-hailing platforms positively affects their intention to use the digital platform. Similarly, this study argues that the driver's perception of the platform's usefulness will enhance their trust in the ride-hailing platform and therefore form the driver's intention to use ride-hailing and eventually affect the overall actual usage of the platform. Thus, we hypothesize:

H2a. *Perceived usefulness has a significant effect on driver's intention to use ride-hailing.*

H2b. *Trust mediates the relationship between perceived usefulness and the driver's intention to use ride-hailing.*

3.3. Perceived Risk and Driver's Intention to Use Ride-Hailing, Mediated by Trust

Perceived risk refers to a user feeling a definite level of uncertainty in the shape of potential risks which may hinder his/her usage behavior of a specific technology. Past empirical evidence suggested a negative relationship link between perceived risk, intention and actual usage of new technologies. For instance, there is a negative relationship shown in the use of online banking technologies [19,22] and mobile banking [33]. Yoga and Wanda [12] assert an insignificant relationship between perceived risk and intention to use ride-hailing in terms of ride-hailing literature. Mittendorf and Ostermann [25] concluded an adverse effect of perceived risk on the use intention of Uber among its drivers. Wang et al. [34] concluded a negative relationship between perceived risk and intention to use ride-hailing. Evidently, it can be seen that majority of technology acceptance scholars argue that lower perceived risk associated with ride-hailing platforms actually increases

riders' intention to use ride-hailing [12,24,34]. In line with that, this study argues the level of drivers' perceived risk will affect their intention to use ride-hailing platforms. If the driver perceives using ride-hailing platforms as very risky, this will decrease their intention to use the platform. Inversely, if a driver's perceived risk is lower, this consequently will improve their intention to use ride-hailing. On the other hand, it has been observed that trust plays a vital role in the relationship between perceived risk and intention to use [25]. A significant relationship between perceived risk and trust is attested by numerous scholars [35,36]. Therefore, it is asserted that high perceived risk will limit the driver's trust and thus negatively affect their intention to use the ride-hailing platform. Similarly, a lower perception of risk would improve the driver's overall trust and, as a result, stimulate their intention to use the ride-hailing platform. Therefore, it is hypothesized that:

H3a. *Perceived risk has an insignificant relationship with the driver's intention to use ride-hailing.*

H3b. *Trust mediates the relationship between perceived risk and the driver's intention to use ride-hailing.*

3.4. Governmental Regulations and Driver's Intention to Use Ride-Hailing, Mediated by Trust

While government regulations are critical in the ride-hailing industry, a prior study has suggested that ineffective regulatory control over ride-hailing services results in waves of adopters feeling unsure and skeptical in terms of its acceptance [3]. Retamal and Dominish [37] added that the lack of effective governmental regulations in developing countries impedes the development of sharing economy. In line with that, Dalberg [38] suggests that poor or complex regulatory frameworks are not conducive to sharing economy growth. For instance, Shao [24] argued that government support is vital in the continuous use of ride-hailing services in China. Thus, it can be seen that the existence of regulations by the government has a direct effect on the usage of ride-hailing services among its service suppliers. Therefore, this study argues that the drivers' intention to use ride-hailing is affected by the regulations imposed by the government and, as a result, affects the overall actual usage of ride-hailing. Besides that, this research argues that effective regulations imposed by the government on the drivers will improve their intention to use ride-hailing, and this subsequently has a positive impact on their actual usage of ride-hailing. To justify this, the literature signifies that support provided by the government improves the users' trust in the platform and raises their intention to use it [24]. Therefore, we hypothesized that:

H4a. *Governmental regulations have a significant effect on driver's intention to use ride-hailing.*

H4b. *Trust mediates the relationship between governmental regulations and driver's intention to use ride-hailing.*

3.5. Trust and Driver's Intention to Use Ride-Hailing

Generally, interacting with complete strangers holds a certain level of unpredictability given their independence, and this contributes to a level of complexity among people [39]. Trust is said to be the currency of sharing economy transactions, and its presence is said to play a pivotal role [40,41]. Physical interactions between drivers and riders occurring during a ride-hailing transaction entail potential risk. The feeling of being unable to control the other party's actions essentially intensifies that complexity, and this inhibits one's intention to carry out certain behaviors [39]. Trust in terms of ride-hailing is derived from three perspectives; (i) trust in peers, (ii) trust in the platform, and (iii) trust in the product [26]. Trust in the platform was the strongest driver of user intention to use ride-hailing services [15]. In other words, the extent to which a user perceives the ride-hailing platform to be highly competent, reliable, and to operate with integrity, builds their usage intention and, ultimately actual usage. However, this study argues that the driver's perception of ability, integrity, and benevolence on his peers, platform, and product drives his intention to use the platform. To justify this, the literature establishes a significant

association between trust and intention to use. This can be seen through the investigations of those who consolidates the significance of trust when it comes to the usage intention of ride-hailing services. Therefore, it is hypothesized that:

H5. *Trust has a significant effect on driver's intention to use ride-hailing.*

3.6. Driver's Intention to Use Ride-Hailing and Actual Usage, Mediated by Trust

TAM postulates that actual technology usage is determined by the behavioral intention of its user [42]. In other words, Davis [29] argues that once a user's intention to use a certain technology has been formed, it will lead to the actual usage of the technology. In terms of ride-hailing, intention to use and actual usage have been subject to multiple investigations confirming the significant associations between the two constructs [3,7,43]. In line with that, it is hypothesized that:

H6a. *The driver's intention to use ride-hailing has a significant effect on actual usage.*

H6b. *Trust mediates the relationship between the intention to use ride-hailing and actual usage.*

4. Research Method

This study employed a survey to test the proposed extended TAM model among ride-hailing drivers. We chose the survey because it is said to be the most flexible mode of knowledge collection for quantitative research [44]. For a survey, a questionnaire is mandatory, which allows data to be collected in a comprehensive manner in order to be analytically appropriate [45]. Therefore, a set of questionnaires was distributed through manual and online measures using purposive sampling of current ride-hailing drivers in Malaysia.

4.1. Questionnaire Measurement Development

Most of the constructs (i.e., perceived ease of use, perceived usefulness, perceived risk, trust, intention to use and actual usage) in this study were adapted from previous sources with the exception of the governmental regulations construct, which is a newly developed construct. Appendix A lists the measurement items and their sources. The measures for governmental regulations were developed following the standard scale development procedure by [46]. The items were constructed primarily through the conceptual definitions and later were tested through pre-test, which later led to confirmation of the suitability of the items measuring the construct in focus. Appendix B explicates the measurement development process for the governmental regulations construct.

The questionnaire was pilot-tested among 37 ride-hailing drivers using the same sampling and data collection methods that would be used in the actual data collection process. All items were set at a 5-point Likert Scale from Strongly Disagree (1) to Strongly Agree (5). Actual usage was subjectively measured by using frequency and intensity as suggested by Burton-Jones [47], Kim and Lee [48] and Davis [29]. Frequency measures the number of hours driven for a ride-hailing platform in a typical week through a nominal scale ranging from less than 5 h a week (minimum) to more than 60 h a week (maximum). As for intensity, drivers were asked to rate their current usage as driving for ride-hailing in a typical week ranging from less than once a week to four to 6 times per week. Meanwhile, the intention to use was measured by five items as suggested by Pavlou [49], Kim and Garrison [50] and Hsiao et al. [30]. The items reflect the driver's intention to use the ride-hailing services currently and in the future and examine their level of comfort using the platform in general. The perceived ease of use was measured by using five items that measure the drivers' level of comfort as well as their ease in using ride-hailing applications, as suggested by Hsiao et al. [30], Kim and Garrison [50], Venkatesh and Davis [51] and Pavlou [49]. Following that, perceived usefulness was measured by using three items that measure the fulfilment of driver's needs when using ride-hailing applications, as suggested by Pavlou [49]. Perceived risk consists of 10 measurement items that reflect a driver's belief that his/her usage of the ride-hailing platforms could expose them to a possible

performance, financial, time, psychological, privacy or social loss, as argued by Featherman and Pavlou [17].

4.2. Data Collection

Data to test the extended TAM model were collected from a sample of ride-hailing drivers, who were chosen through purposive sampling and by using the snowballing technique. A total of 600 questionnaires were distributed among ride-hailing drivers through online and manual channels in Malaysia from August 2020 until October 2020, during the peak phase of the COVID-19 pandemic. Online distribution of questionnaires was completed through Google Forms which were disseminated to various social groups of ride-hailing drivers across Malaysia. Manual distribution was carried out through the submission of questionnaires to relevant ride-hailing headquarter offices. A total of 436 completed questionnaires were returned through manual measures and 59 through online google forms, which yielded an excellent response rate of 82.5 percent. Thus, a total of 495 usable questionnaires were attained.

The analysis of the respondent's demographics indicates that a majority of the ride-hailing driver respondents are males, which accumulated to a total of 91.5% (n = 453) compared to females, who were only at 8.5% (n = 42) in the sample. Moreover, 43% of the ride-hailing drivers are aged between 25 to 31 years old (n = 213). Meanwhile, 53.5% (n = 265) of ride-hailing drivers were part-timers who drive for about 40–50 h per week or less. Whereas 46.5% (n = 230) were full-time drivers who drove for 40–60 h and above weekly, accounting for more than 100 driving jobs respectively.

4.3. Data Analysis Technique

Data collection from 495 ride-hailing driver respondents was then analyzed with structural equation modelling (SEM) by using partial least squares (PLS 3.0) through outer and inner measurement model testing. PLS-SEM was chosen due to a number of reasons. Firstly, PLS-SEM is capable of predicting latent variables more efficiently [52]. Secondly, PLS-SEM can analyze complex research models consisting of reflective and formative constructs efficiently, making it an attractive statistical tool for social science researchers as in this study. This is because PLS-SEM is normally successful in estimating such models without any limitations [53].

5. Results

5.1. Assessment of Measurement Model

To maintain good reliability and validity of the measurement items for the seven constructs in our research model, we examined the internal composite reliability, average variance extracted (AVE), and discriminant validity of each construct. Table 1 exhibits the internal composite reliability and the square root of the average variance extracted (AVE) for each construct in the research model. Both composite reliability and AVE exceeded the recommended threshold of 0.7 and 0.5, suggesting good reliability and convergent validity of all seven constructs [54]. Meanwhile, item loadings of seven constructs loaded greater than the recommended threshold of 0.7, as shown in Table 2. However, one item loading of governmental regulations (GR1) was considered for deletion, but the content validity is considered an important aspect. Hence, the item (GR1) was not deleted. Overall, these results demonstrate good convergent validity.

Table 1. Reliability and Validity of All Constructs.

Construct	Composite Reliability	Average Variance Extracted (AVE)
Actual Usage	0.846	0.734
Governmental Regulations	0.895	0.589
Intention to Use	0.893	0.625
Perceived Ease of Use	0.881	0.597
Perceived Risk	0.897	0.636
Perceived Usefulness	0.887	0.723
Trust	0.946	0.555

Table 2. Convergent Validity of Seven Constructs.

Construct	Items	Loadings
Perceived Ease of Use	PEAU1	0.721
	PEAU2	0.774
	PEAU3	0.781
	PEAU4	0.778
	PEAU5	0.807
Perceived Usefulness	PU1	0.814
	PU2	0.885
	PU3	0.851
Perceived Risk	PR1	0.798
	PR2	0.818
	PR3	0.808
	PR5	0.817
	PR6	0.755
Governmental Regulations	GR1	0.590
	GR2	0.732
	GR3	0.814
	GR4	0.819
	GR5	0.828
	GR6	0.812
Trust	T1	0.764
	T2	0.811
	T3	0.788
	T4	0.791
	T5	0.760
	T6	0.739
	T7	0.753
	T10	0.712
	T11	0.712
	T12	0.768
	T13	0.756
	T14	0.712
Intention to Use	ITU1	0.813
	ITU2	0.790
	ITU3	0.842
	ITU4	0.793
	ITU5	0.709
Actual Usage	Intensity	0.885
	Frequency	0.828

To assess the discriminant validity, we used three methods, including the Fornell and Lacker [55] criteria, the cross loadings, and the heterotrait–monotrait ratio of correlations (HTMT). When it comes to assessing the discriminant validity by the Fornell and Lacker [55] criteria, satisfactory discriminant validity is reached when the square root of the AVE value

of each construct is more than all correlations between that and other variables of the framework as shown in Table 3. We observed the cross-loadings and found the square root of AVE of all seven constructs is higher than the squared correlation with other constructs. As for the item cross-loadings, it can be seen from Table A1 (Appendix B) that all items loaded well into their own constructs and poorly on the others. As shown, this study's discriminant validity evaluated was satisfactory and acceptable in regard to the criteria of [55].

Table 3. Discriminant Validity (Fornell-Larcker Criterion).

	Actual Usage	Governmental Regulations	Intention to Use	Perceived Ease of Use	Perceived Risk	Perceived Usefulness	Trust
Actual Usage	**0.857**						
Governmental Regulations	0.084	**0.767**					
Intention to Use	0.137	0.480	**0.791**				
Perceived Ease of Use	0.108	0.523	0.561	**0.773**			
Perceived Risk	0.182	0.551	0.467	0.617	**0.798**		
Perceived Usefulness	0.168	0.492	0.568	0.519	0.589	**0.850**	
Trust	0.114	0.690	0.544	0.672	0.734	0.606	**0.745**

Next, the HTMT method has some advantages that make it a more viable measure of discriminant validity than the prior two methods. Firstly, it is argued that obtaining the HTMT does not require any factor analysis. Secondly, it does not require calculating the scores of the constructs as well [56]. Therefore, HTMT as a new measure of discriminant validity is deemed necessary. Table 4 demonstrates the results for the HTMT valuations that were obtained through the bootstrapping routine in SmartPLS 3.0. Henseler et al. [56] suggest that evaluating HTMT values means comparing the obtained figures with thresholds. It is recommended that values that are below the threshold of 0.85 [57] signify strong discriminant validity, while other authors suggest a threshold lower than 0.9 [58]. In line with that, all values obtained in the table below are well below the thresholds, suggesting a secure discriminant validity of all constructs.

Table 4. Discriminant Validity: Heterotrait-Monotrait Ratio Of Correlations (HTMT).

	Actual Usage	Governmental Regulations	Intention to Use	Perceived Ease of Use	Perceived Risk	Perceived Usefulness	Trust
Actual Usage							
Governmental Regulations	**0.122**						
Intention to Use	**0.185**	**0.558**					
Perceived Ease of Use	**0.143**	**0.612**	**0.665**				
Perceived Risk	**0.237**	**0.639**	**0.546**	**0.725**			
Perceived Usefulness	**0.236**	**0.586**	**0.680**	**0.626**	**0.698**		
Trust	**0.147**	**0.765**	**0.609**	**0.752**	**0.817**	**0.688**	

5.2. Assessment of Structural Model

Table 5 below represents the structural model results. A total of six direct relationships were tested using structural equation modelling in PLS-SEM. To obtain these values, as shown above, a two-tailed test with a probability error of 5% through the bootstrapping process was carried out. In terms of results, the significance of the above relationships is evident through the measurements of the path coefficients, t-values, and *p*-values. However, some researchers suggest that the display of all significance measures is not required as all those values portray the same result of whether a relationship is significant or otherwise [54]. In that vein, although all three means of hypotheses significance testing (path coefficients, t-values and *p*-values) are reported, this paper majorly focuses on explaining

the significance of a relationship based on the t-values computed through the bootstrapping process. Overall, four out of six direct relationships were found to be significant. The direct relationships were between perceived ease of use and intention to use, perceived usefulness and intention to use, governmental regulations and intention to use, and intention to use and actual usage. The above relationships had computed t-values well above the threshold value of 2.57 and are found to be satisfactory in terms of their significance [54]. Therefore, H1a, H2a, H4a, and H6a are accepted.

Table 5. Structural Model Analysis Results and Hypotheses Testing.

	Direct Relationship	Path Coefficient	T-Statistics	*p* Values	Result
H1a	Perceived Ease of Use -> Intention to Use	0.311	6.148	0.000	Supported
H2a	Perceived Usefulness -> Intention to Use	0.330	4.730	0.000	Supported
H3a	Perceived Risk -> Intention to Use	−0.004	0.064	0.949	Not Supported
H4a	Governmental Regulations -> Intention to Use	0.159	3.202	0.001	Supported
H5	Trust -> Intention to Use	0.103	1.318	0.169	Not Supported
H6a	Intention to Use -> Actual Usage	0.138	2.828	0.005	Supported

Next, mediation analysis was carried out in PLS-SEM to test the mediating role of Trust by carrying out consistent bootstrapping in SmartPLS 3.0 [59]. Table 6 outlines the results of indirect effects of perceived ease of use (H1b), perceived usefulness (H2b), perceived risk (H3b), and government regulations (H4b) to intention to use through the mediator trust as well as an indirect effect of intention to use to actual usage through trust (H6b). When the indirect effect is significant, mediation is present. However, in order to determine whether its full or partial mediation, the significance of the direct effect between the independent and dependent variable must be evaluated where a significant direct effect suggests partial mediation, whereas an insignificant direct effect suggests full mediation [59].

Table 6. Mediation Analysis (Indirect Effects).

	Mediated Relationship	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	*p* Values
H1b	Perceived Ease of Use -> Trust -> Intention to Use	0.183	0.180	0.065	2.804	**0.005**
H2b	Perceived Usefulness -> Trust -> Intention to Use	0.185	0.189	0.061	3.033	**0.003**
H3b	Perceived Risk -> Trust -> Intention to Use	0.397	0.395	0.074	5.346	**0.000**
H4b	Governmental Regulations -> Trust -> Intention to Use	0.335	0.348	0.085	3.956	**0.000**
H6b	Intention to Use -> Trust -> Actual Usage	0.397	0.400	0.080	4.966	**0.000**

Firstly, the indirect effect of perceived ease of use on intention to use through the mediator trust (H1b) is significant, confirming that there is partial mediation of trust in the relationship between perceived ease of use and intention to use ride-hailing. Next, the H2b relationship was found to be significant, which shows that trust partially mediates the relationship between perceived usefulness and intention to use ride-hailing of ride-hailing drivers. Thirdly, the indirect effect of perceived risk to intention to use through trust (H3b) was found to be significant, indicating the existence of mediation. Therefore, it can be argued that trust mediates the relationship between perceived risk and intention to use ride-hailing. Next, the indirect effect of governmental regulations on intention to use through trust (H4b) was found to be insignificant. In such an instance, Nitzl et al. [59] suggests that there is a full mediation. Finally, the mediation model of intention to use, trust, and actual usage (H6b) revealed the indirect effects of intention to use to actual usage through the

trust was found to be significant. Therefore, this means that trust plays a mediating role in the direct relationship between intention to use and actual usage. Furthermore, the direct effect of intention to use and actual usage was insignificant. This means that full mediation of trust between the two constructs exists.

6. Discussion

The relationship between perceived ease of use and intention to use the ride-hailing platform among drivers is found to be significant. The drivers' intentions to become ride-hailing service providers will increase if they perceive the service platform to be easy to use. In general, this indicates that it is imperative that the ride-hailing digital platform is designed to be easy to understand and use among drivers to accept riders. According to the *ICT and Access by Individuals and Households Survey Report*, the average ICT services and equipment, including mobile phones, was as high as 98.2% in 2019. This also proposes that Malaysian familiarity towards mobile applications may lead to the belief that the ride-hailing platform is relatively easy to use and operate. Trust is found partially mediating this relationship, conveying that if a ride-hailing driver believes that the riders on the platform are reliable, trustworthy, and harmless to them, this actually makes them believe that the platform is relatively easier to use and thus improves their intention to drive for the certain ride-hailing platform. This indicates the importance of trust in digital relationships such as ride-hailing. This is especially important when there is a dyadic relationship between two peers, such as in a traditional ride-hailing exchange.

The positive relationship between perceived usefulness and intention to use ride-hailing showed that the ride-hailing services currently operating in the country have been successful in satisfying various needs of their drivers (e.g., additional income and rising number of riders), which in turn has encouraged them to further become the supplier of the services in the long run. Perceived usefulness also refers to the capability of the ride-hailing technology's technical characteristics in fulfilling its users' social, economic, and technological needs [60]. The substantial positivity of this relationship could be a result of the COVID-19 pandemic. As the pandemic has caused a tremendous rise in the unemployment rate, many have turned to ride-hailing driving as a source of additional income. Consequently, this has signified the usefulness of ride-hailing in the fulfilment of the needs of drivers during a crisis. In addition, trust was found to be partially mediating the relationship between perceived usefulness and intention to use ride-hailing. This indicates that a higher perception of the usefulness of ride-hailing services among drivers improved the level of trust they have in their riders, on the platform and in the service itself. This consequently affects their intention to use ride-hailing in a positive way manner to a certain extent.

Unexpectedly, this study found that there was an insignificant relationship between perceived risk and drivers' intention to use ride-hailing. This contradicts the abundance of existing research that concluded a negative relationship between the two constructs. The insignificant result indicated that although a driver might feel threatened by risks associated with ride-hailing, it does not have any effect on their intention to use the platforms. During the COVID-19 pandemic, the need for additional income soared higher than ever before as a result of the high unemployment rate in the country post the pandemic, which led to the public resorting to ride-hailing as a source of income, drivers in particular. According to reports, e-haling services in Malaysia hired an additional 30,000 drivers and riders during the Movement Control Order (MCO) imposed by the government [61]. Evidently, the pandemic had an adverse effect on the income patterns of many Malaysians, which motivated them to drive for ride-hailing services as a source of income. Hence, in such situations, it is believed that the driver's intention to use ride-hailing would be unchanged irrespective of the possible performance, financial, time, psychological, privacy, or social risks the platforms might have been perceived to be associated with. However, surprisingly, when the mediating role of trust was added into the equation, it was found that there was a significant direct relationship between perceived risk and intention to use ride-

hailing. Corroborating with previous studies related to the relationship of perceived risk, trust, and intention to use [34,62,63], the results of full mediation analysis confirmed that trust is indeed the currency of ride-hailing services. This result serves as a catalyst to the policymakers that stringent privacy and security laws must be maintained to eliminate risks from ride-hailing.

The implementation of governmental regulations is found to have a significant relationship with the drivers' intention to use ride-hailing, particularly in Malaysia. This result supports the claim that effective policy implementation is crucial to the growth and sustainability of the ride-hailing industry (Shao, 2018), while the ineffective or inaccurate policy acts as a significant barrier in the development of the industry in the country of operations [3,37]. Moreover, this study has proved the notion that the administration's implementation of policies directed at ride-hailing drivers is adaptable, effective, and compliant with the country's ride-hailing industry. This provides a positive indication towards the industry policymakers regarding their choice of policies and shows that the ride-hailing sector's growth is in the right direction of development. Additionally, the factor that has motivated the drivers to drive for the ride-hailing platform of their choice is that the implemented policies are easy to adhere to, do not cost a lot, and are a requirement in registering as a driver with their respective ride-hailing platforms. Consequently, the drivers may feel a sense of achievement by fulfilling the requirements, and thus form their intention to become the service providers for them. As mentioned earlier, the stringent yet easy ride-hailing policies directed at all types of ride-hailing drivers (part-time and full time) in reality portray the policymakers' brilliance in creating a sustainable ride-hailing environment in the country. Besides that, it is argued that the effective implementation of governmental regulations leads to a higher level of trust among drivers, which significantly forms their intention to use ride-hailing in the long run. These results suggest that ride-hailing companies should adopt pragmatic strategies to improve the level of trust between the drivers through implementing policies that carry fringe benefits for the drivers, such as that of permanent employees of a company, to make the drivers feel more secure and rewarded in their driving jobs.

Moving forward, TAM clearly expands on this notion where it is validated that when a user intends to use a new technology, this will most definitely lead to the actual usage of the preferred technology. Significantly, this research further validates the propositions made by TAM but from the perspectives of the ride-hailing drivers. Furthermore, the mediating role of trust was tested between the relationship between intention to use, and actual usage and the results revealed a full mediation. This means that a driver's trust in the 3P (peer, product, and platform) forms their intention to use the ride-hailing services, which eventually leads to actual usage. In previous literature, it has been tested and confirmed multiple times that a higher level of trust forms the intention to use technology and has been identified as an important contributing factor that leads to the intention of a user to transact [49,64]. In the sharing economy, trust is said to be one of the main drivers of users to engage in sharing [15,16,26]. Therefore, it can be argued that when ride-hailing drivers have higher trust, this produces their intention to use the platform and eventually leads to actual usage. The positive role of trust in creating the intention to use ride-hailing technology by drivers in Malaysia indicates that the ride-hailing services are safe to be used and how important it is to maintain a healthy level of trust between the ride-hailing platforms and their users.

7. Implications, Limitations and Conclusions

Although the TAM is not new to the technology adoption literature, prior related ride-hailing research has only examined the adoption of ride-hailing platforms among riders. This study represents an important contribution to the theory by extending TAM to address the causal antecedents of its two constructs (perceived ease of use and perceived usefulness) with the inclusion of three new constructs, including trust, perceived risk and governmental regulations. Previously, it has been noted that the majority of studies

in Malaysia have focused on examining the role of satisfaction, ride intention service attributes, and service quality in TAM, with respondents being riders in a majority [3,5,65]. Thus, the results of this research have successfully bridged the research gap that exists in information systems (IS) research by offering results from the perspective of ride-hailing drivers. Undoubtedly, researchers believe that the inclusion of governmental regulations as an independent addition to TAM is seen as the most significant and important contribution of this research to the theory of technology acceptance from the perspective of Malaysia. It is proven that behavioral factors cannot just be added and studied by using TAM, but that constructs such as governmental regulations are equally vital in technology acceptance studies. Overall, the results of this research are beneficial not just for the policymakers, but also for authorities and ride-hailing application developers who can introduce new features to improve the usability of the applications. Not just that, the practitioners can use the results to come up with highly effective new policies to regulate the industry, which as an effect will generate a more secure, guarded, and safe sharing space.

This research faces some limitations despite the interesting results it yielded. Firstly, the sample size of this research was 495 respondents only, and it is argued that a larger sample could successfully establish more firm results. Furthermore, the majority of the respondents were found to be males, and most of them were in the age group of 25–31 years old. Although the profile of the respondents matches the required users of ride-hailing, it would be interesting to see how elderly users (drivers above 65 years of age) perceive the ease of use and usefulness of ride-hailing applications and the basis of their decisions to use ride-hailing services. Future research should examine female ride-hailing drivers and their issues and actual usage of the digital platform. Moreover, it would be fruitful to compare the male and female ride-hailing drivers to yield interesting results regarding the gender gap that possibly exists in the local ride-hailing industry. Secondly, this research made use of subjective measures of actual usage by estimating their frequency and intensity of usage. Furthermore, the demographic information of the respondents only inquired about their age, gender frequency and intensity. It would be noteworthy for future studies to include other demographics, such as geography, income, and social status, to better comprehend how different earners from different countries intend to use ride-hailing.

Although objective measures are said to be relatively more challenging to attain and remain somewhat controversial [51,66], it would be interesting to look at objective measures of actual usage, which could produce more accurate results in terms of the real usage of ride-hailing among its users through objective means, such as self-reporting etc. In addition to that, the geographical limitations of this research led to data only being collected throughout Malaysia. Future researchers are recommended to examine ride-hailing from other Southeast Asian countries and produce comparative studies. In this way, a complete ride-hailing outlook of Southeast Asia can be acquired and each country can learn from one another based on their shortcomings and successes in growing their respective ride-hailing industries. Besides that, the relevance of COVID-19 for this study was limited to the fact that the data collection was carried out during the pandemic. Hence, future studies may carry out new research that can yield results post-pandemic. It would be gripping to observe and compare results during and after post-pandemic phases to see how the same factors play in different environments.

This study aims to extend our understanding of the factors that determine the actual usage of ride-hailing applications among drivers in Malaysia by introducing the construct of governmental regulations and including perceived risk and trust in the highly acclaimed TAM model. We found that perceived ease of use and perceived usefulness are significant determinants of intention to use, which revealed the victorious functionality and efficiency of ride-hailing applications in the country. At the same time, we found a paradoxical relationship between perceived risk, trust, and intention to use. The results secured within this study further confirm the authenticity of TAM in the research arena of information systems and technology acceptance. Therefore, it is asserted that the current research model

should be employed in variant research settings in order to further strengthen the model, producing results that can be generalized in a widespread academic arena.

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Appendix A. Questionnaire Items

	Questionnaire Items	Sources
Intention to Use		
ITU1	I intend to use ride-hailing, given the chance.	Adapted from Pavlou [49], Kim and Garrison [50] and Hsiao et al. [30]
ITU2	I predict to use a ride-hailing application in the future, given the chance.	
ITU3	It is likely that I will use a ride-hailing in the near future.	
ITU4	Assuming I have mobile wireless technology, I intend to use ride-hailing.	
ITU5	I would engage in a sharing encounter on a ride-hailing platform in general.	
Actual Usage		
AU1	How Many Hours Do You Drive for the Ride-hailing Platform in A Usual Week?	Subjective measurements based on Kim and Lee [48] and Davis [29]
AU2	What Is Your Current Use of The Ride-hailing Platform in A Week?	
Perceived Ease of Use		
PEAU1	Interacting with a ride-hailing application is clear and understandable.	Adapted from Hsiao et al. [30], Venkatesh and Davis [51], Pavlou [49] and Kim and Garrison [50]
PEAU2	Interacting with the ride-hailing application does not require a lot of mental effort.	
PEAU3	I find the ride-hailing application easy to use.	
PEAU4	Learning to operate with the ride-hailing application is easy for me.	
PEAU5	I find it easy to locate the information that I need on a ride-hailing application.	
Perceived Usefulness		
PU1	I think that the ride-hailing application is functional.	Adapted from Pavlou [49]
PU2	I think that the ride-hailing application creates value to me.	
PU3	I think that content on the ride-hailing application is useful to me.	

	Questionnaire Items	Sources
PPR1	I think that the personal information that I provide on the ride-hailing application is secure.	Adapted from Pavlou [49]
PPR2	I think that the monetary information that I provide on the ride-hailing application is well protected.	
PPR3	I think that ride-hailing application will not use unsuitable methods to collect my personal data.	
PPR4	I think that it is possible that signing up for ride-hailing will lead to financial loss for me.	
PPR5	I think that the security system built in the ride-hailing application is strong enough to protect my information.	
PPR6	I think that it is highly likely that there will be something wrong with the performance of the ride-hailing application and it will not work properly.	
PPR7	I think that signing up for ride-hailing would lead to a loss of privacy for me because my personal data would be used without my knowledge.	
PPR8	I think that driving for ride-hailing will not fit in well with my self-image or self–concept.	
PPR9	I characterise the decision to transact with ride-hailing with significant risk.	
PPR10	I think that the ride-hailing application is dangerous to use.	
Trust		
T1	The riders on the ride-hailing platform are competent.	Adapted from Hawlitschek [26].
T2	The riders on the ride-hailing platform are capable.	
T3	The riders on the ride-hailing platform are qualified.	
T4	The riders on the ride-hailing platform are reliable.	
T5	The riders on the ride-hailing platform are honest.	
T6	The riders on the ride-hailing platform keep their word.	
T7	The riders on the ride-hailing platform mean no harm to me.	
T8	The riders on the ride-hailing platform are principally well-meaning.	
T9	The ride-hailing platform is competent in dealing with its drivers.	
T10	The ride-hailing platform is capable of meeting my requirements as a driver.	
T11	The ride-hailing platform is qualified to offer me a good service for driving.	
T12	The statements provided by the ride-hailing platform are reliable.	
T13	The ride-hailing platform is honest in dealing with my private data.	
T14	The ride-hailing platform delivers agreed service to its drivers.	
T15	The ride-hailing platform keeps the interest of its drivers in mind.	
T16	The ride-hailing platform means no harm to its drivers.	
T17	The ride-hailing platform has no bad intentions for its drivers.	

Appendix B. Cross Loadings of Measurement Items

Table A1. Cross Loadings of Items.

	Actual Usage	Governmental Regulations	Intention to Use	Perceived Ease of Use	Perceived Risk	Perceived Usefulness	Trust
Intensity	0.828	0.070	0.121	0.067	0.094	0.122	0.060
Frequency	0.885	0.074	0.115	0.115	0.209	0.163	0.129
GR1	0.039	0.590	0.299	0.336	0.351	0.332	0.439
GR2	0.046	0.732	0.316	0.381	0.421	0.301	0.493
GR3	0.058	0.803	0.397	0.371	0.382	0.402	0.481
GR4	0.098	0.814	0.363	0.396	0.407	0.375	0.499
GR5	0.078	0.828	0.355	0.427	0.462	0.368	0.597
GR6	0.065	0.812	0.456	0.475	0.492	0.466	0.632
ITU1	0.106	0.430	0.813	0.424	0.333	0.443	0.430
ITU2	0.067	0.378	0.790	0.422	0.337	0.453	0.417
ITU3	0.152	0.401	0.842	0.424	0.389	0.471	0.475
ITU4	0.067	0.348	0.793	0.458	0.389	0.450	0.423
ITU5	0.144	0.337	0.709	0.488	0.395	0.424	0.400
PEAU1	0.051	0.362	0.464	0.721	0.453	0.385	0.486
PEAU2	0.086	0.409	0.459	0.774	0.510	0.424	0.584
PEAU3	0.036	0.368	0.393	0.781	0.433	0.338	0.449
PEAU4	0.121	0.369	0.401	0.778	0.431	0.363	0.463
PEAU5	0.119	0.497	0.439	0.807	0.540	0.475	0.588
PPR1	0.089	0.419	0.330	0.476	0.789	0.542	0.580
PPR2	0.183	0.436	0.392	0.462	0.817	0.520	0.564
PPR3	0.159	0.420	0.343	0.494	0.808	0.386	0.558
PPR5	0.174	0.464	0.401	0.538	0.817	0.435	0.640
PPR6	0.118	0.456	0.391	0.487	0.755	0.465	0.578
PU1	0.180	0.388	0.420	0.424	0.389	0.814	0.429
PU2	0.130	0.457	0.517	0.459	0.524	0.885	0.555
PU3	0.128	0.408	0.502	0.440	0.571	0.851	0.548
T1	0.133	0.498	0.430	0.546	0.606	0.481	0.765
T10	0.123	0.539	0.371	0.475	0.534	0.436	0.712
T11	0.121	0.495	0.376	0.470	0.560	0.393	0.723
T12	0.066	0.523	0.385	0.498	0.556	0.447	0.768
T13	0.104	0.529	0.366	0.496	0.573	0.417	0.756
T14	0.071	0.523	0.367	0.465	0.548	0.428	0.701
T2	0.081	0.510	0.393	0.541	0.578	0.489	0.811
T3	0.101	0.497	0.429	0.529	0.563	0.512	0.788
T4	0.063	0.495	0.406	0.546	0.581	0.472	0.791
T5	0.006	0.528	0.459	0.521	0.523	0.477	0.760
T6	0.036	0.523	0.420	0.488	0.512	0.432	0.739
T7	0.072	0.536	0.444	0.523	0.549	0.501	0.753
T8	0.077	0.462	0.404	0.449	0.457	0.402	0.659
T9	0.137	0.540	0.412	0.441	0.503	0.414	0.688

Appendix C. Measurement Development for New Construct Governmental Regulations

The primary step in new scale development includes the conceptualization of the construct. which includes identifying the construct and what it intends to measure con-

ceptually at the same time specifying the nature of the construct as suggested by previous literature [46,67]. Conceptually, defining governmental regulations requires a set of principles that focus on incorporating the well-being of all the players affected by the policies including the policy makers (government). It is suggested by the World Economic Forum that certain principles are to be kept in mind when developing governmental regulations in the sharing economy. Firstly, the regulations must be able to initiate innovation. This means that the government needs to provide an environment that induces innovation by providing necessary infrastructure that supports hub for innovation [68]. Secondly, it is said that the regulations must be people-oriented, focusing on the overall well-being and welfare of the population. Next, a proactive approach must be applied by implementing regulations on to sharing economy by eliminating any grey areas that can lead to confusion and lack of understanding of the regulations. Besides that, another important aspect of regulatory implementation is that the government must be capable of assessing the regulatory system whereby the government not only pays attention to new entries but also regulate and control existing incumbent businesses simultaneously [68]. Furthermore, governments and policy implementer systems must be data driven which allows them to use the data for the betterment of the sharing economy industry. Not just that, the governments ought to be flexible and acceptable to rapid changes as a sharing economy involves constant changes and developments which allows them to quickly adapt to new changes in terms of technology and policies. Finally, another important principle involves shared regulations, whereby all players and stakeholders of the sharing economy are involved which results in effective implementation of governmental regulations for the sharing economy [68]. Following that, this research defined governmental regulations as "*policies and practice interventions in the operations of ride-hailing services targeted at the platform's drivers by the government*". This definition of governmental regulations incorporates the essence of the construct highlighting the main characteristic of the construct which is the interventions by the government to regulate the industry. Besides that, the definition also comprises of the people-centered aspect as suggested by [68]. It underlines the most important factor related to the implementation of regulations, which is its target population, the ride-hailing drivers. This inclusion is important because it narrows down the definition which is to be applied by researchers specifying on ride-hailing providers only. This makes it easier for the construct to be utilized in different sharing economy settings.

The second step involves accomplishing the development and generation of the items to measure the construct in hand. Ride-hailing is an online transactional system, and debates have surrounded the industry regarding its legibility and whether it qualifies to be regulated. Not just that, regulations are such that vary from country to country. For instance, Grab drivers in Singapore are eligible for tax filing, whereas that is not the case in Malaysia since the country is still in process of legalizing the industry amongst its drivers [69]. Therefore, it is less likely for literature to guide the measurement items for governmental regulations. This can only be done through the review of industrial reports that reveal the current regulations introduced by the government. However, the design and style of the measuring items for the construct can definitely be adapted from previous literature. In that vein, there were a total of six items chosen to measure governmental regulations. Five of which represent each of the policy that was introduced in Malaysia in 2019. These five policies include the medical check-up policy, 6-h training policy, display of ride-hailing sticker policy, ride-hailing insurance policy and PuspaKom car inspection under the Public Service Vehicle (PSV) permit policy directed at ride-hailing drivers in Malaysia [4]. The sixth measurement item is added that measures the overall perception of the ride-hailing drivers of the regulations and whether they think it helps to build a safe sharing environment in the industry. The last item incorporates the two principles set by [68], which are people-orientation and assessing the regulatory system. This item gauges the overall reaction of e-haling drivers in respect to the regulations directed at them as well as intends to assess the efficiency of them. Table A2 demonstrates the six measurement items generated to measure governmental regulations.

Table A2. Governmental Regulations Measurement Items.

Item	Measurement Items
GR1	I am informed that my medical check-up is required in fulfilling the Public Service Vehicle (PSV) permit policy.
GR2	I am informed that a 6-h training and exam is required in fulfilling the Public Service Vehicle (PSV) permit policy.
GR3	I am informed that the display of an ride-hailing sticker is required in fulfilling the Public Service Vehicle (PSV) permit policy.
GR4	I am informed that a valid ride-hailing insurance is required in fulfilling the Public Service Vehicle (PSV) permit policy.
GR5	I am informed that a Puspakom car inspection required in fulfilling the Public Service Vehicle (PSV) permit policy.
GR6	Overall, I believe that the implementation of governmental regulations help in creating a safe sharing environment for both drivers and riders.

Moreover, confirming the dimensionality of government regulations is an important step after the conceptualization and defining of the construct. Generally, a construct is unidimensional or multidimensional [46]. Governmental regulations, however, are viewed as a unidimensional construct. This is because regulations are such that they may evolve over time. Thus, eliminating any one of the measurement items from the construct shall not affect the conceptualization of it, as suggested by [46]. The researcher argues that, over time, there might be deletion or addition to regulations implemented by the government, and therefore fixation of governmental regulations as unidimensional is deemed more appropriate. Hence, the deletion of any item from the construct shall not have an impact on the overall conceptualization of the construct. Thus, governmental regulations are deemed a unidimensional construct in this research.

Next, once the measurements items have been developed, they must be tested for their content validity as suggested by [46]. Prior to evaluating the content validity of the items, an important step is to determine the face validity of the measurement items. Face validity is defined as the process to review and determine the extent to which the items measure the construct they are supposed to be measuring [70]. Face validity can be done by using a pool of respondents prior to the actual collection of the data. The main aim of face validity is to ensure that the initial items wholly measure the construct before its content validity can be assessed. In that vein, a handful of respondents were requested to ensure the face validity of the six items. They were asked to read, understand, and answer the six measurement items on a 6-point a Likert scale gauging strong disagreement to agreement on the statements. Initially, the six measurement items were tested for face validity only in English language but as the research progressed, it was found out that quite a big number of respondents were more comfortable in engaging with the questionnaire in Malay language. Therefore, the six items were then translated into Malay language and presented again for face validity. The inclusion of the translation to Malay language improved the face validity of the measurement items for governmental regulations as the initial respondents requested for face validity now observed all six items to be easy to understand and comprehend. The next step was to evaluate the content adequacy of the new measurement items for governmental regulations. In order to do so, a total of 37 ride-hailing drivers were asked to rate the six measurement items of governmental regulations in which they were asked to which extent they think the six items are representing the construct as suggested by [46]. Table A3 demonstrates an example of the table that was presented to the respondents to rate the measurement items of governmental regulations. The raters were asked to rate whether each of the items captures all aspects of the construct using a five-point Likert scale ranging from 5 (completely) to 1 (not at all).

Table A3. Rating Matrix for Governmental Regulations.

Governmental Regulations: Policies and practice interventions in the operations of ride-hailing services targeted at the platform's drivers by the government [68]	
Governmental Regulations Scale Items	
1. I am informed that my medical check-up is required in fulfilling the Public Service Vehicle (PSV) permit policy.	4
2. I am informed that a 6-h training and exam is required in fulfilling the Public Service Vehicle (PSV) permit policy.	4
3. I am informed that the display of a ride-hailing sticker is required in fulfilling the Public Service Vehicle (PSV) permit policy.	4
4. I am informed that a valid ride-hailing insurance is required in fulfilling the Public Service Vehicle (PSV) permit policy.	4
5. I am informed that a Puspakom car inspection required in fulfilling the Public Service Vehicle (PSV) permit policy.	4
6. Overall, I believe that the implementation of governmental regulations helps in creating a safe sharing environment for both drivers and riders.	3

The next step after the content validity has been confirmed is to specify the measurement model of governmental regulations which involves specifying whether the construct in focus is a reflective or formative construct as suggested by [46]. In line with that, it is known that every country has distinct regulations to regulate ride-hailing industries in their country and regulations of a country are not constant and therefore are interchangeable as policies of a country develop and progress. Hence, it is argued that there exists no uniform set of regulations that can be used in all studies in order to measure its effect on the intention and actual usage of a ride-hailing service. Hence, a total of 6 items have been developed that suit fit the current Malaysian regulatory environment in terms of ride-hailing drivers as ruled by the Ministry of Transport. Each item represents one policy respectively that has been recently implemented by the Ministry of Transport on to the drivers of all ride-hailing platforms. Therefore, it is argued that since the governmental regulations are subject to change and may fluctuate and vary depending in new rulings and leaderships in Malaysia, it is seen as a reflective construct as depicted in the diagram below as extracted from SmartPLS. Next, pre-test is to be completed once the measurement model has been specified. Data need to be obtained from a group of respondents in order to acquire the convergent and divergent validity of the measurement items of governmental regulations. Therefore, this pre-test was carried out among 37 (n) samples, which accounts as 10% of the main sample size (n = 377) as a reasonable number to conduct a pilot test. The following Table A4 represents the reliability and validity of governmental regulations.

Table A4. Reliability & Validity of Governmental Regulations.

Construct	**Item**	**Loadings**	**Convergent Reliability (CR)**	**Cronbach's Alpha**	**Discriminant Validity (Inter-Correlation)**
Governmental Regulations	GR1	0.921	**0.964**	**0.955**	**0.906**
	GR2	0.944			
	GR3	0.955			
	GR4	0.956			
	GR5	0.888			
	GR6	0.742			

In order to measure the validity of the construct governmental regulations, researchers suggest that the average variance extracted (AVE) of the construct should be 0.8 or higher [71]. In line with that, as it can be seen from the table above, all loadings were computed at surpassing the threshold of 0.7 as suggested by Hair et al. [54]. Other than that, the convergent reliability was calculated at 0.964 which successfully surpasses the threshold of 0.7 as suggested by Fornell and Lacker [55], Hair et al. [54] and Wetzels et al. [72], hence confirming the reliability of the governmental regulations. As for discriminant validity, the

computed figure of 0.906 which is higher than all the interrelations with other constructs confirms the discriminant validity of the newly developed construct called governmental regulations. Thus, it can be concluded that governmental regulations presented the suitable samples as well as items that can successfully measure the construct.

The next step is scale purification and refinement which involves the measurement of the goodness of fit of the measurement model. A chi-square test is used in order to evaluate whether the model is enough in explaining the sample data. It is suggested that a non-significant ($p > 0.10$) chi-square is an indication of a goodness of fit for the model according to Mackenzie et al. [46]. Therefore, a chi-square test was carried out to evaluate the goodness-of-fit for governmental regulations using SPSS software. Table A5 depicts the results.

Table A5. Test Statistics for Goodness-of-Fit (Chi-Square Test).

	Chi-Square	df	Asymp. Sig.
I am informed that my medical check-up is required in fulfilling the Public Service Vehicle (PSV) permit policy.	13.316	4	0.010
I am informed that a 6-h training and an exam is required in fulfilling the Public Service Vehicle (PSV) permit policy.	16.474	4	0.002
I am informed that the display of a ride-hailing sticker is required on my car in fulfilling the Ride-hailing Vehicle Permit (EVP) policy.	19.105	4	0.001
I am informed that valid ride-hailing insurance is required in fulfilling the Public Service Vehicle (PSV) permit policy.	16.474	4	0.002
I am informed that a PuspaKom car inspection is required in fulfilling the Public Service Vehicle (PSV) permit policy.	13.842	4	0.008
Overall, I believe that the implementation of governmental regulations helps in creating a safe sharing environment for both drivers and riders.	6.737	4	0.150

Note: 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 7.6.

After the goodness-of-fit has been determined by the chi-square test, the next step is to determine the reliability of the measurement items of the construct in hand. According to Mackenzie et al. [46], the convergent validity can be evaluated by computing the average variance extracted (AVE) of the indicators of the construct in focus. It is suggested that the AVE value of 0.5 and higher is recommended due to the fact that this suggests the construct measures more than half of the variance of the indicators in first-order latent constructs such as governmental regulations. In that vein, the results of the pre-tests revealed an AVE of 0.820 computed for governmental regulations, which confirms the convergent validity of governmental regulations which is a first-order reflective construct.

Next, the reliability of the set of indicators for the construct is computed by using Cronbach's Alpha and the accepted threshold values 0.7 and above for newly developed measurement items [46]. As can be seen from Table A4, the computed Cronbach's Alpha for governmental regulations is 0.955, which successfully surpasses the recommended threshold value. Therefore, finally, it can be argued that all items measuring governmental regulations are statistically reliable. Furthermore, it is suggested that if there is no addition for items or in any case of a deletion of measurement items, the analysis can be redone using the same sample [46]. However, since no items were added or deleted from the construct, the analysis was carried out using the same sample to run the analysis again and the results retrieved were identical to the previous results of the analysis carried out earlier. Therefore, it can be argued that all six items presented to measure governmental regulations are reliable and valid.

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