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Determinants Factor of Passengers' Propensity to Utilise E-Hailing Services in Kota Kinabalu, Sabah

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Abstract

In the realm of public transportation, e-hailing services have emerged as a prominent mode of transportation in recent years. This study aims to elucidate the complex relationships between four key constructs, namely safety features, fare, ease of usage, and accessibility, in shaping user inclination towards the adoption of e-hailing services. Using the Stated Preference Survey (SPS) method, a meticulously designed online questionnaire was administered to three hundred respondents in Kota Kinabalu. Employing partial least squares-structural equation modelling for analysis, the results highlight the significance of ease of usage and accessibility as robust predictors influencing Kota Kinabalu residents' preference for using e-hailing services. The safety aspect displays notable disparities based on gender, as male and female consumers possess contrasting perspectives regarding the degree of protection provided by e-hailing services. In contrast, the concept of price value has a restricted ability to forecast user propensity, as surge pricing was universally enforced during peak hours in all e-hailing services. The study's findings provide useful insights for e-hailing businesses, indicating strategic enhancements in service delivery to guarantee customer comfort and safety, thereby increasing their service coverage, and attracting a wider user demographic.

1. Introduction

Public transportation is a form of transport that the government makes available to the entire population. However, owing to the unreliability of public transportation, most individuals choose to drive private vehicles for convenience [1], [2]. According to Shamsuddin et al. [3], the number of privately owned vehicles in the city has expanded dramatically, attributed to the need for and affordability of owning a vehicle. Corresponding to Shamsuddin et al.'s findings, significant traffic congestion would cause air and noise pollution, as well as pose a risk to pedestrians and cyclists. As a result, numerous studies have suggested that an efficient public transportation system should be established as one approach to reducing traffic congestion [2], [4] improving air quality and health [3], [5]. In Malaysia, e-hailing is part of a larger economic movement toward a "shared economy," in which people may share assets and services via a network that successfully connects customers and suppliers [6]. E-hailing was universally seen as a beneficial step for clients, who have gained access to more options and lower fares in general. E-hailing, on the other hand, has had a detrimental influence on conventional taxi services since it shares the same market demand as taxis [6], [7]. Aside from that, earlier research on shared mobility has aroused heated discussion on a number of problems. Some of the concerns have been made about how services may be regulated, their safety effects, and how they alter travel behaviour [8]. Some argue that sharing systems reduce automobile ownership and enhance public transport usage, while others argue that they

divert people away from transit and add to already congested roadways [9]. Because this service is still in its early stages, there is minimal data accessible for transportation planners and academics.
The Eleventh Malaysia Plan includes public transport as one of the sources of revenue for Malaysia's economic growth. Prior to the 11th Malaysia Plan, the government seeks to ensure adequate and reasonable access to transportation, since comprehensive and dependable public transit will encourage sustainable economic growth [10]. E-hailing has revolutionized Malaysia, but it has also caused strife in the taxi sector. In light of the strong reaction to e-hailing services in Malaysia, however, the Malaysian government has made a commendable step toward placing e-hailing on an equal legal footing with regular taxis [6], [11]. As limited research on e-hailing services in Kota Kinabalu has sparked an interest in examining the determinants factor of passengers' propensity to use e-hailing services in Kota Kinabalu.

1.1 Challenges in Current Public Transportation

Urban communities are currently worried about the increasing number of private automobiles due to the greater availability of transportation [2], [12], [13]. Studies suggest that 54% of families in Malaysia possess more than one vehicle, which supports the widespread preference for private car ownership in society [14]. As society places a greater emphasis on private automobiles, automobile demand will rise [12], [15]. Previous research has shown significant problems with traffic congestion in metropolitan areas of Malaysia. These concerns are characterized by increased traffic volumes during specified periods and on specific routes, as reported by Chiu Chuen et al. [16] and Ismail et al. [17]. Several factors, such as the state of the roads and the level of service (LoS), contribute to extended traffic congestion, as exemplified by the delays created by road work between Jalan KKIP and Jalan Tuaran [2]. The consequences include extensive traffic congestion, air and noise pollution, an unwelcoming urban environment, and hazards for pedestrians and cyclists [15], [18], [19].

The inclination towards private transportation stems from the deficiencies of existing public transport alternatives [20]. Research highlights many challenges associated with public buses, including limitations in amenities, inadequate infrastructure, inefficient fleet management, dispatching inefficiencies, and long waiting periods [7], [21]. The lack of effectiveness in the public transport system in Kota Kinabalu is a significant issue, as emphasized by the Division of Traffic and Public Transport, the Kota Kinabalu Urban Transport Study, and the Master Plan Study of Public Transport in Major Cities and Towns [5].

According to Azizul Ladin et al. [22] an efficient public transport system might help reduce traffic congestion in metropolitan areas. The introduction of e-hailing services in Malaysia has revolutionized the traditional taxi industry by providing a fresh option for public transportation that closely resembles private car services [23]. Therefore, this service caters the interest of Malaysians for shorter trip durations and improved convenience.

1.2 Theoretical Background

Therefore, it is crucial that researchers need to understand the customers' perceptions and satisfaction level on the e-hailing service for the industry to identify the most prominent features of their service which can help the business to grow and widely accepted. Some of the features that have been identified to influence the customer's satisfaction level with e-hailing services are security and safety features, fares, payment method and ease of usage. According to Teo et al. [24], customers express various safety concerns when using ride-sharing services, encompassing worries about drivers, passenger privacy, vehicle condition, and insurance coverage during service utilization. Ceder et al. [25] emphasize that safety is a crucial aspect of service quality, comprising trip characteristics such as personal safety, journey time, connection reliability, transfer time, and transfer information. Furthermore, personal safety at stations was found to be the most significant factor influencing travellers' decisions to use public transportation. To alleviate these safety concerns, e-hailing systems have implemented features to mitigate "stranger risk," utilizing GPS-enabled mobile devices to track customers' locations during rideshare trips [26]. Additionally, Onyango [27] reports the installation of monitoring devices to provide specific information about drivers, including their name, license plate number, and real-time position.
A recent investigation conducted by Belk [28], highlights the financial benefits that motivate consumers to participate in the sharing economy. Specifically, the study reveals that individuals are able to access desired goods and services at a lower cost through sharing economy platforms, rendering traditional taxi services less economically viable. This cost advantage was further accentuated by the provision of discount vouchers offered by e-hailing providers, which enhance the financial savings of consumers [23].
The study conducted by Mohd Idros et al. [29] and Rayle et al. [30] highlights the crucial role of user-friendliness in e-hailing websites, particularly in terms of navigational, functional, and information accessibility features. These features significantly contribute to enhancing the overall user experience, which in turn fosters passenger intent to utilize these services. The convenience offered by e-hailing applications, such as the ability to order rides with a simple touch on a mobile device and real-time monitoring of the driver's proximity, streamlines the route planning process, leading to increased customer satisfaction. The integration of user-friendly features in e-hailing websites plays a vital role in enhancing the user experience, which is a key factor in the success of these services.

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In the domain of transportation, ease of access plays a crucial role in shaping consumer preferences. According to Teo et al. [24], the accessibility of e-hailing services is contingent upon a range of factors, including the simplicity of booking processes, the availability and coverage of vehicles in both urban and suburban areas, operating hours, the number of contracted drivers, and the speed of delivery. These factors, in turn, significantly impact consumer intent to use and satisfaction with e-hailing services.

This study aims to investigate the key factors that influence customers' inclination to utilise e-hailing services within Kota Kinabalu, Sabah. The research employs a conceptual framework, grounded in relevant theoretical frameworks, and depicted in Fig. 1, which posits the dependent variable (i.e., User propensity to utilize e-hailing) as a function of four independent variables: (i) safety feature, (ii) fare, (iii) ease of usage, and (iv) accessibility. The dependent variable was expected to be influenced by these independent variables, which are hypothesized to impact customers' decision-making processes regarding the use of e-hailing services.

This investigation makes a substantial contribution to the existing body of literature on transportation engineering, specifically in the context of the e-hailing industry. By examining the intricate interplay of factors that influence customer preferences and behaviour in this domain, the research sheds light on the complex dynamics governing customer behaviour in the e-hailing market. The study's nuanced analysis offers a comprehensive understanding of the factors that shape customer behaviour in this transportation context, which can inform the development of targeted and effective transportation engineering strategies and policies for e-hailing service providers. The findings of this research have the potential to optimize the transportation system within Kota Kinabalu, Sabah, leading to improved customer satisfaction, experience, and the overall efficiency of e-hailing services in the region.

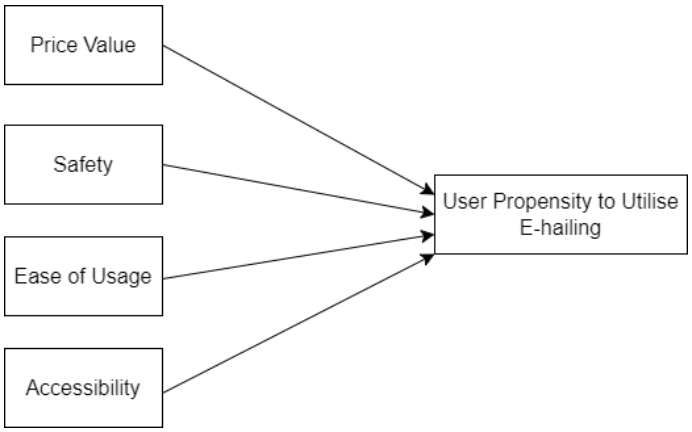

Fig. 1 *A model of consumer adoption behaviour in e-hailing services*

2. Research Methodology

This section outlines the methodological approach employed in the present study, providing a structured framework for a systematic and comprehensive investigation into the factors influencing consumer adoption of e-hailing services in Kota Kinabalu, Sabah. The methodological framework utilized is rigorous in design, with meticulous data collection techniques and the utilization of analytical tools to enhance the clarity and interpretability of the findings, thereby increasing the accuracy and reliability of the study results. A structured framework for the investigation is employed, ensuring a thorough and systematic examination of the factors influencing consumer adoption of e-hailing services in the study area.

2.1 Research Design

The present study was conducted in Kota Kinabalu City, which serves as the capital of Sabah, an eastern Malaysian state that is geographically isolated from the rest of the country by the South China Sea. Kota Kinabalu City has emerged as the primary entry point to Borneo's islands and the hub of all economic, industrial, residential, touristic, and transportation activities. To collect data for this study, a Google Form survey was distributed to a representative sample of 300 local residents in Kota Kinabalu, which represents a population of 500,000 individuals, with a confidence level of 95%. The sample size was determined using Mills and Gay's theory [31] which stipulates that the sample size should be chosen based on the desired level of precision and the degree of variability in the population. Before the final questionnaire was deployed, a pilot study was conducted with twenty randomly selected respondents to assess the questionnaire's validity and accuracy. The sampling technique employed in this study was convenience sampling, which is a non-probability sampling technique that is widely

used in social science research [32]-[34]. Convenience sampling was preferred in this study because it is more practical and efficient to recruit respondents and collect questionnaires in Kota Kinabalu City.

In conclusion, the choice of Kota Kinabalu City as the research location was guided by its strategic position as the capital of Sabah and the hub of various economic and social activities. The sampling technique employed in this study was convenience sampling, which allowed for a more efficient and practical data collection process.

2.2 Sample and Data Collection

The data were collected via an electronic survey developed according to the aforementioned scales. The questionnaire had two parts. In the first part, the demographic data of the respondents were collected, namely gender, age, education level, occupation, income, owning a private vehicle, owning a driving license, e-hailing services use and the frequency of usage. The second part comprised the scales of the structural model proposed. All constructs were measured using a five-point Likert-type scale varying from 0 (totally disagree) to 4 (strongly agree). The instrumentation for this research is a questionnaire developed based on past research article [35]. The items were developed based on literature review. Thus, the questionnaire had been developed based on particular constructs as shown in Table 1.

Table 1 *Questionnaire item*

Section	Construct	Elaboration
A	Demographic information	Gender Age Education level Occupation Income Own a private vehicle. Own a driving license. E-hailing services use Frequency of usage
B	User perception on e-hailing services	B1: Price value B2: Safety B3: Ease of usage B4: Accessibility

From April to August 2022, an online questionnaire was administered to a sample of individuals to gather information on their demographic characteristics, usage patterns, and reasons for utilizing e-hailing services. The survey revealed several notable findings regarding the demographics of the respondents. Notably, the 18-23 age group comprised the largest proportion (30%) of respondents, while female participants outnumbered male participants by a margin of 50.7%. In terms of education, over 50% of the respondents held a bachelor's degree, indicating a high level of educational attainment among the sample. Furthermore, 54% of the respondents owned a private vehicle, while 67.7% possessed a driving license, suggesting that a significant proportion of the sample had access to these forms of transportation.

The survey also collected data on the type of e-hailing services used by respondents. Unsurprisingly, the majority of respondents (77%) most frequently used Grab, a popular e-hailing platform in the region. Additionally, the survey revealed that 41.3% of respondents rarely or never used e-hailing services, while over 19% of respondents used these services once per week, 2-5 times, or less than 10 times.

The survey conducted in the specified region sheds light on the demographic characteristics and usage patterns of e-hailing service users. The findings highlight the importance of tailoring e-hailing services to cater to the diverse age groups, genders, and educational backgrounds within the population. Furthermore, the data indicates that despite the prevalence of private vehicle ownership and driving licenses among the sampled individuals, a significant portion of respondents rely heavily on e-hailing services for their transportation needs. These discoveries have far-reaching implications for policymakers, e-hailing service providers, and transportation engineering researchers, as they provide a more profound understanding of the complex dynamics of the e-hailing market in the specified region.

2.3 Data Analysis

In light of the limitations of traditional statistical methods, which often rely on analysing individual relationships between variables one at a time, structural equation modelling (SEM) has emerged as a powerful tool for examining the complex web of dependencies among latent variables. SEM, as defined by Gefen et al. [36], is a statistical approach that facilitates the mapping of multiple dependent variables to a single research model,

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allowing for a simultaneous analysis of all the paths involved. This comprehensive approach had been widely adopted in the field of social sciences to which it can examine all the dependence relationships among latent variable simultaneously as highlighted by Hair et al. [37]. By leveraging the capabilities of SEM, researchers can gain a more nuanced understanding of the interplay between latent variables and their relationships, leading to more accurate and robust findings. Utilizing SMARTPLS 4.0, the researcher was able to conduct a thorough examination of the data, leading to well-informed conclusions. Before testing the proposed relationship among the theoretical constructs, it was necessary to establish the discriminant and convergent validity of the measurement instruments.

Table 2 *Description of variables in the mode*

Variable Name	Code [Range]	Code Description
Gender	[0,1]	0 = Female 1 = Male
Age	[0,5]	0 = Less than 18 years old 1 = 18 – 23 years old 2 = 24 – 29 years old 3 = 30 -49 years old 4 = 40 – 50 years old 5 = More than 50 years old
Education level	[0,5]	0 = Secondary School 1 = Certificate 2 = Diploma 3 = bachelor's degree 4 = master's degree 5 = PhD
Occupation	[0,4]	0 = Unemployed 1 = Student 2 = Government sector 3 = Private sector 4 = Self-employed
Income/month (RM)	[0,6]	0 = Less than RM800 1 = RM 800 – RM 1500 2 = RM 1500 – RM 2000 3 = RM 2000 – RM 3000 4 = RM 3000 – RM 4000 5 = More than RM 4000 6 = Prefer not to mention
Private vehicle ownership	[0,1]	0 = Owns a vehicle 1 = Does not own a vehicle
Own a driving license	[0,1]	0 = Owns a driving license 1 = Does not own a driving license
E-hailing services use	[0,3]	0 = Grab 1 = Maxim 2 = MyCar 3 = Other
Frequency of usage	[0,4]	0 = Daily 1 = Once per week 2 = 2 – 5 times 3 = Less than 10 4 = Never
User perception on e-hailing services - Safety Features - Fare - Ease of Usage - Accessibility	[0,4]	0 = Strongly disagree / Very unsatisfied 1 = Disagree / Unsatisfied 2 = Neutral 3 = Agree / Satisfied 4 = Strongly / Very Satisfied

Table 3 *Results of data distribution*

Constructs	Mean	Std. Deviation	Skewness	Kurtosis
Price Value				
E-hailing have fair pricing	2.46	0.704	0.265	-0.169
E-hailing provide acceptable value	2.48	0.702	0.371	-0.192
I think that I can save money by using E-hailing services as transportation	1.897	0.8693	0.108	0.449
Safety				
I feel safe when riding in a e-hailing vehicle	2.16	0.627	0.419	1.456
The E-hailing driver always keeps their passenger safe	2.25	0.608	0.416	1.342
The E-hailing driver always drive with safety	2.25	0.613	0.579	1.133
Ease of Usage				
It is easy to book a ride using the e-hailing apps on smartphone	2.8	0.72	0.001	-0.264
It is easy to contact the e-hailing drivers and vice versa	2.67	0.703	0.348	-0.625
It is easy to pay for the ride	2.78	0.712	0.308	-0.916
It does not take too long for the e-hailing driver to arrive	2.42	0.739	0.383	0.056
Accessibility				
The e-hailing service is not limited in my area	2.5	0.77	-0.141	0.677
I can easily access the e-hailing service any time	2.46	0.759	0.149	-0.13
The e-hailing drivers always picked up and dropped me off at the specified location	2.61	0.686	0.534	-0.586

Table 4 *Profile of respondents (n = 300)*

Characteristics	n	%		n	%
Gender			**Income**		
Male	148	49.3	< RM800	52	17.3
Female	152	50.7	RM800 - RM1500	6	2.0
Age			RM1500 - RM 2000	26	8.7
< 18	51	17.0	RM2000 - RM3000	31	10.3
18 - 23	90	30.0	RM3000 - RM4000	31	10.3
24 - 29	59	19.7	> RM4000	21	7.0
30 - 39	36	12.0	Prefer not to mention	133	44.3
40 - 50	42	14.0	**Own a private vehicle**		
> 50	22	7.3	Yes	162	54.0
Education Level			No	138	46.0
Secondary School	56	18.7	**Own a driving license**		
Certificate	30	10.0	Yes	203	67.7
Diploma	38	12.7	No	97	32.3
Bachelor's Degree	152	50.7	**E-hailing services often use**		
Masters' Degree	21	7.0	Grab	244	77.0
PhD	3	1.0	MyCar	9	2.8
Occupation			Maxim	62	19.6
Unemployed	16	5.3	Other	2	0.6
Student	151	50.3	**Frequency of Use**		
Government Sector	54	18.0	Daily	3	1.0
Private Sector	58	19.3	Once per week	59	19.7
Self-employed	21	7.0	2-5 times	57	19.0
			Less than 10	57	19.0
			Never	124	41.3

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3. Results

3.1 The Measurement Model Evaluation

According to Hair et al. [37] a model must meet certain conditions to ensure internal consistency reliability, convergent validity, and discriminant validity. These conditions, as outlined by Johnson et al. [38], include (i). High and significant loads for the manifest variables: The manifest variables should have strong and significant relationships with the latent variables; (ii). Small variation range of loadings for each variable: The loadings for each variable should be consistent and not vary greatly across different manifest variables; (iii). Cross-loading for latent variables should be smaller than specific loading: The loadings for a latent variable on other latent variables should be smaller than the specific loading for that latent variable; (iv). Average variance extracted (AVE) must be equal to or higher than 0.5. The AVE measures the amount of variance in the latent variables that is not explained by the manifest variables. A value of 0.5 or higher indicates that the latent variables have sufficient variance to be meaningful; (v). Composite reliability (CR) and Cronbach's alpha (α) must be equal to or higher than 0.7: These measures of reliability indicate the consistency of the latent variables. A value of 0.7 or higher indicates that the latent variables are dependable; (vi). AVE square root for a latent variable must be higher than its correlation with the other latent variables: This condition ensures that the latent variables are distinct and not redundant. By meeting these conditions, a model can demonstrate internal consistency reliability, convergent validity, and discriminant validity, which are important properties of a well-structured measurement model.

Composite reliability (CR) was used to assess internal consistency in the PLS-SEM analysis. In Table 5, it can be observed that the CR values exceeded 0.7 ranging from 0.810 to 0. 927. The convergent validity was assessed based on two criteria: outer loadings and the average variance extracted. As recommended by Hair et al. [37], the outer loading of all measurement items should be greater than 0.6 From Table 5, it is evident that all constructs meet this criterion except for item number three in "Price value," where the outer loading stands at only 0.310 regarding saving money by using E-hailing services as transportation. Four constructs showed AVE values ranging from 0.623 to 0.779, indicative of adequate convergent validity. Third, discriminant validity was assessed using the Fornell and Larcker criterion. The Fornell and Larcker criterion was used to assess discriminant validity, which requires that the square root of the AVE for each construct should be larger than its correlation with any other construct [38]. Table 6 shows that the AVE value for each construct was higher than the squared correlation coefficient with the other constructs. This finding indicated that all measurement instruments suggested in this study demonstrated sufficient discriminant validity.

Table 5 *Results of measurement model evaluation*

Constructs/Dimensions	Outer Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
Price Value			
E-hailing have fair pricing	0.929	0.810	0.623
E-hailing provide acceptable value	0.954		
I think that I can save money by using E-hailing services as transportation	0.310		
Safety			
I feel safe when riding in a e-hailing vehicle	0.896	0.908	0.768
The E-hailing driver always keeps their passenger safe	0.887		
The E-hailing driver always drive with safety	0.845		
Ease of Usage			
It is easy to book a ride using the e-hailing apps on smartphone	0.924	0.927	0.763
It is easy to contact the e-hailing drivers and vice versa	0.936		
It is easy to pay for the ride	0.928		
It does not take too long for the e-hailing driver to arrive	0.679		
Accessibility			
The e-hailing service is not limited in my area	0.860	0.914	0.779
I can easily access the e-hailing service any time	0.900		
The e-hailing drivers always picked up and dropped me off at the specified location	0.889		

Table 6 *Fornell-Larker criterion for discriminant validity*

	Accessibility	Convenience	Price Value	Safety Feature	User Propensity to Use E-hailing
Accessibility	0.883				
Convenience	0.656	0.874			
Price value	0.322	0.41	0.789		
Safety feature	0.371	0.398	0.302	0.876	
User propensity to use e-hailing	-0.306	-0.382	-0.206	-0.213	1

3.2 Structural Model Evaluation

After confirming the validity of the measurement model, we assessed the structural model. The results displayed in Fig. 2 show that the explained variance proportion for user propensity to use e-hailing is R2 = 0.156, indicating strong predictive power in support of our proposed model. According to Gelman et al. [39], R2 values equal to or greater than 0.10 were considered adequate for a particular endogenous construct. Accessibility, as measured by the R-square value of 0.001 displays a minimal contribution to the model's predictive ability. In contrast, convenience, as indicated by its R-square value of 0.425 exhibits a substantial explanatory effect on the dependent variable. This factor contributes meaningfully to the model's overall explanatory power, with a moderate R-square value that is slightly lower but still significant. Price value, as evidenced by its R-square value of 0.102, explains a notable portion of the variance in the dependent variable. Safety feature, as indicated by its R-square value of 0.165 exhibits a moderate positive impact on the dependent variable.

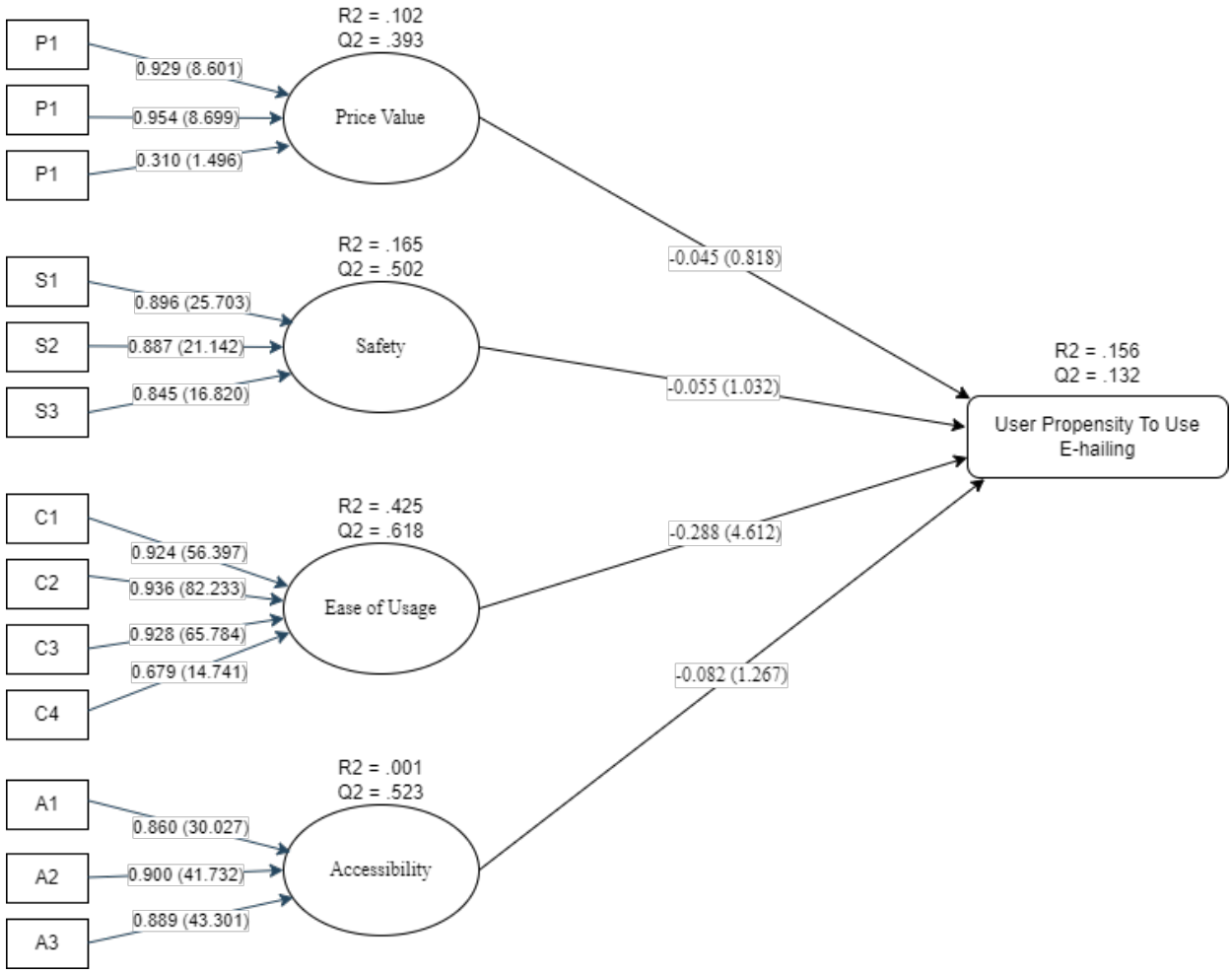

Fig. 2 *Results of structural model*

Additionally, the Stone – Geisser Q2 value was calculated to estimate predictive relevance using the blindfolding procedure in SmartPLS 4.0. According to Hair et al. [37], suggested that values of 0.02, 0.15, and 0.35 indicate small, medium, and large predictive relevance for an endogenous construct, respectively. The model's Q-square value of 0.523 indicates a high predictive accuracy for Accessibility, suggesting its effectiveness in capturing and explaining the variance in this factor. It was expected as Accessibility plays a critical role in determining the adoption of e-hailing services, especially for individuals with mobility impairments as well as areas where the e-hailing service can be available. The Q-square value for Ease of usage is also high at 0.618, suggesting that the model has strong predictive capabilities for this factor. Ease of usage plays a key role in the adoption of e-hailing services as it enables users to request transportation easily and quickly without needing to physically locate and hail a taxi. The Q-square value for price value (0.393) suggests that the model has some ability to predict the variance in price value, although not as high as convenience. This indicates that the model can capture underlying patterns in price value that influence user adoption of e-hailing services. The Q-square value for safety feature (0.502) is high, indicating effective prediction of the variance in Safety Feature, which aligns with safety's importance in e-hailing service adoption.

4. Discussion

The study proposed and validated an integrated framework with the addition of four constructs (price value, safety, ease of usage and accessibility) into user propensity to use e-hailing services. The findings indicate that the propensity of users to adopt e-hailing services was significantly influenced by the convenience of their utilization. This was primarily attributed to the app-based and internet-dependent nature of these services, which enables users to effortlessly hail rides through their smartphones with minimal cognitive load. The user-friendly interface of e-hailing apps, allowing for simple and rapid booking, is a significant contributor to this convenience. Moreover, the integration of a seamless payment process and real-time ride tracking features further enhances the overall usability of these services, thereby increasing their appeal among users [40]. The utilization of e-hailing services has garnered widespread attention for its seamless and effortless nature, allowing users to effortlessly hail a ride with just a few taps on their smartphone. However, a counterargument exists that this convenience may not be universally accessible, particularly in areas with poor or limited internet connectivity. This limitation can create a significant barrier for certain demographics or in specific geographical locations, thereby hindering the accessibility of e-hailing services [41]. Indeed, the utilization of e-hailing applications has garnered attention with regards to the protection and privacy of users' personal information. The sharing of sensitive data, including payment details, on digital platforms has raised concerns among users, particularly in the wake of recent data breaches and privacy violations within the technology industry. These incidents have led to a heightened awareness of the potential risks associated with the collection, storage, and transmission of personal data, and have contributed to the emergence of data privacy and security as a pressing concern in the digital age [42].

Next construct is accessibility. The accessibility of e-hailing services contributes to their growing popularity among users. The seamless availability of rides at any time of the day, along with the extensive coverage of service areas, enhances the overall convenience for users [43]. E-hailing services, in contrast to conventional public transport systems, provide a greater degree of adaptability and swift responsiveness to customer requests, hence enhancing their attractiveness. Users may effortlessly request trips at their preferred time and place, simplifying their transit experience and offering a more convenient option compared to conventional public transportation. However, it is vital to remember that despite the broad availability of e-hailing services, there are parts of the public that may still encounter problems in obtaining e-hailing services [44]. Socioeconomic differences and geographical variances might affect the equal distribution of e-hailing accessibility, potentially leading to exclusion of specific user groups. Hence, it is crucial to tackle the possible discrepancies and obstacles in order to provide fair and equal access for all user demographics. Given that the majority of respondents in this survey were students, it may be inferred that the e-hailing services at their college are easily accessible. Further research should be undertaken into e-hailing services in different demographic regions as Sabah is still a developing state. This issue encompasses not just the ethical dimensions of providing services, but also plays a role in fostering the sustainable expansion and inclusiveness of e-hailing platforms.

The current study underscores the pivotal role of safety in determining users' inclination towards utilizing e-hailing services, which is in accordance with previous investigations in other transportation contexts [35]. The findings emphasize the necessity to prioritize the safety and security of users while they engage with e-hailing platforms to foster trust and confidence in the service. Furthermore, the integration of safety features within e-hailing apps, such as emergency buttons and trip-sharing options, serves to reinforce the commitment to providing a secure and reliable transportation experience for users [45]. Notably, safety ranks third among the factors influencing users' propensity to use e-hailing services, implying that other factors may also play a significant role in deterring individuals from utilizing these platforms. Despite the implementation of safety measures within e-hailing services, concerns and criticisms persist regarding their effectiveness in addressing safety incidents involving drivers and passengers [46]. Therefore, it is essential to acknowledge these concerns

and continue to address them to ensure a safer and more reliable transportation experience for users. The use of e-hailing services has given rise to a plethora of concerns regarding the reliability of background checks and the overall security of the experience. Furthermore, the incorporation of personal data and location sharing within these apps has sparked privacy debates, as users may feel uneasy about the extent to which their information is being utilised and shared. These concerns were particularly pronounced among different user demographics, with female users, for instance, experiencing distinct safety concerns compared to male users, particularly in unfamiliar areas or at night. In fact, the recent survey revealed that more than 50% of respondents were female, highlighting the importance of addressing these nuanced safety considerations. To cater to the diverse needs of all users, e-hailing companies must recognize the specific safety concerns of different demographics and implement measures that effectively address them, such as providing users with the option to select preferred drivers or specify safety preferences. By doing so, these companies can enhance the overall safety experience for their users and foster a more secure and trustworthy environment for all.

In a recent study, the price value of e-hailing services was found to be associated with a Q-square of 0.393, indicating a significant relationship between user propensity and the affordability of these services. The cost-effectiveness of e-hailing compared to traditional modes of transportation is a crucial factor in attracting users, particularly in urban areas where public transportation costs or private vehicle ownership can be prohibitively expensive [47]. The affordability of e-hailing services is a key driver of increased usage, as it reduces financial strain on individuals. However, some critics argue that while e-hailing may seem cost-effective in the short term, the cumulative expenses of frequent rides can become a financial burden for certain user groups, particularly those who rely on these services for daily commuting [46]. Therefore, it is important to consider both the perceived and actual cost-effectiveness of e-hailing services in order to fully understand their impact on user behaviour. It is essential for e-hailing companies to strike a balance between competitive pricing and sustainable profitability, as this will ensure that their services remain accessible and affordable for a diverse range of users [48]. The findings of this study suggest that affordability is a primary concern for the majority of respondents, who were primarily students. While e-hailing services may offer financial advantages to some users, they can exacerbate disparities in transportation access for others. Moreover, the competitive fares offered by these services do not always reflect the true cost of transportation, as users may encounter surge pricing during peak hours or in high-demand areas [49]. This unpredictability and inconsistency in pricing can lead to unforeseen costs for users, particularly during times when they rely on e-hailing services the most. In light of these opposing arguments, it is crucial for e-hailing companies to prioritize more than just competitive pricing. They must also ensure that their services are cost-effective and equitable for all user demographics. To achieve this, companies may need to address surge pricing concerns by implementing more transparent pricing models or exploring alternative pricing strategies. Additionally, promoting the complementary use of public transportation and implementing measures to support affordability for frequent users can help to mitigate any potential disparities in access to transportation. By taking a holistic approach to pricing and affordability, e-hailing companies can help to ensure that their services remain both competitive and sustainable in the long term.

5. Conclusion

The study highlights the crucial significance of ease of usage in the extensive acceptance of e-hailing services, which are distinguished by a design reliant on mobile devices and the internet, user-friendly interfaces, and effortless payment procedures. Nevertheless, it is essential to recognize the possible constraints in regions with inadequate internet connectivity, since this might impede accessibility and exacerbate inequality across various user groups. The study emphasizes that accessibility plays a crucial role in the widespread use of e-hailing services. The ability to easily use these services, together with their flexibility, quick response times, and wide coverage, make them an attractive option compared to traditional public transportation.

To provide fair access for users from all demographic backgrounds, it is crucial to address socioeconomic and geographical inequities, notwithstanding the benefits offered by e-hailing services. User preferences were significantly influenced by safety, and in order to establish trust and confidence in e-hailing services, it is crucial to address issues regarding the efficacy and dependability of background checks. Cost-effectiveness is another crucial consideration, as e-hailing businesses must find a middle ground between competitive pricing and long-term profitability. Although the appeal of cost-effectiveness is strong, it is important to address the possible obstacles associated with accumulating charges and unpredictable prices. Transparent models and techniques must be implemented to ensure affordability for all user groups.

The paper advocates a comprehensive strategy for e-hailing businesses, highlighting the importance of continuous efforts, flexibility, and a dedication to promoting an inclusive and safe transportation environment. Future research and actions should further develop and broaden these results to enable sustainable development and accessibility in varied demographic locations as the e-hailing environment progresses. To summarize, the study underscores the significance of convenience, accessibility, safety, and cost in the acceptance and

effectiveness of e-hailing services. It stresses the necessity of a comprehensive strategy to tackle the obstacles and constraints linked to these aspects.

The study can be expanded in some respects. First, further study in developed countries is required to better support the current findings. Second, a large part of this survey's respondents was of the younger generation compared to the older generation; therefore, more research on elderly respondents should be undertaken in order to compare the intention to use e-hailing across age groups.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: ***study conception and design:*** *Azwa Safiqah Darawati, Mohd Azizul bin Ladin;* ***data collection:*** *Azwa Safiqah Darawati, Mohd Azizul bin Ladin;* ***analysis and interpretation of results:*** *Azwa Safiqah Darawati;* ***draft manuscript preparation:*** *Azwa Safiqah Darawati, Mohd Azizul bin Ladin. All authors reviewed the results and approved the final version of the manuscript*

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