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Analytical Hierarchy Process in Evaluating E-Hailing Passenger Safety Concerns

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Abstract

Understanding the safety concerns of e-hailing passengers is of utmost importance for both operators and regulatory bodies. By prioritizing passengers' safety concerns, operators can enhance the quality of their services, thereby ensuring a safer and more secure experience for all passengers. Additionally, regulatory bodies can utilize this insight to monitor e-hailing operations more effectively, ensuring compliance with safety standards and regulations. The study methods start with the literature that identified critical concerns that include personal data privacy, driver conduct, sexual harassment, safety tracking, and vehicle safety. This study employed a quantitative approach to data collection, targeting university students aged 19 to 30. Pairwise ranking collected through questionnaires was analyzed using a three-level Analytical Hierarchy Process (AHP) technique. Findings revealed that sexual harassment ranked as the top concern, followed by the preference for "female for female" driver-to-passenger features to counter sexual harassment and the importance of effective real-time tracking with GPS for location monitoring. The study's findings underscore the necessity for the industry to collectively address passenger safety concerns. Future work will allow transport planners and regulatory bodies to utilize these findings to develop and enforce effective policies aimed at monitoring and improving the safety standards of e-hailing operators. Ultimately, by addressing passengers' priority concerns, both operators and regulatory bodies can collaborate to create a safer environment for everyone involved in e-hailing services.

Keywords: AHP, e-hailing, Safety, Sexual Harrasment, Transport Planners.

Introduction

Currently, there are 27 e-hailing providers in Malaysia, including Pink Rider, Maxim, Uber, Grab Taxi, and In Driver, according to the latest data from (APAD, 2023). The utilization of the

e-hailing system as an alternative transportation mode holds the potential to decrease the number of cars on the road. This is particularly significant when considering the environmental impact of cars on pollution, as the transportation sector is responsible for approximately 23% of global carbon dioxide emissions, primarily resulting from the combustion of fossil fuels (Nazri *et al.*, 2021). Despite the community's acceptance of this transportation method as a preferable option due to its progress, there are still concerns about its passengers' safety.

Passenger concerns about safety in the context of e-hailing services stem from the exposure to potential crimes that could jeopardize both passengers and drivers. Instances of criminal activities associated with e-hailing have raised questions about the genuine safety of this mode of transportation for both parties. One critical safety concern for passengers revolves around the protection of personal data, with the possibility of privacy violations if passenger information is shared without consent (Fam, 2022). Various incidents, including driver misconduct, cases of sexual harassment and assault, overcharging, and accidents, have been central to safety-related complaints. Female passengers face the unfortunate risk of experiencing sexual harassment and assault, highlighting prevalent issues affecting women. Additionally, the lack of proper vehicle inspection and maintenance can lead to car malfunctions, posing risks to passengers and other road users. It is essential to address these safety concerns to ensure the overall well-being of both e-hailing passengers and service providers.

The objectives of this study are multifaceted: firstly, to attain a comprehensive understanding of data privacy, driver's road manners, sexual harassment, safety tracking, and vehicle safety by referencing prior research; secondly, to identify the most concerning safety element for e-hailing passengers using the Analytical Hierarchy Process (AHP) method; and thirdly, to analyze and rank the safety concern elements and their alternatives. By focusing on these objectives, this study aims to contribute valuable insights into the safety concerns that passengers emphasize while utilizing e-hailing services. This understanding can be instrumental for regulatory bodies and planners in developing effective policies and regulations to monitor e-hailing operators. The utilization of the AHP technique in this study is noteworthy, as it represents a comprehensive approach with a significant impact on business success. Its application aims to enhance consumer decision-making and ensure the safety of passengers on the road, providing a valuable contribution to the overall improvement of e-hailing services.

Literature Review

Ehailing Services Safety Issues

E-hailing transcends its role as a mere transportation solution; it also contributes to job creation, facilitates seamless payments, and has a profound impact on both individual lives and economies. Malaysia took a pioneering step by legalizing e-hailing services, with companies such as Grabcar and Uber recognized as lawful public transportation services (Bernama, 2017). However, the safety incidents involving e-hailing drivers and passengers, especially those leading to fatalities or the loss of dignity, are of significant concern. One such alarming incident was a murder case involving a GrabCar driver in Kampung Shahbandar, Tuaran Sabah, where the victim's body was discovered near the shore (Aziz, 2019). Another incident involved an Uber driver who faced molestation by a male passenger (Amly, 2017). These cases underscore the gravity of safety concerns, impacting both passengers and drivers.

In this section, the exploration of the five elements pertaining to passenger safety when using e-hailing services is explained:

a) *Data Privacy:* E-hailing apps, while providing convenience for passengers, raise concerns regarding the security and privacy of personal data. Jing (2019) highlights that these apps capture and share riders' personal data, allowing drivers access to certain passenger details before pick-up, creating a potential risk of misuse. The close connection between threat perception and cybersecurity activity suggests that e-hailing services may face risks jeopardizing passengers' safety and security (Nik Mat *et al.*, 2021). The potential consequences of data breaches are exemplified by the 2016 Uber hack, which affected 57 million passengers, as reported by (Kamais, 2019).

b) *Driver's Road Manners:* Risky driving causes many road accidents, which injure and kill people, especially in low- and middle-income countries (Mohamed *et al.,* 2018, as cited in Timmermans, 2021). According to Jiang et al (2017), as referenced in Tan et al (2022), drivers with poor sleep quality or a history of exhaustion were more likely to drive while exhausted and more accepting of it. Thus, driving attitude is vital to passenger safety.

c) *Sexual Harassment:* Sexual harassment is sexually improper behavior that degrades, humiliates, or upsets the victim or creates an uncomfortable workplace (Curry & Rieser, 2018). Safety affects consumer trust in e-hailing services (Gefen *et al*., 2003). E-hailing driver authentication emphasizes the importance of platform safety and reliability for passengers. The Land Public Transport Agency (APAD) has increased background checks for e-hailing drivers to ensure user safety (Jais & Marzuki, 2020). To ensure drivers have no criminal records and a safe driving record, the Road Transport Department (JPJ) and police are conducting the checks (Ramanujam, 2017).

d) *Safety Tracking:* Transportation safety is monitored in real time by safety tracking devices. E-hailing services' estimated time of arrival (ETA) has enhanced passenger experience and travel. E-hailing platforms let drivers and riders know each other's locations and local traffic on a real-time basis Chi (2019), as referenced in (Farin *et al.*, 2017). Abdul Rahim *et al* (2023) suggested e-hailing services' panic buttons, but insufficient government safety rules have made protection a contentious subject.

e) *Vehicle Safety:* The type, model, and quality of vehicles, the actual moment-by-moment routes the car travels, the maximum gas mileage requirement, reporting requirements, the car's age limit of five years, and the surveillance and assessment standard are all standards to protect e-hailing passengers. E-hailing businesses realize they must maintain their fleet to keep drivers and passengers safe.

The analytical hierarchy process (AHP), analytical network process (ANP), data envelopment analysis (DEA), and fuzzy decision-making are MCDM methods. The AHP is a popular decision-making tool for complicated challenges with multiple criteria and subjective choice evaluation (Nejad *et al.,* 2021). Pairwise comparisons, alternative comparisons on several attributes, and attribute weights define the method Loken (2007), as quoted in (Mohammed & Daham, 2020). A decision-maker compares two items using a nine-point scale (Mohammed & Daham, 2020). AHP successfully combines qualitative and quantitative data (Nejad *et al.,* 2021). Considering quantitative and qualitative factors is the best option (De Marinis & Sali, 2020, as stated in Mohammed & Daham, 2020). AHP has the potential to be a good strategy for creating an evaluation tool for road safety concerns from the function derived (Salleh, 2023). Mittal & McClung (2016) Transportation selection findings show that due to port congestion and delays on the U.S. west coast ports and their effects on shippers' supply chains, shippers' priorities have altered and that cost and port characteristics are no longer their primary

determining factors. Kucuker & Giraldo (2022) find that the high risk of erosion was highly impacted by the land cover, where 59.46% of the region is bare ground, and that the places with the lowest risk of erosion were mostly those that had forest cover. In terms of soil erosion dangers, this analysis indicated priority regions.

Research Methodology

There are 4 phases involved, and Figure 1 illustrates the study flow. Phase 1 is knowledge acquisition, where AHP and related studies were explored and analyzed. Phase 2 comprises AHP modeling, questionnaire development, and a pilot test. Phase 3 is data collection. Web-based questionnaires were employed to target respondents aged between 20 and 30, with a sample size of 100 university students. There is a site supervisor who will brief the respondents on how to answer the pairwise questionnaire, and each of the five elements listed in Table 1 has been explained thoroughly. Respondents were given the pairwise comparison scale adapted from Saaty's nine-point scale. This scale, which ranges from 1 to 9, expresses importance on a linear scale from equal to highly important (E. Mastrocinque et al., 2020, as cited in Nejad et al., 2021).

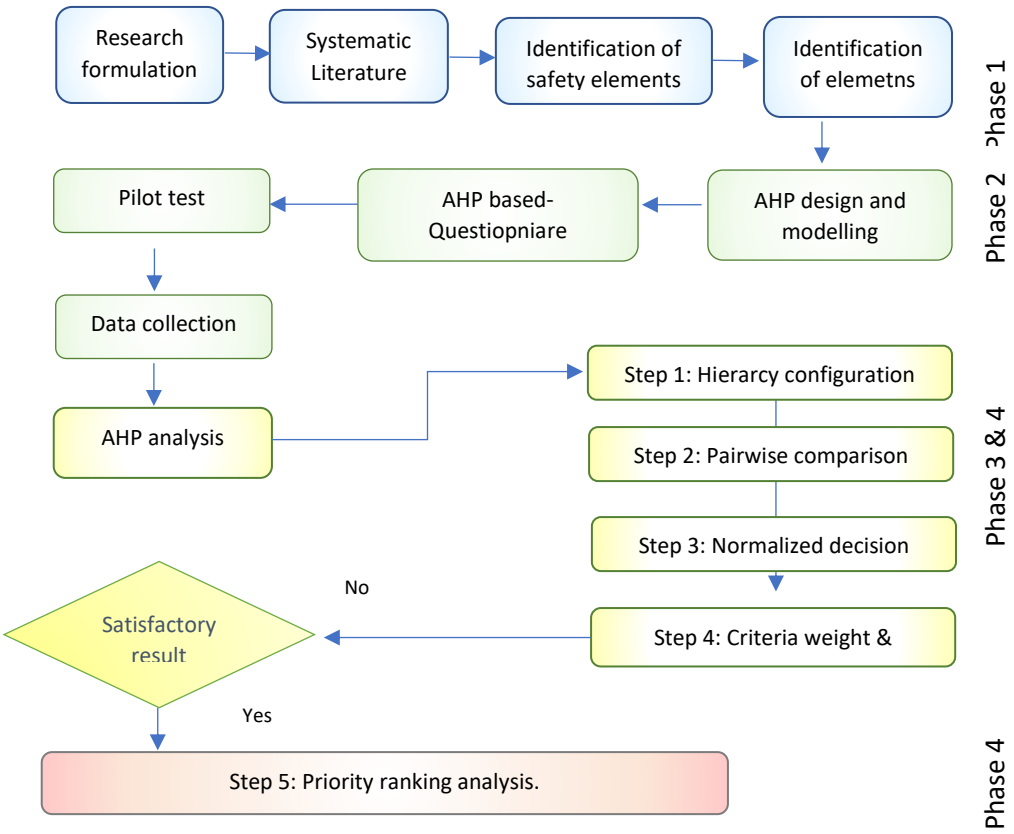

Figure 1. Study Flow

Table 1
The Description of element

No.	Criteria	Description
1	Data privacy	passenger's private information is disclosed without the owner's consent.
2	Driver's manner	Driver's attitudes toward traffic safety and their understanding of traffic laws.
3	Sexual harassment	Actions that violate the passengers' dignity.
4	Safety tracking	GPS monitoring is needed for ride tracking.
5	Vehicle Safety	Measures taken to prevent accidents in the event of a crash.

Phase 4 focuses on AHP development and analysis, which comprises the following steps. Step 1, evaluate criteria and sub-criteria were defined to select the elements that have influenced passengers' safety when they are on an e-hailing ride. It is included in the decision hierarchy. The hierarchy model of AHP is depicted in Figure 2. Step 2 involve of implementeation of pair-wise comparison using 5×5 matrix with a total of 17 pairwise comparisons, with 1 for the main criteria, 5 for the sub-criteria, and 11 for the alternatives. Table 2 shows the comparison matrix for the main criterion.

Table 2
Pairwise Comparison Matrix

Criteria	Data privacy	Driver's road manner	Sexual harassment	Safety tracking	Vehicle safety
Data privacy	1	2	1/2	5	9
Driver's manner	½	1	1	5	7
Sexual harassment	2	1	1	5	9
Safety tracking	1/5	1/5	1/5	1	3
Vehicle safety	1/9	1/7	1/9	1/3	1

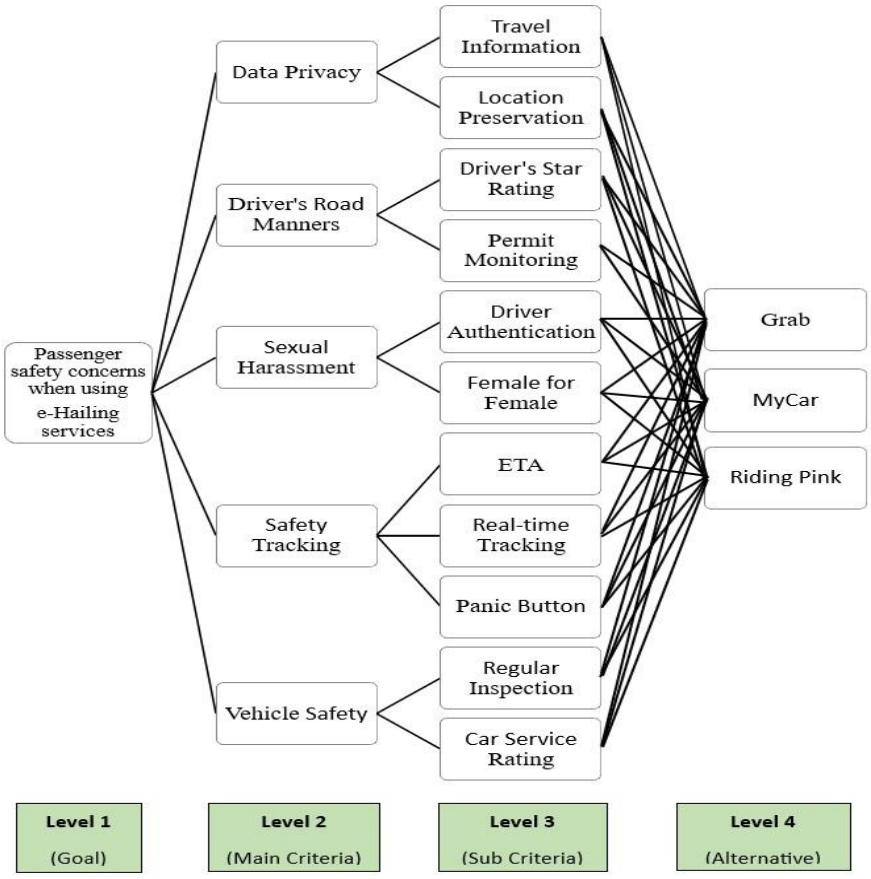

Figure 2. AHP decision hierarchy

Table 3
Normalized Comparison Matrix

Criteria	Data Privacy	Driver's Manner	Sexual Harassment	Safety Tracking	Vehicle Safety
Data Privacy	0.27	0.44	0.18	0.31	0.31
Driver's Manner	0.14	0.22	0.36	0.31	0.24
Sexual Harassment	0.55	0.22	0.36	0.31	0.31
Safety Tracking	0.05	0.04	0.07	0.06	0.10
Vehicle Safety	0.03	0.03	0.04	0.02	0.03

In Step 3, a normalized decision matrix has been established after the summation of each column of value from the pair-wise comparison matrix. Table 3 below shows the normalized comparison matrix. Next, in step 4, the criteria weight is calculated to obtain the average of every criterion shown in Table 4. The formula is criteria weight = row average in the normalized matrix.

Table 4
Criteria Weight

Criteria	Data Privacy	Driver's Manner	Sexual Harassment	Safety Tracking	Vehicle Safety	Criteria Weight
Data Privacy	0.27	0.44	0.18	0.31	0.31	0.30
Driver's Manner	0.14	0.22	0.36	0.31	0.24	0.25
Sexual Harassment	0.55	0.22	0.36	0.31	0.31	0.35
Safety Tracking	0.05	0.04	0.07	0.06	0.10	0.07
Vehicle Safety	0.03	0.03	0.04	0.02	0.03	0.03

Consequently, the consistency index (CI) calculated is 0.0482. Then, the consistency ratio (CR) is calculated by dividing the CI by the random index. This step is iterative to ensure it is consistent. The CR value obtained is 0.043, which is less than 0.10, and this means the weight is consistent; otherwise, re-evaluate the pairwise comparisons. The ranking calculation is done in step 5, where geometric means have been used to combine the comparison matrix. The consistency of the aggregated matrices has also been checked. The weight of alternatives is calculated using the following formula: Alternative weight = priority matrix X criteria weight. The largest number is chosen.

Analysis and Findings

This section will present results at level 3 of the AHP hierarchy, which covers the analysis of each sub-criteria, and at level 4, which presents the results. Figure 3 shows the Level 3 global ranking of sub-criteria. According to the analysis' findings, respondents ranked vehicle permit monitoring as the feature that was most important, while ETA ranked as the feature that was least important when it came to e-hailing safety concerns. Next following elaboration is based on Figure 4. Relating to the data privacy sub-criteria, which are location preservation and journey information, respondents ranked Grab as having the finest features, followed by Riding Pink and, finally, MyCar. This shows that respondent concerns about operators' ability to handle data, privacy, and safety are important. The element of a driver's manners comprises two sub-criteria, which are permit monitoring and the driver's star rating. The respondent concurred that e-hailing operators should ensure that all drivers are in possession of valid permits. Grab has the highest rank, then Riding Pink, and then MyCar, which demonstrates this. The driver's star rating follows the same pattern.

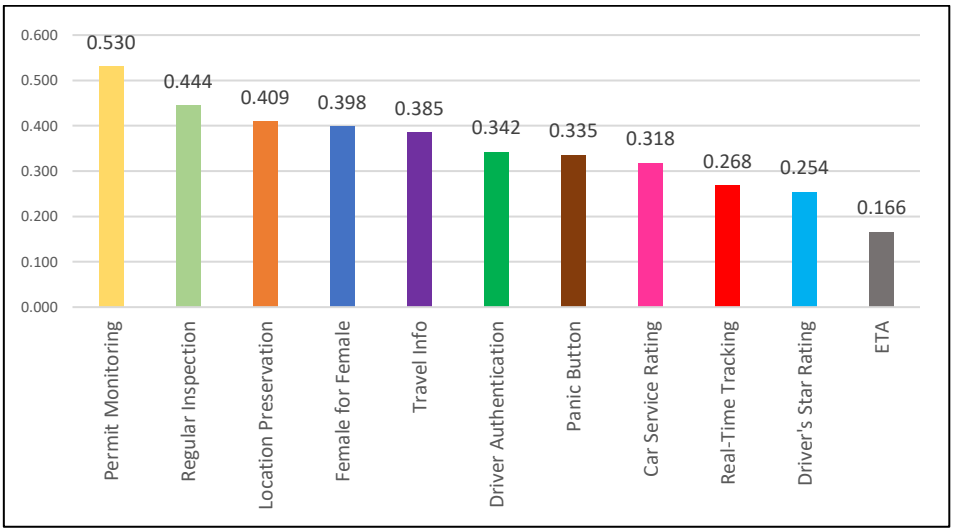

Figure 3. Weight comparison among each sub criteria

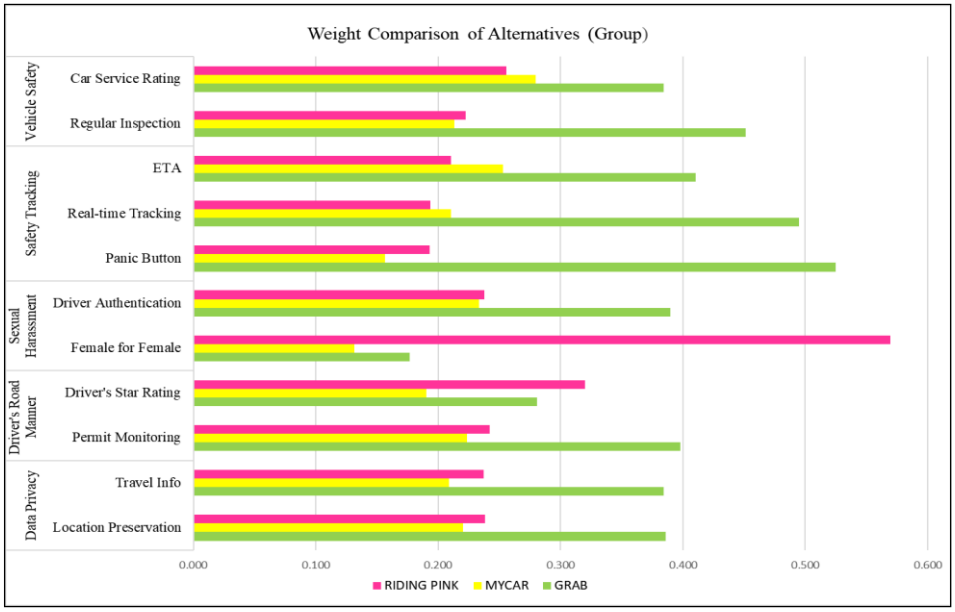

Figure 4. Weight Comparison of Safety Concern

The element of sexual harassment comprises two sub-criteria, which are a female-for-female feature and driver authentication. For this, Riding Pink was chosen for its female features. Grab is the most preferred choice among respondents for driver authentication, with just a slight difference between Riding Pink and MyCar. For the safety tracking element, Grab has all the features needed. For the panic button, Grab obtained the highest rank, followed by Riding Pink, and lastly, MyCar. The same goes for the real-time tracking feature, which has a similar pattern to ETA. Lastly, the element of vehicle safety covers two sub-criteria, which are regular inspections and car service ratings. Most of the respondents agreed and ranked that Grab emphasizes regular vehicle inspections. The final ranking shows that Grab is the most popular choice, with a weight of 2.110. Riding Pink, 1.559, and MyCar, 1.147, came after it. It obviously shows how Grab dominates e-hailing services for the safety features provided in the apps and services. This has been strengthened by the standard deviation for responses that chose and rank Grab that obtained value of 0.542. And the standard deviation for Riding Pink is 0.486, followed by the standard deviation for MyCar, with a value of 0.329.

It shows how respondents concerns about concerns such as personal data privacy, driver's manners, sexual harassment, safety tracking, and vehicle safety rank operators and services that fulfilled their expectations as high rank, and this explains why they chose Grab's.

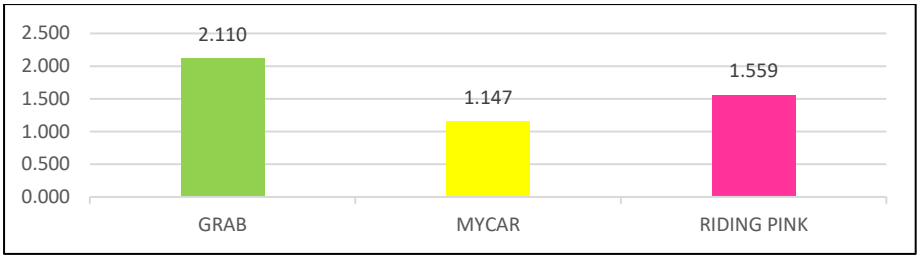

Figure 5. Final Ranking of Alternatives

Discussion

The first and most significant findings highlight sexual harassment as the foremost concern among e-hailing passengers, with the highest weight compared to other safety elements. This aligns with Agrawal *et al* (2020) findings, indicating that fear of sexual harassment discourages public transportation use, impacting both genders. Despite a gender imbalance in respondents, the study asserts that both men and women share significant concerns about sexual harassment.

Secondly, Riding Pink stands out as a preferable choice, particularly for its "female for female" sub-criteria, suggesting respondents believe it provides effective measures to counter sexual harassment. This resonates with Hassan *et al* (2020) statement on the global issue of harassment faced by women in public transportation. On the other hand, Grab is favored over Riding Pink and MyCar, consistent with its diverse safety features, including a panic button, real-time tracking, and routine inspection. The panic button, real-time tracking, and routine inspection are the features that passengers chose as being the most important because they ranked highest than the other features According to Duong (2022), Grab began as a ride-hailing service and has now grown into a variety of business sectors, positioning itself as an on-demand "*super app*" for these safety measures.The Minister of Tourism, Arts, and Culture's endorsement emphasizes Grab's commitment to passenger safety. This aligns with a statement by the Minister of Tourism, Arts, and Culture, Dato' Sri Nancy binti Shukri, who stated that passengers' safety will be improved since the button will be immediately linked to the Land Public Transport Commission ("*E-hailing Panic Button*", 2020).

Thirdly, real-time tracking emerges as a top concern, reflecting recommendations for passengers to use GPS for location tracking. However, the paragraph also underscores potential risks associated with gathering exact location data. It concludes with the importance of e-hailing companies maintaining strict maintenance practices to ensure vehicle reliability and provide a smooth and efficient service. Overall, the coherent narrative emphasizes the multi-faceted dimensions of safety concerns, addressing issues ranging from sexual harassment to technological considerations and maintenance practices. In addition, e-hailing companies seek to keep their cars in optimal condition by executing strict maintenance practices, reducing the chance of failures, and providing a smooth and efficient service for passengers.

Conclusion

This study highlighted the most important safety element that e-hailing This study investigates safety apprehensions among passengers by collecting and evaluating data using

the Analytic Hierarchy Process (AHP) methodology. This study also facilitated the identification of the e-hailing applications and features that passengers seek to ensure their safety during an e-hailing trip. The conclusion of this presentation is that sexual harassment is the predominant concern when utilizing e-hailing services, in comparison to other safety factors. According to the analysis, Riding Pink is the second most preferred option, following Grab. Ultimately, it is imperative for individuals to prioritize their own safety, particularly when utilizing e-hailing services. E-hailing companies should remain vigilant regarding parts and features that require enhancement in their applications to ensure the safety of passengers. In addition, e-hailing drivers should prioritize passenger safety by exercising caution while driving and exclusively use well-maintained vehicles. The study's results act as a vital signal to the industry, calling for a united endeavor to uphold passenger safety. Transport planners and regulatory agencies can utilize this knowledge to create and implement efficient strategies for monitoring and enhancing the safety regulations of e-hailing companies. In our subsequent projects, we will analyze the findings of this study, wherein we will develop and assess a simulation of e-hailing applications that address safety concerns.

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References

Abdul Rahim, M., Abu Bakar, N., Mat Nawi, N. M., Nik Hashim, N. A. A., & Wee, H. (2023). The Determinant Factors Of Tourists' Satisfaction With E-hailing Service. In *Journal of Positive School Psychology* (Vol. 2023, Issue 5). http://journalppw.com

Agrawal, A. W., Loukaitou-Sideris, A., Tortora, C., & Hu, Y. (2020). Crime and Harassment on Public Transportation: A Survey of SJSU Students Set in International Context. *Mineta Transportation Institute Publications*. https://doi.org/10.31979/mti.2020.1810.

Amly, W. S. (2017). Dakwa diraba penumpang, pengerusi persatuan e-hailing mahu sistem dipertingkat. *Astro Awani*. Retrieved January 7, 2023, from https://www.astroawani.com/berita-malaysia/dakwa-diraba-penumpang-pengerusi-persatuan-ehailing-mahu-sistem-dipertingkat-152157.

APAD. (2023) *Retrieved January 7, 2023, from https://www.apad.gov.my/*

Aziz, I. H. (2019). Tingkatkan keselamatan pemandu, pengguna e-hailing. *Berita Harian*. Retrieved January 7, 2023, from https://www.bharian.com.my/berita/nasional/2019/06/570412/tingkatkankeselamatan-pemandu-pengguna-e-hailing.

Bernama. (2017). Perkhidmatan e-hailing kini sah - nancy shukri. *Astro Awani*. Retrieved January 6, 2023, from https://www.astroawani.com/beritamalaysia/perkhidmatan-ehailing-kini-sah-nancy-shukri-150631

Chi, E. C. Y. (2019). Online Impressions On E-Hailing Services: A Study of Positive And Negative Sentiments On Grab Malaysia And Go-Jek Indonesia On Twitter Platform. *Faculty of Accountancy And Management Department of International Business*. http://eprints.utar.edu.my/id/eprint/5060

Curry, A. C., & Rieser, V. (2018). #Metoo alexa: How conversational systems respond to sexual harassment. In *Proceedings of the second acl workshop on ethics in natural language processing* (pp. 7-14). http://dx.doi.org/10.18653/v1/W18-0802

De Marinis, P., & Sali, G. (2020). Participatory analytic hierarchy process for resource allocation in agricultural development projects. *Evaluation and Program Planning*, *80*. https://doi.org/10.1016/j.evalprogplan.2020.101793

Duong, V. (2022). *Case Study: How Grab Becomes a Super App In Southeast Asia?* Savvycom Communication Intelligence. https://savvycomsoftware.com/case-study-grab/

E-hailing Panic Button a Must. (2017). *The Borneo Post*. https://www.theborneopost.com/2017/06/18/e-hailing-panic-button-a-must/

Fam, C. (2022). *Data breaches rising rapidly*. The Star. https://www.thestar.com.my/tech/tech-news/2022/08/29/data-breaches-risingrapidly

Farin, N. J., Rimon, M. N. A. A., Momen, S., Uddin, M. S., & Mansoor, N. (2017). A framework for dynamic vehicle pooling and ride-sharing system. *IWCI 2016 - 2016 International Workshop on Computational Intelligence*, 204–208. https://doi.org/10.1109/IWCI.2016.7860366

Hasan, Md. W., Chowdhury, A. H., Hasan, M. M., Datta, A. R., Mahbubur Rahman, A. K., & Amin, M. A. (2020). IOT-based smart application system to prevent sexual harassment in public transport. *Advances in Computer, Communication and Computational Sciences*, 341–351. https://doi.org/10.1007/978-981-154409-5_31

Jais, A. S., & Marzuki, A. (2020). E-Hailing Services in Malaysia: Current Practices and Future Outlook. In *Malaysia Journal of the Malaysia Institute of Planners* (Vol. 18). https://doi.org/10.21837/pm.v18i13.780

Jing, D. C. K. (2019). *Regulation Matters: A Comparison of Malaysian Indonesian's E-hailing Regulation Framework*. http://eprints.utar.edu.my/id/eprint/5048

Kamais, C. E. (2019). Emerging Security Risks of E-Hail Transport Services: Focus on Uber Taxi in Nairobi, Kenya. *International Journal of Security, Privacy and Trust Management*, *8*(3), 1–18. https://doi.org/10.5121/ijsptm.2019.8301

Kucuker, D. M., & Cedano Giraldo, D. (2022). Assessment of soil erosion risk using an integrated approach of GIS and Analytic Hierarchy Process (AHP) in Erzurum, Turkiye. *Ecological Informatics*, *71*. https://doi.org/10.1016/j.ecoinf.2022.101788

Mohammed, H. J., & Daham, H. A. (2020). Analytic hierarchy process for evaluating flipped classroom learning. *Computers, Materials and Continua*, *66*(3), 2229–2239. https://doi.org/10.32604/cmc.2021.014445

Mohamad, A. F. (2021). *Factors Influencing passenger Satisfaction Using E-Hailing Services In Melaka*. https://etd.uum.edu.my/id/eprint/10114

Nazri, M. A., Ambak, K., Ab Ghani, A. R. A., & Mat Yazid, M. R. (2021). User's Acceptance on e-Hailing System as Alternative Transportation by Using Modal Shift. *International Journal of Integrated Engineering*, *13*(3), 108–118. https://doi.org/10.30880/ijie.2021.13.03.013

Nejad, M. C., Mansour, S., & Karamipour, A. (2021). An AHP-based multi-criteria model for assessment of the social sustainability of technology management process: A case study in banking industry. *Technology in Society*, *65*. https://doi.org/10.1016/j.techsoc.2021.101602

Nik Mat, N. K., Sulaiman, Y., Perumal, S., & Ghazi, W. (2021). The Predictors of Cybersecurity Behavior in E-Hailing Services: The Mediating Role of Perceived Threat. *Malaysian Journal of Consumer And Family Economics*, *27*(S1), 147–161.

Ramanujam, M. K. October 24, 2017. *SPAD background checks on Uber and Grab drivers*. Paul Tan's Automotive News. https://paultan.org/2017/10/24/spadbackground-checks-on-uber-and-grab-drivers/

Salleh. S. S. (2023). Ranking Parents Concerns About Road Safety at School Using an Analytic Hierarchy Process*, Journal of Malaysian Planners*, Vol.21 Issue 4, Pp. 113 – 125. DOI: https://doi.org/10.21837/pm.v21i28.1320

Tan, C., Shi, Y., Bai, L., Tang, K., Suzuki, K., & Nakamura, H. (2022). Modeling effects of driver safety attitudes on traffic violations in China using the theory of planned behavior. *IATSS*

Timmermans, C., Shawky, M., Alhajyaseen, W., & Nakamura, H. (2022). Investigating the attitudes of Egyptian drivers toward traffic safety. *IATSS Research*, *46*(1), 73–81. https://doi.org/10.1016/j.iatssr.2021.11.007