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Predicting the Acceptance of an Advisory Intelligent Speed Assistance System: A Case of Nigerian Drivers

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Abstract: The use of advanced driver assistance systems (ADAS) to improve transport and road safety has been growing rapidly. For any significant reduction in crashes and fatalities, drivers must use these systems. Thus, the need to understand factors that will impact their adoption and acceptance. This study aims to test the efficacy of the Unified Theory of Acceptance and Use of Technology (UTAUT) model in the investigation of acceptance of an advisory Intelligent Speed Assistance (ISA) by Nigerian drivers. This involves the examining of factors which might influence acceptance of an Advisory ISA system among a group of commercial Nigerian drivers. A test survey involving 20 participants was carried out before and after the use of a smart phone advisory speed limit system. The results indicate that the predictive power of the model was only significant after participants had used the system (Time 2), explaining 36% of the variance in Intention to use, with the construct of Performance Expectancy serving as the strongest predictor of intention. Overall, the findings suggest high acceptance levels from the drivers, as participants demonstrated strong beliefs and positive Intention to Use the system. The findings also show that participants' acceptability levels reduced after using the ISA system. However, the results suggest that they could be other factors responsible for predicting intention to use the ISA system and thus should be further investigated. Based on these findings, the paper provides several implications for the implementation of ADAS and suggestions for future research.

Keywords: Intelligent Speed Assistance, Acceptance, UTAUT Model, Speeding

1. Introduction

The use of advanced driver assistance systems (ADAS) to improve transport and road safety has been growing rapidly. Some of these technologies have been used to warn and even confine speeding drivers or help drivers comply with posted speed limits. An example of such system is the Intelligent Speed Assistance (ISA). An ISA system functions by providing drivers with the current speed limit and speed limit changes. Some variants allow the driver to choose whether to adopt the speed restriction (voluntary) while others enforce the current speed limit (mandatory) [1].

Findings from past studies have shown the potential of ISA systems in the reduction of mean speeds, speed variability, and lowering of distances/times travelled above the speed limit [2-4]. Whilst most of this research have focused on the technological feasibilities of ISA and the intended impacts, not very much has been done to understand their acceptance and usage. According to Adell et al., the acceptance (the degree to which an individual intends to use a system and, when available, to incorporate the system in his/her driving) of advanced driver support systems is important for their usage [5]. Thus, investigating ISA acceptance and its determining factors is very important, because even though individuals or organisations, and institutions adopt these systems within their business, they cannot guarantee that these tools are maximising efficiency unless users are using them appropriately [6]. The current study assesses the predictive utility of the Unified Theory of Acceptance and Use of Technology (UTAUT) adapted for a smartphone speed limit advisory based on data collected from a group of Nigerian drivers.

1.1. Unified Theory of Acceptance and Use of Technology (UTAUT) Model

Several technology acceptance models have been used to give insights into the factors that influence users' decisions to use and adopt technological systems when presented with

them. The most used of these are the Technology Acceptance Model [7], and the Unified Theory of Acceptance and Use of Technology (UTAUT) [8]. TAM is based on Ajzen & Fishbein, Theory of Reasoned Action (TRA) which postulates that perceived usefulness and perceived ease of use are the main determinants of behavioural intention to use, which in turn influence actual system use [9].

Venkatesh et al., proposed the UTAUT model by incorporating eight of the most significant theories in user acceptance into a fused acceptance model [8]. According to the UTAUT model, Usage Behaviour is directly determined by Behavioural Intention and Facilitating Conditions (FC). Behavioural Intention (BI) is in turn influenced by Performance Expectancy (PE) ('*is the degree to which an individual believes that using the system will help him or her to attain gains in their job performance*'), Effort Expectancy (EE) ('*is the degree of ease associated with the use of the system'*) and Social Influence (SI) ('*is the degree to which an individual perceives that important other believe he or she should use the new system'*) [8]. Gender, age, experience, and voluntariness of use are posited by the model as key moderators of the impacts of the above-mentioned constructs.

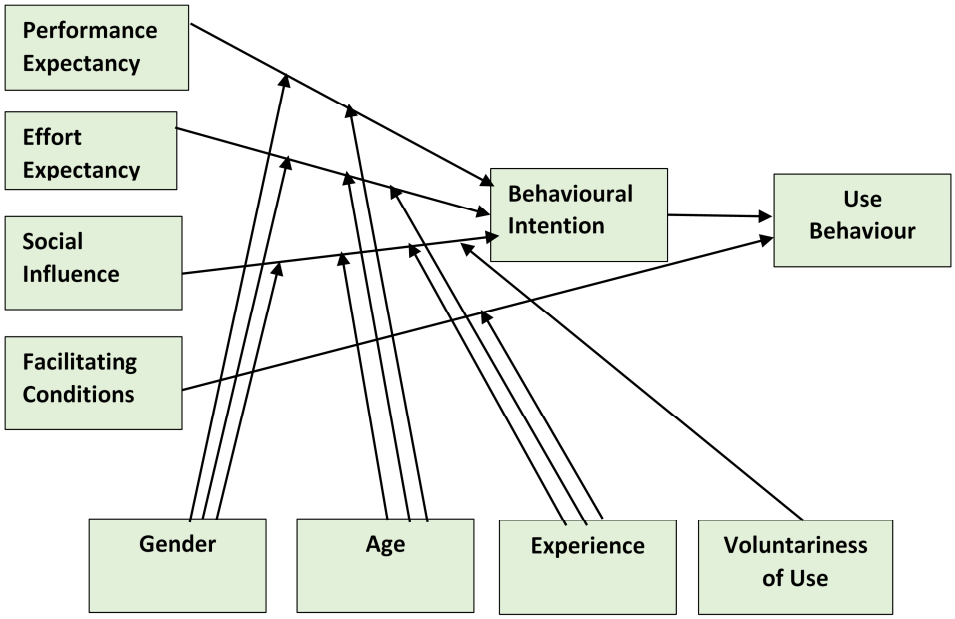

Figure 1. *The UTAUT Model (Source: [8], pg 447).*

The UTAUT model has gained a lot of traction among researchers and has been used in a wide variety of research domains such as information/communications, banking, education, and health (for review see [10, 11]). The appropriateness of the model has so far been supported by these studies and has helped in understanding what factors either enable or hinder technology acceptance and use. The UTAUT model has also been used to investigate whether the same factors apply in the domain of driver support systems. In a study by Adell., on the SASPENCE system (designed to help drivers keep a safe speed according to road conditions and traffic and a safe distance to vehicles ahead) prototypes in routes in Italy and Spain [12]. The UTAUT model was applied as far as possible in the prediction of acceptance of the system with results showing Performance Expectancy and Social Influence had a significant positive effect on Intention to use the system, with PE being the major predictor. However, Effort Expectancy showed no significant direct relation to the intention to use the system. The model showed a relatively low explanatory power for intention to use the system at 20% when the independent variables (PE, EE, and SI) were included [12].

Madigan et al., used an adapted UTAUT model to predict the usage of Automated Road Transport Systems. The model was able to explain 22% of the variance in Behavioural Intention, with all three constructs (PE, EE, and SI) being significant in the prediction and PE being the strongest predictor. They concluded that the current state of the Model is limited in the determination of factors that influence the intention to use driver assistance systems [13]. In a study by Lai et al., an extended UTAUT model was used as the framework for measuring the acceptability of ISA [14]. The study found numerous significant correlations between the UTAUT constructs indicating they may be measuring the same underlying acceptability. Results showed consistent and highly significant patterns over time. There was a significant decrease in Facilitating Conditions, Social Influence, Behavioural Intentions, and Anxiety, which according to the authors was due to initial preconceptions of using the ISA system being replaced by evidence-based opinions. They conclude that emotive factors rather than ease of use were the predictor of usage of the system [14]. In another study by Langer et al., the model was used to assess the acceptance of an Intention Detection system to assist drivers in lane changing. The model explained 46% of the variance in Intention. Social Influence was the only significant predictor of Intention against the researcher's expectations [15].

Although published studies adopting the UTAUT model in

the context of driver acceptance of ISA systems, and other driver support systems remain scarce, and particularly so in low-income nations, this does not undervalue the utility of the UTAUT model in the prediction of Intention to use the systems. According to Al-Qeisi, research is yet to establish if technology acceptance models developed in western nations are fully transferrable or applicable in other nations [16], therefore the need to continue the investigation on the effectiveness of the UTAUT model in a different socio-cultural context..

1.2. The Current Study

The current study seeks to apply the UTAUT model in the investigation of acceptance of an advisory ISA by Nigerian drivers, which serves the individual level adoption of the technology. The study also seeks to examine the changes in acceptability levels over time. Thus, the following research questions were outlined:

RQ1. What are the determinants of intention to use an advisory ISA system? In other words, how much impacts do PE, EE, and SI have on Behavioural Intention?

RQ2. Are there differences in drivers' acceptability of the ISA system after usage?

2. Methodology

2.1. Participants

The study sample consisted of 20 all-male (all efforts to recruit female participants were unsuccessful as females rarely drove for commercial purposes in Nigeria) participants recruited from an oil company in Port-Harcourt, Nigeria as part of the main study which involved investigations on the effectiveness of different speed limit compliance interventions among commercial drivers. Their age range was between 35-60 years and their average annual mileage of about 10,000 kilometres. The choice of commercial drivers is based on their over-representation in road traffic crashes in Nigeria representing 58.9% of crashes [17]. Ethical approval for this study was obtained before data collection from the Research Ethics Committee of the University of Leeds with Ethics reference: AREA 16-011 [18].

2.2. Procedure

Implementation of the ISA system and driver speeding behaviour monitoring was achieved using a GPS-based speed limit warning application downloaded on an iPhone 8 and a hand-held 1Hz GPS logger respectively. The system employed a visual display on the phone screen showing the prevailing speed limit, the speed of the vehicle, and a digital map. In this study, the threshold chosen was 1 km/h higher than the posted speed limits. The warning was a visual display of flashing red by the speed rondel accompanied by a continuous beeping alert or voice alert. This continues until the vehicle speed is reduced below the posted speed limit.

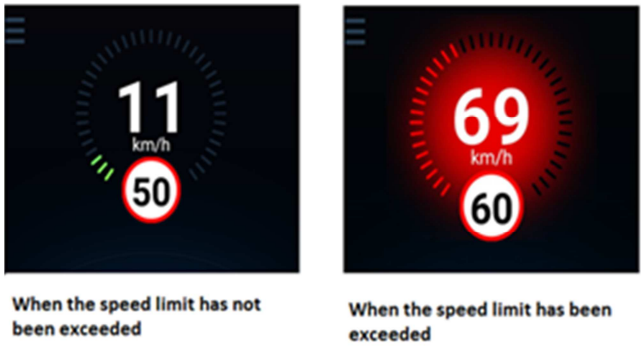

Figure 2. *The Advisory ISA system used in the study Source [2].*

Test drives were done along a 46 km route in Port-Harcourt, Nigeria. The survey was self-administered in paper form and completed prospectively at two-time intervals (between November 2016 and February 2017), with participants completing the survey before (Time 1), and after the use (Time 2) of the ISA application. The items used in the survey were adapted from the one used by Lai et al,,…[14] to investigate the acceptability of an advisory ISA by UK drivers. The driver ISA acceptance survey consisted of 10 items measuring the constructs of the UTAUT model (see Table 1). All items were measured using a 5-point Likert scale (scored 1-5 for low to high acceptability). Each construct of the model was measured to speed warning application and speeding. The questionnaires were completed anonymously before and after the ISA drive and took between 5 and 7 minutes to complete.

Table 1. *UTAUT Items Measured.*

S/N	Items
Performance Expectancy	
1	The speed warning application system will be effective in reducing my speed.
2	Will drive more safely with the speed warning application system.
3	Using the speed warning application system will improve my driving performance.
4	I will find the speed warning application system useful when I drive.
Effort Expectancy	
5	Learning to operate the speed warning application system will be easy for me.
6	I will find the speed warning application system easy to use.
Social Influence	
7	My employer will support my use of the speed warning application system.
8	People who are important to me will support that I should use a speed warning application system.
Behavioural Intention	
9	I intend to use the speed warning application system.
10	I plan to use the speed warning application system

3. Results

3.1. Measure of Validity

A factor analysis was conducted, using Principal Components Analysis (PCA), with Varimax rotation to investigate if the UTAUT constructs were distinct. Individual Kaiser-Meyer-Olkin (KMO) measures for all constructs were above 0.5 which according to Field [19] is an acceptable limit for sampling adequacy. Barlett's test of sphericity was statistically significant ($p<0.05$), indicating that the data is likely factorable. An examination of the Scree plot and [20] criterion of eigenvalues greater than 1 showed 3 clear factors emerging, explaining 67.6% of the total variance (i.e. 38.8%, 17.2%, and 11.6%). As seen in Table 2, only items under Performance Expectancy, Effort Expectancy, and Behavioural Intention had good discriminant validity, as they had obvious large loading in their corresponding components. The Social Influence factors were not consistent in their loading, which could have been because of the short scales (only 2 items), which according to Madigan et al.….[13] is common in the UTAUT literature. However, the contents of the items were considered valuable and hence were maintained in the analyses.

Table 2. *Component loadings for UTAUT items measured.*

Items	Component		
	1	2	3
Performance Expectancy			
1. The speed warning application system will be effective in reducing my speed.	.66	.21	-.08
2. Will drive more safely with the speed warning application system.	.70	.15	-.001
3. Using the speed warning application system will improve my driving performance.	.75	.27	-.001
4. I will find the speed warning application system useful when I drive.	.80	.30	-.04
Effort Expectancy			
1. Learning to operate the speed warning application system will be easy for me.	-.24	-.03	.78
2. I will find the speed warning application system easy to use.	.14	.10	.88
Social Influence			
1. My employer will support my use of the speed warning application system.	.48	-.01	.52
2. People who are important to me will support that I should use the speed warning application system.	.75	.020	.31
Behavioural Intention			
1. I intend to use the speed warning application system.	.24	.91	.03
2. I plan to use the speed warning application system.	.25	.90	.04

Note: Major loadings for each item are in bold.

3.2. Descriptive Statistics and Correlations in the UTAUT

From the analysis, results show mean scores ranging from 3.97 to 4.35 on a 5.0 scale. Table 3 shows that the mean scores of each UTAUT variable were above the midpoint indicating that overall, the participant's performance Expectancy, Effort Expectancy, Social Influence, and Behavioural intentions were more favourable toward acceptance of the ISA system. The results also show that the scores were slightly higher at Time 1 (before use of ISA) than in Time 2 (after use of ISA). There was a slight spread of the scores about the mean as can be seen from the standard deviations at both time points.

Spearman correlation analysis was used to test the relationships among the UTAUT constructs, at both Time 1 and 2, as can be seen in Table 3. They appear to be significant correlations between the constructs, indicating they may be measuring the same underlying acceptability [14]. The highest correlation was 0.6, which is moderately low to rule out multicollinearity.

Table 3. *Descriptive statistics and correlations between UTAUT constructs.*

Variable	Time 1					Time 2				
	Mean (SD)	PE	EE	SI	BI	Mean (SD)	PE	EE	SI	BI
Performance Expectancy (PE)	4.24 (0.51)	-	0.43	0.53*	0.55*	3.79 (0.76)	-	-0.11	0.38	0.64**
Effort Expectancy (EE)	3.97 (0.71)	0.43	-	0.23	0.24	3.95 (0.75)	-0.11	-	0.33	-0.05
Social Influence (SI)	4.35 (0.48)	0.53*	0.23	-	0.32	3.90 (0.62)	0.38	0.33	-	0.23
Behavioural Intention (BI)	4.00 (0.87)	0.55*	0.24	0.32	-	4.05 (1.05)	0.64**	-0.05	0.23	-

Note: A high mean value indicates PE, EE, SI, and intention in favour of the acceptability of ISA.
*= Correlation is significant at the 0.01 level (2-tailed) (P < .01)
**= Correlation is significant at the 0.05 level (2-tailed) (P < .05)

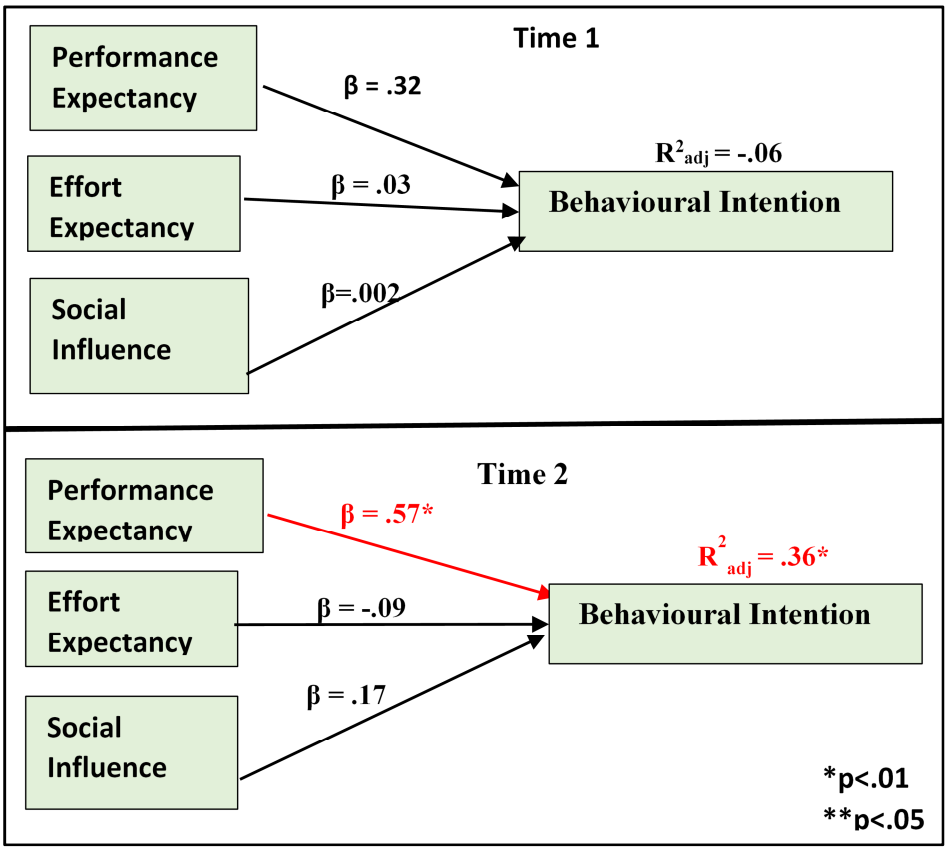

Figure 3. *Standard regression weights for PE, EE and SI explaining variance by the UTAUT model for Intention at Time 1 and Time 2.*

4. Discussions

4.1. Predicting Behavioural Intention

A multiple regression analysis was carried out for both Time 1 and 2 data, to examine the relationship between the independent constructs. There were constraints in item development arising from the fact that the Advisory ISA was temporarily used in the study (only during the test period). The UTAUT constructs of Use Behaviour and Facilitating Conditions (FC) could not be varied and therefore are not investigated. However, past studies show that FC does not explain any variance in the Intention to use [8]. Also, the UTAUT model has four moderators: gender, age, experience, and voluntariness. For this study, these were all excluded, due to experimental constraints (participants were all males, there was little spread of participants' age, participants had little or no prior experience with the system, and the behaviour under consideration is discretionary and voluntary).

The predictive power of the UTAUT model was only significant at Time 2, explaining 36% of the variance in Intention to Use [$F(3, 16) = 4.48$, $p<0.05$]. A possible explanation for the inability of the model to significantly predict Intention at Time 1, could have been because of some preconceptions held by participants [14] at this phase, as data in Time 1 was collected before the participants had experienced with the ISA system. Expectations regarding system acceptability by drivers are limited when made in advance as in this study [15], as there is no prior experience to compare with. The standardised beta coefficient revealed that the impact of Performance Expectancy appeared to be the only significant predictor of Intention [$\beta = .57$, $p<0.05$].

Data suggest that the more a participant believes that using the system will help them to attain gains in job performance, the more likely their Intention to Use the system. This result is consistent with past studies which in their proposition argue that Performance Expectancy is the strongest predictor of Intention to Use [8, 12, 13]. This finding suggests that the gains in terms of performance of the technology are the main component in the choice of accepting it or intending to use it.

This study did not find either Effort Expectancy (similar to Adell….[12]) or Social Influence to be significant predictors of Behavioural Intention in either period. Unlike Information technology (for example, computer program) for which the UTAUT model was developed, and which requires action by the user, the ISA system in this study required fewer inputs/effort by the driver. Further, the strong social dimension of driving compared with information technology was expected to have a significant influence on Intention to Use. But this was not the case with a possible reason being the short time drivers had to use the system.

Overall, the findings show that the basic UTAUT model was able to partially predict Behavioural Intention, with results relatively similar to past studies that found PE to be the strongest determinant of Intention [13, 12].

4.2. Comparing UTAUT Constructed over Time

To establish if participants' acceptance levels changed over time, a Wilcoxon signed-rank test was carried out on the data. Relative changes in scores at Time 1 and 2 suggest that to a certain level exposure to the ISA influenced acceptance levels. Results, as seen in Table 4, show that Performance Expectancy significantly decreased over time (meaning the degree to which they thought using the ISA system will improve their driving was reduced). This implies that after driving with the system, participants were not as impressed with the overall influence of the ISA on their speed choice, as they had initially thought, indicating less acceptability.

Acceptability scores relating to Social Influence also significantly decreased after an experience with the ISA system. After using the ISA system, participants felt their employers/family/friends would still recommend usage, but with probably less enthusiasm. This finding is similar to Lai et al….[14], which to the best of the candidate's knowledge is the only other study to have prospectively measured User Acceptance of ISA. Finally, results showed that Effort Expectancy and Behavioural Intention remained at the same level over time.

One possible explanation for this reduction in acceptability levels could be drawn from the fact that, before the participants had any experience with the ISA system (i.e. Time 1), they only had preconceptions (likely high expectations) about the ISA system, and after usage, this initial preconception would have been replaced by evidence-based views [14]. According to Oei & Polak the acceptance of ISA is remarkably higher before the test than during and after the test. [21]. Therefore, it makes sense to build the relationship between the acceptability construct of the model on Time 2 data only. At Time 2, participants had driven with the ISA system, had evaluated their performance with the system, thus, and was the best time to make any evidence-based decision to use or not use the system.

Table 4. *Results of statistical analysis of the UTAUT constructs, over time.*

Variables	Median		Paired Differences
	Time 1	Time 2	
Performance Expectancy	4.3	3.9	Z (19) = -2.243; p= 0.025**
Effort Expectancy	4.00	4.0	Z (19) = 0.027; NS
Social Influence	4.00	3.75	Z (19) = -2.553; p= 0.011**
Behavioural Intention	4.00	4.00	Z (19) = -.058; NS

*= significant at the 0.01 level (2-tailed) (P <.01)
**= significant at the 0.05 level (2-tailed) (P <.05)
NS = Not Significant

5. Conclusion

The findings from this study provide some support for the use of the UTAUT model as a framework for assessing the acceptability of the advisory ISA system, although not all cases of the original hypotheses were sustained. The UTAUT model suggests three influencing factors to explain Behavioural Intention. At Time 1, none of them were able to predict behavioural intention, this is not surprising, as only very few expectations regarding system acceptability can be made in advance when there is no prior experience to compare with (at baseline, drivers' were yet to use the ISA system). The predictive power of 35% of the model at Time 2 in this study, though slightly higher than past studies by Adell… [12] and Madigan et al…..[13] (20 and 22% respectively), is closer to the range in other past studies in the driver assistance context (46%) [15]. Also consistent with past studies, participants are driven to intend to use the ISA system mainly based on their Performance expectancy from using the system.

The findings suggest high acceptance levels from the drivers. Participants demonstrated strong beliefs and positive Intention to Use the system. However, significant differences in PE and SI over time might imply that after using the ISA system (after Time 1), participants though impressed with the system, had to replace their initial acceptance with real-life experience. The high acceptability of ISA is similar to Biding, T. et al…[22], who found that 50% of the drivers' who used a warning ISA are willing to pay to keep it.

The partial performance of the model in this study could be a result of the shortfall of the UTAUT model in taking into consideration all components which influences driver Intention to Use the ISA system, [13]. The UTAUT model was originally developed for use in information and communication technology and differs from the driving context in which it was used in this study. Driving requires more social interaction than using a computer, it also requires less input/effort into the system compared with using a computer [12], thus, might have resulted in the poor performance of the model by the EE and SI constructs of the model. Therefore, as suggested by Adell, E., Madigan, R., and Lai, F. et al. [12-14], drivers' intention to use the ISA system, might be hinged on emotive factors such as safety, enjoyment/comfort during use rather than its ease of use or what important others approved. Including these components in future studies is likely to increase the predictive power of the UTAUT model.

This study was conducted in Nigeria, which is a country with a fast-growing information and communication market. Usage of smartphones and the availability of mobile internet is still very much limited; therefore, the results from this study cannot be generalised to other countries with relatively

mature information and communication systems. A future study could examine how the results from this study could be compared with developed nations.

There was poor loading of items in the social influence construct thereby decreasing their reliability and validity, suggesting that they were probably measuring different topics. Future studies might require more understanding of the scales, for example, looking at affective components such as thrill, and comfort.

A further study could investigate behavioural adaptations by the drivers as possible reasons for the findings in this study. According to Saad, & Van., the acceptance of support systems by drivers is dependent on road situations and the driver population [23]. For example, drivers are prone to ignore the speed warnings by the ISA in areas where speed is a norm or in surrounding traffic or areas when they feel under pressure from other drivers. Also, the propensity to drive faster or slower than the surrounding traffic could play a role in the acceptance of the ISA system. Drivers in this study had short-time experiences with the ISA system, thus limiting the effects of any longer-term adaptation.

According to Etika et al., findings from a study with small sample sizes, lack of long-term interaction, and experience with the ISA system should be treated with caution, thus, limit the generalisability of the results [2]. Future studies may produce findings based on a larger sample size, better spread of age and gender, and over a longer time.

Nevertheless, to the best of the researcher's knowledge, this is the first study that seeks to gain an understanding of drivers' acceptance of ISA systems as a driver support system in Nigeria. With the obtained knowledge future systems can be further developed in a context-specific process.

Disclosure Statement

The author declares that there are no known conflicts of interests.

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References

[1] Driscoll, R., Page, Y., Lassarre, S., and Ehrlich, J (2007). LAVIA – An evaluation of the potential safety benefits of the French intelligent speed adaptation project. *51st annual proceedings association for the advancement of automotive medicine*, 51, 485-505.

[2] Etika, A., Merat, N., & Carsten, O. (2021). Evaluating the effectiveness of a smartphone speed limit advisory application: an on-road study in Port-Harcourt, Nigeria. IATSS research, 45 (2), 190-197.

[3] He, Y., Yan, X., Wu, C., Zhong, M., Chu, D., Huang, Z., & Wang, X. (2015). Evaluation of the effectiveness of auditory speeding warnings for commercial passenger vehicles–a field study in Wuhan, China. *IET Intelligent Transport Systems,* 9 (4), 467-476.

[4] Ghadiri, S. M. R., Prasetijo, J., Sadullah, A. F., Hoseinpour, M., & Sahranavard, S. (2013). Intelligent speed adaptation: Preliminary results of on-road study in Penang, Malaysia. IATSS research, 36 (2), 106-114.

[5] Adell, E., Varhelyi, A., & Nilsson, L. (2014). Modelling Acceptance of Driver Assistance Systems: Application of the Unified Theory of Acceptance and Use of Technology. In T. Horberry, A. Stevens, and M. A. Regan (Eds.), Driver Acceptance of new technology: Theory, Measurement and optimisation (pp. 23-35). Farnham: Ashgate Publishing, Ltd.

[6] Zakour, A. B. (2004). Cultural differences and information technology acceptance. In Proceedings of the 7th annual conference of the Southern association for information systems (pp. 156-161).

[7] Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology. MIS Quarterly, 13, 319–340.

[8] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance ofInformation Technology: Toward a Unified View. Management Information System Quarterly, 27 (3), 425-478.

[9] Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour. Englewood Cliffs, NJ: Prentice-Hall.

[10] Taiwo, A. A., & Downe, A. G. (2013). The theory of user acceptance and use of technology (UTAUT): A meta-analytic review of empirical findings. *Journal of theoretical and Applied Information Technology*, 49 (1), 48-58.

[11] Attuquayefio, S. & Addo, H. (2014). Review of studies with UTAUT as conceptual framework. *European Scientific Journal,* 10 (8), 249-258.

[12] Adell, E. (2009). Driver experience and acceptance of driver support systems– a case of speed adaptation. Doctoral Thesis. Lund University, Sweden.

[13] Madigan, R., Louw, T., Dziennus, M., Graindorge, T., Ortega, E., Graindorge, M., & Merat, N. (2016). Acceptance of automated road transport systems (ARTS): an adaptation of the UTAUT model. Transportation Research Procedia, 14, 2217-2226.

[14] Lai, F., Carsten, O., & Tate, F. (2012). How much benefit does Intelligent Speed Adaptation deliver: An analysis of its potential contribution to safety and environment. *Accident Analysis & Prevention*, *48*, 63-72.

[15] Langer, D., Dettmann, A., Leonhardt, V., Pech, T., Bullinger, A. C., & Wanielik, G. (2017). Predicting driver intentions: A study on users' intention to use. Proceedings of the Human Factors and Ergonomics Society Europe Chapter 2016 Annual Conference Prague, Czech Republic. (pp. 123-133). Retrieved from: http://www.hfeseurope.org/largefiles/proceedingshfeseurope2016.pdf.

[16] Al-Qeisi, K. I. (2009). Analyzing the use of UTAUT model in explaining an online behaviour: Internet banking adoption (Doctoral dissertation, Brunel University Brunel Business School Ph.D Theses).

[17] Federal Road Safety Corps. (2017). Annual report. Federal road safety commission, Abuja, Nigeria.

[18] Etika, A. A. (2018). Developing an Effective Speed Limit Compliance Intervention for Nigerian Drivers: A Study of Drivers Who Work in a Fleet Company with Strong Safety Culture PhD Thesis Institute for Transport Studies, University of Leeds.

[19] Field, Andy (2013). Discovering statistics using IBM SPSS statistics. 4th Edition. Sage Publication. London.

[20] Kaiser, H. F. (1974). An index of factorial simplicity. Psychometrika, 39, 32-33.

[21] Oei, H. L., & Polak, P. H. (2002). Intelligent speed adaptation (ISA) and road safety. *IATSS research*, *26* (2), 45-51.

[22] Biding, T., & Lind, G. (2002). Intelligent speed adaptation (ISA). Results of large-scale trials in Borlaenge, Linkoeping, Lund and Umea during the period 1999-2002. Vaegverket Publikation..

[23] Saad, F., & Van Elslande, P. (2012). Drivers' safety needs, behavioural adaptations and acceptance of new driving support systems. *Work*, *41* (Supplement 1), 5282-5287.