# Analysing the Elements that Affect People's Behavioural Intention to Adopt Autonomous Vehicles

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**Abstract**: In order to get fresh insights into how behaviour is accepted at the individual and organisational levels, psychologists and sociologists have been studying the user acceptability of information technology for decades. Several techniques are used in the research's pragmatic approach, which is carried out in the phases that follow. In phase I, a preliminary survey with 408 individuals was used to identify the important variables impacting behavioural intention to use an autonomous vehicle (AV). Experts in the fields of psychology, sociology, and computer science were questioned. Finally, the hypothesis was defined after the model had been built. In phase II, a survey research methodology was used with an additional 482 individuals to empirically validate and improve the conceptual model. A tool for information visualisation was created in phase III to fill the gap between theoretical ideas and real-world business needs. According to the results, every construct in the conceptual model has a significant impact on consumers' behavioural intentions (BI) to embrace AVs. Based on our assessment, the researcher proposes a theoretical AV technology acceptance model (AVTAM) by incorporating these determinants into the Unified Theory of Acceptance and Use of Technology (UTAUT2) model. This model takes into account self-efficacy, perceived safety, trust, anxiety, and legal regulations. The conclusion shows that the adoption of AV technology will be influenced by a number of factors, including the price of the equipment and the legal implications.

**Keywords:** Autonomous Vehicle (AV), UTAUT, UTAUT2, AVTAM, Safety, Trust.

## 1. INTRODUCTION

Since Karl Benz's three-wheeled Motor Car was granted a patent in 1886, the invention of the automobile has influenced our contemporary culture. There are approximately 900 million passenger vehicles on the road at this time in the world, making it the principal form of transportation for many of us today [1]. Road accidents cause up to 50 million injuries and more than 1.2 million fatalities annually [2]. The DARPA Grand Challenge and Urban Challenge in 2004, 2005, and 2007 gave researchers a real-world setting in which to test the most recent sensor, computing, and artificial intelligence technologies [3]. These developments in technology are establishing a transitional phase between traditional, completely human-driven cars and autonomous vehicles (AVs), sometimes known as driverless cars, which may eventually not even need a driver. Technologies that allow a vehicle to help and make decisions for a human driver are included in this continuum. With GPS sensing expertise, such technologies can be created to aid in navigating. They might employ sensors and other equipment, such as lane-keeping systems, adaptive cruise control (ACC), self-parking technologies, and crash warning systems, to prevent collisions. They might also make advantage of a class of technology known as augmented reality, in which a car shows drivers information in fresh and creative ways. Artificial intelligence (AI) is used by AVs to evaluate sensor data, make judgments about how to operate the vehicle, and adapt to changing environmental conditions. The benefit of AVs arises from their capacity for quick information processing, considerably quicker environment adaptation than a human, and information interchange via vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication technologies [4].

Since the 1970s, autonomous vehicles have been prototypes and demonstrative vehicles. Since their 2010 debut, their growth and appeal have dramatically expanded. The problems with modern transportation may be solved by AVs. By consuming less energy and emitting fewer pollutants, widespread AV adoption can enhance efficiency, traffic flow, road safety, accessibility to transportation, among other things, while also having a positive economic and social impact. In order to optimise traffic and maximise all associated benefits for sustainable smart cities, AVs' linked nature allows them to communicate with other cars and crucial infrastructure.

Globally, the transportation sector is worth $4 trillion [5]. The UK automobile industry contributes significantly to the country's economy, generating more than £55 billion in annual revenue and over £12 billion in net value [6]. Energy and this industry go hand in hand. In fact, the internal combustion engine automobile is about to undergo a disruption that will have a negative impact on the oil sector as a whole.

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With the introduction of electric vehicles, the century-old automobile industry is already experiencing its first wave of change. Before the first wave has finished crashing, the self-driving automobile (AV), the second disruptive wave, will arrive. The transportation industry will never be the same. The advent of autonomous vehicles (AVs) will occur much sooner than most people anticipate, and it will have a significant impact on society, urban planning, and transportation. The majority of automakers and certain tech firms are actively creating and testing AVs. In several regions of the UK, AVs in their early stages are already for sale. This brand-new car technology will create enormous opportunity and upheaval. In fact, over the next two decades, driverless cars—also known as smart cars-will transform our daily commute to work and much more. Electric and hybrid cars are also expected to make up a sizable portion of our fleet, changing the demand for transportation and upending our pay-as-you-go revenue model.

The majority of these cars will run on electricity. In addition, we can anticipate a commute that is significantly safer and simpler with fewer fatalities, dramatically fewer accidents, and less traffic. However, car-based technology have the potential to save lives, improve how we utilise the roads, and ultimately lower the billions of dollars that we spend on them. The affordability, safety, and ease of travel by automobile without producing any emissions will put pressure on public transportation. Others will completely vanish, while certain industries will need to reinvent themselves. The inclination is to think of the future as just a continuation of the past when formulating infrastructure plans. Because AVs are such a revolutionary technology, it is impossible to predict the future by only extrapolating from the past. Forecasts for both conventional infrastructure and big infrastructure projects will be affected by the aforementioned problems.

A significant area of concern for research and practise has been the adoption and application of advancements in information systems (IS) and information technology (IT). Numerous theoretical models have been put forth and utilised to investigate IS/IT adoption and usage over the course of the previous few decades.

Figure **1** illustrates the historical timeline. These acceptance models have been developed and evolved through rigorous validations and extensions over the years.

The main objectives of this study are to develop a conceptual model of the determinants of autonomous vehicles acceptance based on the unified theory of acceptance and use of technology as a foundation, to test the empirical validity of the proposed research model in a developed economy context *i.e.*, United Kingdom, and finally to develop a tool to visualise the importance of numerous factors influencing the

| | |
|---|---|
| IDT | Innovations Diffusion Theory |
| TRA | Theory of Reasoned Action |
| SCT | Social Cognitive Theory |
| TPB | Theory of Planned Behaviour |
| MPCU | Model of PC Utilization |
| MM | Motivation Model |
| TAM | Technology Acceptance Model |
| UTAUT | Unified Theory of Acceptance and Use of Technology |

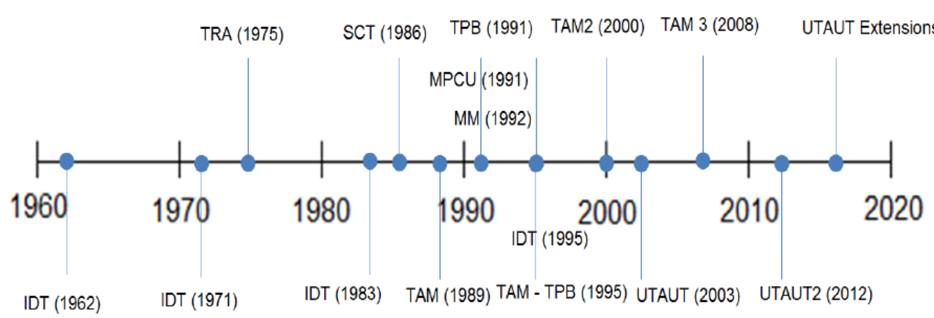


**Figure 1:** Acceptance Models historical timeline.

behaviour of potential consumers towards autonomous vehicles.

The paper will be structured as follows: In section 2, the methods adopted will be discussed, in section 3, the results will be presented. Section 4 will be the discussion and section 5 would be the conclusion and recommendations.

## 2. MATERIALS AND METHODS

Three phases made up the current investigation. Phase I's goal was to use an inductive methodology to uncover previously unrecognised potential components and moderating factors impacting behavioural intention to embrace autonomous vehicles. The UTAUT2 [7] and the automotive technology acceptance research model [8] were combined in this step to help the researcher determine the constructs for the proposed model. The study used an explanatory sequential mixed method design to accomplish this goal. Indeed, in order to find additional potential components or indicators that might affect the behavioural intention of accepting technology but were absent from the prior models, quantitative data was first gathered through a questionnaire. The purpose of the first stage of this study is to provide a thorough analytical framework in which to assess how concerned the general public is with issues of safety, trust, security, and privacy related to autonomous vehicles. Additionally, it aims to investigate the role of human and non-human agents involved in this assemblage with regard to public acceptance of autonomous vehicles. Additionally, it investigates how the user's gender and age affect their ability to embrace or reject technology. Anyone who uses a car—without necessarily being able to drive one-and who is currently residing in the UK and is able to respond to complex questions without parental or guardian approval was included in the sample frame for the study. An easy-to-use sampling technique was used in the study. A questionnaire is distributed to 408 participants, representing diverse industries, age groups, and genders, in order to obtain numerical data from them. This study aims to advance and widen our understanding of how the general public responds to disruptive technologies like driverless automobiles. In SPSS, the data were examined using descriptive statistical methods. The researcher purposefully selected a total of 15 participants (psychologists, sociologists, and computer scientists) from various universities and higher education providers in the UK, including London South Bank University, King's College London, GSM London, and the University of Hertfordshire. Based on the data gathered from the survey, the results led us to the qualitative part of our investigation. These were experts in their fields who could respond to the research inquiries. All participants were interviewed in-person or through Skype at their places of employment. Based on input from these professionals, the model was created, validated, and progressively enhanced. At this point, the hypotheses were also formed.

Phase II of this study's goal was to put the suggested model to the test and validate it. Using Structure Equation Modelling (SEM), the study estimated the direct or indirect effects of the parameters indicated in phase I on the behaviour intention to utilise autonomous vehicles. Deductive reasoning was used during this stage to test the developed hypotheses. A convenience sampling strategy is employed in the investigation. In survey 2, 482 people (the same number as in survey 1) participated. The data were analysed using SPSS and R programming. Factor analysis was utilised to assess the questionnaire's validity, and Cronbach's Alpha was employed to assess its reliability. In order to validate the suggested model, additional regression studies for hypothesis testing quantify the significance of each proposed construct or determinant.

Phase III's main goal was to fully utilise the extended unified theory of technology acceptance and use, turning its potential into a workable business solution that could be used to address real-world issues and help technology companies or marketing agencies predict the easy adoption of their products by potential customers.

## 3. RESULTS

The quantitative data gleaned from the survey questionnaire will be analysed using the Statistical Package for Social Sciences (SPSS), version 21, and R Programming, version 3.5.2. Researchers from a variety of fields, including as the social sciences, business studies, and information systems research, accept and utilise this software package widely [9]. As a result, this tool has been utilised to examine the research study's data in terms of data coding, missing data treatment (using ANOVA), outlier detection (using the Mahalanobis Distance (D2) test), and data normality determination (*i.e.* using kurtosis and skewness statistics). Additionally, descriptive statistics including frequencies, percentages, mean values, and standard deviations will be carried out using SPSS. To summarise the respondents' demographic profile and to acquire a sense of the data in general, these analyses will be carried out for each variable independently [10]. Additionally, SPSS was used to perform Exploratory Factor Analysis (EFA) for the first stage of data analysis before applying SEM. This procedure is known as factor / dimension reduction and it involves condensing data from numerous variables in the proposed research model into a smaller number of factors [11]. In this quantitative study, nominal and ordinal scales were mostly employed to collect data since they would produce results that were suitable for this technique [12].

### 3.1. Sample (socio-demographics) Characteristics

Sample characteristics were analysed using frequency distributions. Analysis shows gender groups are evenly represented, with 56.6% males and 43.4% females. The most represented age groups are 45 – 54 years (22%), and 35 – 44 years (21.6%) see Figure **2**. Concerning levels of education, 78.8% of respondents had achieved a higher educational degree, with 13.7% being PhD holders.

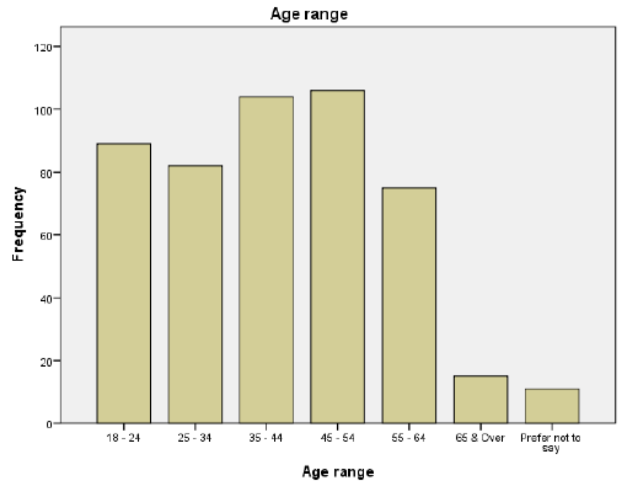


**Figure 2:** Age Range for Participants.

**Table 1: Demographic Breakdown for the Final 482 Respondents**

| Demographic aspect | | U.K. (N=482) | Percentage (%) |
|---|---|---|---|
| **Age group** | 18 - 24 | 89 | 18.5% |
| | 25 - 34 | 82 | 17% |
| | 35 - 44 | 104 | 21.6% |
| | 45 - 54 | 106 | 22% |
| | 55 - 64 | 75 | 15.6% |
| | 65 & Over | 15 | 3.11% |
| | Prefer not to say | 11 | 2.3% |
| **Gender** | Male | 272 | 56.4% |
| | Female | 210 | 43.6% |
| **Level of driving Experience** | No driving experience | 51 | 10.6% |
| | Novice | 42 | 8.7% |
| | Intermediate | 80 | 16.6% |
| | Experienced | 296 | 61.4% |
| | Expert | 13 | 3.7% |
| **Level of Autonomy** | Level 0 | 38 | 7.9% |
| | Level 1 | 52 | 10.8% |
| | Level 2 | 173 | 35.9% |
| | Level 3 | 109 | 22.6% |
| | Level 4 | 110 | 22.8% |
| **Education** | No formal qualifications | 1 | 0.2% |
| | GCSE or equivalent | 10 | 2.1% |
| | A level or equivalent | 91 | 18.9% |
| | Bachelor degree | 148 | 30.7% |
| | Master degree | 151 | 31.3% |
| | PhD | 66 | 13.7% |
| | Other | 15 | 3.1% |

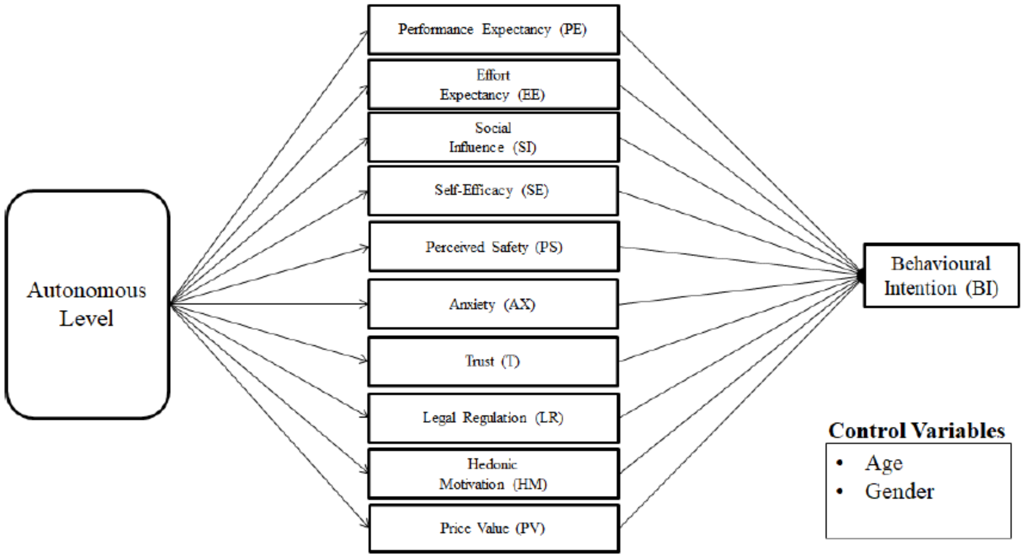


**Figure 3:** Research model for measuring consumers' behavioural intention to adopt Autonomous Vehicles: Autonomous Vehicle Technology Acceptance Model (AVTAM).

### 3.2. Data Analysis

In this section, we use Cronbach Alpha to measure the internal consistency, that is, how closely related a set of items is as a group. All the values are greater than 0.7, which clearly shows the reliability of the scale/research instrument. Dillon-Goldstein rho should be higher than 0.8, as the minimum is 0.91; this is satisfactory.

Figure **3** above illustrate the AVTAM model that has 10 constructs, all influencing behavioural intention to adopt autonomous vehicles. These constructs or determinants are moderated by Age and gender. Table **2** below shows the Cronbach's alpha values used for the reliability of the research instrument.

$$\textbf{Cronbach's Alpha}\ \alpha = \frac{N.\bar{C}}{\bar{V} + (N-1).\bar{C}}$$

N = the number of measurements for one variable

$\bar{C}$ = inter-item covariance among measurements

$\bar{V}$ = the average variance

**Equation 1: Formula for Cronbach's alpha**

**Table 2: Cronbach's Alpha**

| # | Measure | Cronbach's Alpha |
|---|---|---|
| 1 | Performance Expectancy | 0.91 |
| 2 | Effort Expectancy | 0.93 |
| 3 | Social Influence | 0.82 |
| 4 | Self-Efficacy | 0.86 |
| 5 | Perceived Safety | 0.80 |
| 6 | Anxiety | 0.88 |
| 7 | Trust | 0.85 |
| 8 | Legal Regulation | 0.90 |
| 9 | Hedonic Motivation | 0.96 |
| 10 | Price Value | 0.87 |
| 11 | Behavioral Intention | 0.92 |

Table **3**. below presents the correlation matrix showing the correlation coefficients between different constructs part of the proposed model. The most correlated variables are PE & BI (0.81), so with the higher performance expectancy, there are higher behavioural intentions, and PE & PS (0.73), and the least correlated variable is Age. The anxiety is negatively correlated, which is good; the maximum is for Perceived safety (-0.74), which corresponds to what could be expected, as higher Perceived Safety implies less Anxiety.

$$\textbf{Confirmatory Factor Analysis}\ \tilde{\Sigma} = \Lambda\ \Phi\ \Lambda^{T} + \Psi$$

$\tilde{\Sigma}$ = covariance matrix

$\Lambda$ = factor loading matrix

Cov (F) = $\Phi$

Cov ($\varepsilon$) = $\Psi$

Cov (X) = $\Sigma$

X = centred observed variables

$\varepsilon$ = specific factors

F= common factors

**Equation 2: Confirmatory factor Analysis formula**.

**Table 3: Correlations Matrix**

| Measure | PE | EE | SI | SE | PS | AX | T | LR | HM | PV | BI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PE | 1 | | | | | | | | | | |
| EE | 0.66 | 1 | | | | | | | | | |
| SI | 0.73 | 0.62 | 1 | | | | | | | | |
| SE | 0.55 | 0.62 | 0.6 | 1 | | | | | | | |
| PS | 0.68 | 0.6 | 0.48 | 0.42 | 1 | | | | | | |
| AX | 0.51 | -0.5 | 0.38 | 0.33 | 0.74 | 1 | | | | | |
| T | 0.64 | 0.57 | 0.55 | 0.53 | 0.6 | 0.45 | 1 | | | | |
| LR | 0.55 | 0.48 | 0.54 | 0.46 | 0.43 | -0.3 | 0.72 | 1 | | | |
| HM | 0.58 | 0.45 | 0.53 | 0.42 | 0.36 | -0.3 | 0.5 | 0.45 | 1 | | |
| PV | 0.56 | 0.49 | 0.5 | 0.4 | 0.51 | 0.43 | 0.54 | 0.5 | 0.42 | 1 | |
| BI | 0.81 | 0.63 | 0.72 | 0.55 | 0.7 | 0.57 | 0.66 | 0.55 | 0.64 | 0.66 | 1 |

**Table 4: Results of the Original Structural Model**

| Construct | Code Name | Hypotheses | Relationship (Positive) | Standardized regression weights (β) | Supported |
|---|---|---|---|---|---|
| Performance Expectancy | PE | H1 | PE → BI | 0.256 | YES*** |
| Effort Expectancy | EE | H2 | EE → BI | 0.038 | YES |
| Social Influence | SI | H3 | SI → BI | 0.199 | YES*** |
| Self-Efficacy | SE | H4 | SE → BI | 0.020 | YES |
| Perceived Safety | PS | H5 | PS → BI | 0.176 | YES*** |
| Anxiety | AX | H6 | AX → BI | -0.077 | YES** |
| Trust | T | H7 | T → BI | 0.084 | YES |
| Legal Regulation | LR | H8 | LR → BI | 0.043 | YES** |
| Hedonic Motivation | HM | H9 | HM → BI | 0.184 | YES*** |
| Price Value | PV | H10 | PV → BI | 0.193 | YES*** |

*** Significant at 0.001 level (two tailed), **Significant at 0.01 level (two tailed).

To see if the proposed structural model matched the data and test the hypotheses, both goodness of fit indices and parameter estimates coefficients were analysed. The fit indices showed that the structural model that was hypothesised to match the data well. All theories were confirmed.

The findings of this research project are presented in this section. The data was screened using a number of statistical techniques to address concerns with missing values, outliers, and normalcy. Before undertaking structural equation modelling (SEM), this screening was crucial since SEM is extremely sensitive to these problems. To find outliers, the Mahalanobis distance (D2) was calculated using R Programming version 3.5.2. The findings showed that there were hardly any outliers. However, it was determined to eliminate each and every instance. The data's normality was investigated using skewness and kurtosis. Data appeared to be regularly distributed, according to the results.

The measurement and structural model in this work were put to the test using structural equation modelling (SEM), which was carried out using R Programming version 3.5.2. There were two models examined. Two steps of the SEM study were completed. Confirmatory Factor Analysis (CFA) was used in the initial stage to evaluate the measurement model's fit. Analysis of the findings revealed that the measurement model needed to be corrected. All measuring items had standardised regression weights that were higher than the advised level (> 0.7). We dropped only a few observable variables. The measurement model underwent another CFA after the problematic components were removed. The new model demonstrated a better fit to the data, as seen by the model's results, which showed increased goodness of fit indices. The validity and reliability of each latent construct were then evaluated. All of these constructions were found to be reliable based on the assessment. Additionally, each construct's convergent, discriminant, and nomological validity were also established.

The links between the latent constructs were then tested using the structural model. To examine the links between these latent components, ten hypotheses (*i.e.*, H1, H2, H3, H4, H5, H6, H7, H8, H9, and H10) that are expressed as causal routes were utilised. To see if the proposed structural model matched the data and test the hypotheses, both the goodness of the fit indices and parameter estimations coefficients were analysed. The fit indices showed that the structural model that was hypothesised fit the data well.

### 3.3. Visualisation and Interpretation

The tool developed for visualisation (Phase III) is very interactive and can generate 31 charts. The researcher is using a radar chart for the representation of the factors influencing different groups of future users. These categories are organised based on the moderating factors (age, gender, level of education and level of autonomy selected or level of previous driving experience). The arms of the charts are split into 7 equal intervals representing a 7-point Likert scale (1 = Strongly disagree, 2 = slightly disagree, 3 = disagree, 4 = neutral, 5 = slightly agree, 6 = agree, 7 = strongly agree).

**Interpretation:**

Figure **4** clearly shows that the majority of the [18 – 24] age group does not have the intention to adopt AV. This group is very worried about the cost of such a technology. They score very high on most factors except Anxiety. Indeed, the effort necessary to control the technology, the trust in car manufacturers, the self-efficacy and the laws put in place to regulate the service will play a major role for younger users. They mostly scored [6 = Agree].

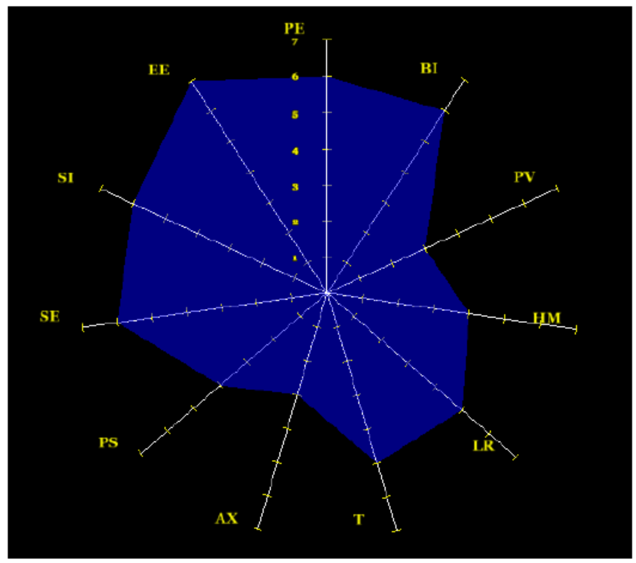


**Figure 5:** Radar chart for [65 & Over] Age group.

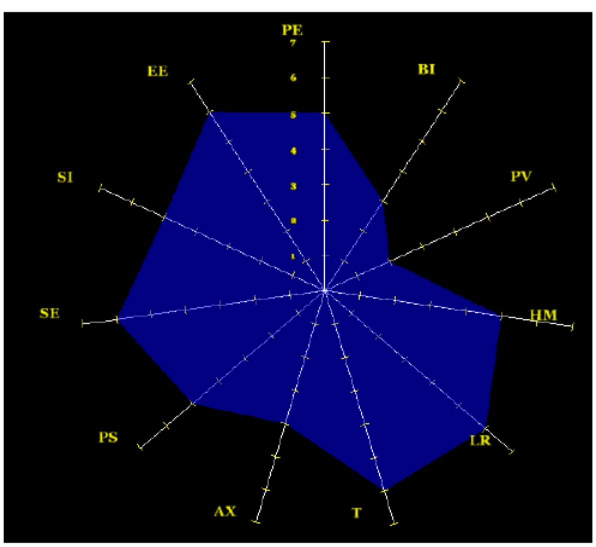


**Figure 4:** Radar chart for [18 - 24] Age group.

| Range of options for α | |
|---|---|
| PE | Performance Expectancy |
| EE | Effort Expectancy |
| SI | Social Influence |
| SE | Self-Efficacy |
| PS | Perceived Safety |
| AX | Anxiety |
| T | Trust |
| LR | Legal Regulation |
| HM | Hedonic Motivation |
| PV | Price Value |
| BI | Behavioural Intention |

**Interpretation:**

Figure **5** shows that most of the [65 & Over] age group are interested in adopting AV [BI]. This group is also very worried about the cost of such a technology. The effort necessary [EE] to control the technology appears to be more important than all other factors. This group will be influenced by friends, family, and experts' commentators on the technology [SI]. The performance of the technology will also play an important role.

## 4. DISCUSSION

The following sections provide discussions on the constructs and items, and hypotheses tested in this study. It also discusses the ratings of construct items obtained through descriptive statistics and Structure Equation Modelling.

### Performance Expectancy (PE)

A seven-point Likert scale with four items was used to measure the PE concept. The majority of participants appear to think that AV performance will have a significant impact on their intention to employ this technology, as seen by the total mean score of 4.39 across all items in this construct. When asked if they would find AV useful for their daily activities, the majority of participants said "yes" or "strongly agree." Additionally, the Cronbach's Alpha coefficient for this construct was 0.91, which is higher than the 0.7 threshold that is advised for optimal consistency. This outcome shows that the PE construct's assessment items have high internal consistency. I would find self-driving cars beneficial on a daily basis, said PE1. PE2 declared, "I will arrive at my destination safely if I employ self-driving automobiles." PE3 said, "I would be able to achieve my goals more quickly by using self-driving cars." Self-driving automobiles would boost my productivity, according to PE4. After the test, the construct's hypothesis was confirmed, hence it is included in the revised model because the estimate was significant at 0.3435 and had a p-value less than 0.001.

### Effort Expectancy (EE)

On a seven-point Likert scale, four items were used to measure the EE concept. The majority of participants appeared to think learning to use this technology would be simple based on the overall mean score of all items in this construct, which was 5.06. When asked if they found driving AVs easy, the majority of participants agreed or highly agreed. Furthermore, the Cronbach's Alpha coefficient for this construct was 0.93 higher than the 0.7 that is suggested for optimal consistency. This outcome shows that the EE construct's assessment items have high internal consistency. PE1 declared, "I would find it simple to learn how to operate a self-driving car." "Interaction with self-driving automobiles would be clear and understandable," according to EE2. I would find self-driving automobiles to be simple to use, said EE3. It would be simple for me to learn how to operate self-driving cars, said EE4. After the test, the hypothesis for this construct was confirmed; even though it was not statistically significant, it is now included in the updated model.

### Social Influence (SI)

A seven-point Likert scale with four items was used to measure the SI construct. The majority of respondents believed that people important to them, such as family members, experts' commentators, celebrities, and friends, will play a significant role in influencing their intention to use this technology, as indicated by the overall mean score of 4.64 across all items of this construct. When asked if they would be influenced by people and the media, the majority of interviewees said they would or they would strongly agree. Additionally, the Cronbach's Alpha coefficient for this construct was 0.82 higher than the optimum consistency value, which is 0.7. This outcome shows that the PE construct's assessment items have high internal consistency. I would be pleased to present the system to people that are close to me, said SI1. "People whose opinions are significant to me would appreciate the system, too," remarked SI2. People I like would typically push me to use the system, according to SI3 When making decisions to employ self-driving cars, SI4 said, "I would take advice from those who are important to me into consideration." After testing, the construct's hypothesis was confirmed, hence it is now included in the revised model because the estimate was 0.1826 significant and the p-value was less than 0.001.

### Self-Efficacy (SE)

On a seven-point Likert scale, four items measuring the SE concept were used. The average score across all items in this construct was 4.84, which indicated that most participants believed they could use the system if given additional time to comprehend it or the required assistance. This will also affect how they feel about using this technology. On questions pertaining to the construct, the majority of participants agreed or strongly agreed. Furthermore, the Cronbach's Alpha coefficient for this construct was 0.86 higher than the 0.7 that is suggested for optimal consistency. This outcome shows that the PE construct's assessment items have high internal consistency. "I could use the system to finish a task or activity." If nobody was around to direct me, SE1 said, "...I wouldn't know what to do." If I could call for assistance if I got trapped, SE2 said, If I had a lot of time, as SI3 said. "If I had only the built-in help function for assistance," SI4 said. After the test, the estimate for this construct was 0.0058; even though it was not significant, it was included in the updated model, supporting the hypothesis.

### Anxiety (AX)

A seven-point Likert scale with five items was used to measure the AX construct. The average score across all questions in this construct was 3.93, suggesting that most participants have confidence in the system's ability to get them where they're going according to plan. The model will include the construct of anxiety. Even so, it will have a detrimental impact on behaviour, therefore the association is greater for higher levels of anxiety and lower levels of behaviour intention. Additionally, the Cronbach's Alpha coefficient for this construct was 0.88, which is higher than the 0.7 value that is advised for optimal consistency. This result implies that the AX construct's measurement items have high internal consistency. I'm worried about using the system, AX1 said. AX2 saying, "I think using the technology could lead to an accident." The mechanism "frightens me a little," says AX3. AX4 says, "I worry that the system may prevent me from reaching my target." "I'm afraid I don't comprehend the system," AX5 says. The estimate was -0.1884 significant with a p-value less than 0.001 and was therefore included in the updated model even though the hypothesis for this construct was not supported after the test.

### Legal Regulation (LR)

On a seven-point Likert scale, three items were used to measure the LR concept. The majority of participants appeared to think that the legal restrictions placed on AV manufacturers and software companies developing these technologies will have a significant impact on their intention to use this technology, as indicated by the overall mean score of 4.55 across all items in this construct. When asked whether strict restrictions will be put in place to protect users of self-driving cars, the majority of responders said yes or strongly agreed. Additionally, the Cronbach's Alpha coefficient for this construct was 0.90 higher than the suggested level of 0.7 for good consistency. This result implies that the LR construct's measurement items have high internal consistency. I think there will be strict regulations in place to control the producers of self-driving cars, said LR1. According to LR2, "I think that strong restrictions will be put in place to protect users of self-driving cars." "I think the public liability insurance will protect users from personal injury," LR3 declared. After the test, the estimate for this construct was 0.0466, supporting the hypothesis. It is a component of the new model even if it is not important.

### Hedonic Motivation (HM)

On a seven-point Likert scale, three items were used to measure the PE concept. The majority of participants appear to think that utilising self-driving cars will be far more fun than using traditional cars, as evidenced by the total mean score of 4.84 across all components of this construct. When asked whether they would find AV more enjoyable than traditional autos, the majority of participants said they would. Additionally, the Cronbach's Alpha coefficient for this construct was 0.96 higher than the suggested level of 0.7 for optimal consistency. This outcome shows that the HM construct's assessment items have high internal consistency. Comparing self-driving cars to conventional cars, HM1 said, "Using self-driving cars would be fun." When opposed to using ordinary cars, using self-driving vehicles would be enjoyable, according to HM2. Comparing self-driving automobiles to conventional cars, HM3 said, "Using self-driving cars would be incredibly entertaining." After the test, the construct's hypothesis was confirmed, hence it is included in the revised model because the estimate was significant at 0.2059 and had a p-value less than 0.001.

### Price Value (PV)

On a seven-point Likert scale, three items were used to measure the PV construct. The majority of participants appear to think that AV technologies will be very expensive based on the overall mean score of all items in this construct, which was 3.21. They will decide whether or not to adopt this technology largely based on the cost. When asked whether the self-driving automobile will be decently priced, the majority of participants objected vehemently. Additionally, the Cronbach's Alpha coefficient for this construct was

0.87, which is higher than the 0.7 threshold that is advised for optimal consistency. This conclusion shows that the PV construct's measurement items have high internal consistency. I think self-driving cars would be affordably priced, said PV1. "I think a self-driving car would be a fair value for the money," said PV2. I think buying a self-driving automobile would be a wise investment, said PV3 Since the estimate was 0.1716 significant and the p-value was less than 0.001, the hypothesis for this construct was found to be correct following the test and is therefore included in the revised model.

**Behavioural Intention (BI)**

According to the results, the three evaluated items for this scale had mean values of 4.07, which indicated that individuals had significant behavioural intentions regarding the usage of autonomous vehicles. When asked if they would utilise AV when it was implemented in the future, a substantial number of participants strongly disagreed or disagreed, yet at the same time, a large number of people disagreed or severely disagreed. Additionally, the Cronbach's Alpha coefficient for this construct was 0.92 higher than the suggested level of 0.7 for optimal consistency. This conclusion implies that the BI construct's assessment items exhibit high levels of internal consistency. "I intend to use the self-driving car when it is accessible," BI1 said. I think it will be a good idea to use self-driving cars in the future, said BI2. I intend to use the self-driving automobile in the future, said BI3. The two extreme viewpoints on the chosen issue are reflected in these divergent responses. The majority of participants who did not wish to utilise AV expressed great concern about the technology's security, the public's mistrust of IT corporations, the potential for hacking, and the vulnerability of security features. See the participant comments listed below:

> "I believe that self-driving cars are a retrograde step. Not only are they a security risk, but they will render people more helpless and dependent on technology they do not understand.
>
> I enjoy driving. Self-driving vehicles remove the pleasure and skill of driving. I have heard news reports of failures and, in some cases, the resulting collisions involving self-driving vehicles. I have concerns that the vehicle systems could be hacked or otherwise interfered with. I also have reservations about Google's intrusion into people's privacy, tracking and effectively spying on people. I believe Google to be a malevolent and sinister organisation."
>
> "I would not get in a car that self-drives. I wouldn't trust the system like that at all."
>
> "My main concern is the issue of privacy"
>
> "Self-driving cars would be productive in daily lives but only under following strong road regulations."
>
> "You haven't addressed the area of illegal hacking of a self-driving car"

It clearly appears that the main concerns of most participants are around security, hacking, privacy, trust, liability, cost and regulations.

At the same time several participants were very excited about the technology as it can be reflected in their comments below:

> "Self-driving cars raise interesting possibilities for older people to complete journeys they otherwise might not be able to do."
>
> "Looking forward to it. I am an advanced police driver."
>
> "The self-drive car would be good for the disabled and elderly, but for me, I prefer to be active and in control of my car and drive in peace without government interference"
>
> "My use of AV will depend on cost, having legal structures in place, and reliability/safety records of the various vehicle options noted. It will also depend on when these options become available since I am also considering a hybrid in the next few years (which would likely be my last car)."

Although many cannot wait for the technology to be available, it is also clear that security, privacy, safety and government interference are their primary concerns.

## 5. CONCLUSION AND RECOMMENDATIONS

Technology frequently develops faster than our society's capacity to establish accepted guidelines for its use. Without a doubt, this is applicable to autonomous vehicles. It is anticipated that autonomous vehicles will soon be commonplace on our roadways. Overall, some of the most important suggestions emerged: UK transportation services should evaluate the amount of funding for road infrastructure needed for each of the four stages of AVs and how this will affect the kind of infrastructure needed. This area will require serious investigation in the near future. It's possible that the uncertainty around potential future rules is the biggest obstacle to innovation. Questions remain on how quickly tests can be administered and how long the application process would last without knowing the rules in their final form. According to current policy, a data-recording and data-sharing policy should be developed with the necessary standard-creating organisations to speed up the deployment procedure. This is so that manufacturers can learn from the mistakes made by other developers and prevent mistakes from being repeated. Road pricing will play a key role in preventing increased traffic and congestion as a result of the travel benefits that AVs deliver. AVs can offer the freedom and flexibility that people with mobility issues need at a considerably cheaper cost than the present on-demand transportation options. Should public transportation authorities enter into the business of operating autonomous vehicles if they replace or enhance bus services? It's unclear exactly who would own what and how it would be managed in a world where shared self-driving cars are taking us everywhere. The findings and discussions of the research given in this paper were summarised in this part, which also served as its conclusion.

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