Section A-Research paper
ISSN 2063-5346

Voice Based Artificial Intelligence Technologies: Study on User Acceptance in the Era of Digital Disruption

Sayee Darshini N[1], Dr. Rhytheema Dulloo[2]

[1]PG Scholar, School of Management
Hindustan Institute of Technology and Science, Chennai, India

[2]Assistant Professor (S.G), School of Management
Hindustan Institute of Technology and Science, Chennai, India

dulloo.rhytheema@gmail.com

Abstract

As the era of digital disruption unfolds, Voice Based Artificial Intelligence (AI) technologies have emerged as a powerful force for reshaping user interactions and experiences, driving significant transformations in industries such as communication, commerce, and entertainment. Voice based artificial intelligence (AI) technologies are becoming increasingly common in our daily lives. To ensure the success of these technologies, it is critical to determine the elements that contribute to their adoption.

The present research aims to identify and classify the drivers of adoption of voice based Artificial Intelligence and their influence on user acceptance. The results indicate that perceived usefulness, perceived ease of use, consumer attitude and perceived trust have significant influence on user acceptance of voice based artificial intelligence with perceived usefulness being the most important factor. Thus, it is proposed that designers and developers examine these aspects and seek to create systems that are not only technologically proficient but also suit their users' requirements and expectations.

Keywords: consumer attitude, digital disruption, perceived ease of use, perceived trust, perceived usefulness, technologies, user acceptance, voice based artificial intelligence.

INTRODUCTION

As the era of digital disruption unfolds, Voice Based Artificial Intelligence (AI) technologies have emerged as a powerful force for reshaping user interactions and experiences, driving significant transformations in industries such as communication, commerce, and entertainment. **Arun and Dulloo (2023)**, highlight "digital disruption" sparked by abrupt changes brought in by technology has fundamentally altered how businesses operate and create value. Voice assistants like Apple's Siri, Amazon's Alexa, Microsoft's Cortana, Google's Google Assistant are providing a new and more natural method for people to connect. These technologies eliminate the need for typing or touchscreen use by leveraging natural language processing and machine learning algorithms to understand instructions, answer inquiries, and even carry on conversations with their gadgets. In a developing nation

like India, the Voice based artificial intelligence technologies are now available to every individual.

India represents an immense opportunity **(Dulloo, 2021)** with rise in use of smart phones, inexpensive internet connections and improved support for local languages. However, access to technology does not always lead to adoption. This raises important questions about what are the elements that contribute to user acceptance of voice based Artificial Intelligence in a country like India. The current study examines the elements influencing user adoption of voice based artificial intelligence in an effort to provide an answer to this issue by building on previous research on technological acceptance. The study also intends to capitalize on constructs such as perceived usefulness, perceived ease of use, consumer attitude, user acceptability, and perceived trust to acquire a deeper understanding of why consumers adopt voice based AI technology. The research problem addressed in this research work focuses on "***Voice Based Artificial Intelligence Technologies: Study on User Acceptance in the Era of Digital Disruption."*** The research will add to both the theoretical and applied literature on voice based AI technologies since the findings will advance knowledge in the field of voice based artificial intelligence.

LITERATURE REVIEW

The popularity of voice based artificial intelligence (AI) has grown over time with the emergence of virtual assistants like Siri, Alexa, Cortana and Google Assistant. Voice-based artificial intelligences are Internet-enabled gadgets that help their users out with daily tasks such as setting alarms and playing music as well as interacting with other users **(Han and Yang, 2018; Santos *et al.*, 2016)**. Researchers, however, debate how well these technologies are received by users. The major obstacle limiting the success of any novel technology is absence of user acceptance **(Davis, 1993)**. To better understand the variables influencing user acceptability of technology voice based AI, several researches have been carried out. The author will highlight some of the noteworthy researches conducted on innovative technologies like Voice based AIs in this review of the literature.

Dulloo (2020) studied the impact of technology like mobile apps on consumers' purchase intention. In her study TAM is taken as the base model and findings highlighted perceived usefulness, perceived ease of use and consumer attitude have a strong influence on consumers' behavioral intention to purchase from mobile apps. **Venkatesh *et al.* (2000)** looked at how social influence and gender play a factor in how people embrace and use technology. The research discovered that social influence and gender are important determinants of technology acceptance and usage. By exploring the impact of four moderators on technology acceptance and usage, **Venkatesh *et al.* (2016)** expanded the Unified Theory of Acceptance and usage of Technology (UTAUT). According to the study, user acceptability is significantly predicted by performance expectancy, effort expectancy, social influence, and enabling factors. **Hamari *et al.* (2014)**. discovered that voice based AI can be more widely accepted by users by using persuasive system design. The Unified Theory of adoption and Use of Technology (UTAUT) model is utilised in one of the initial research on user adoption of voice based AI by **Venkatesh *et al.* (2012)** to investigate the

variables affecting such acceptance. They discovered that user approval is significantly predicted by performance expectancy, effort expectancy, and social influence.

Dulloo (2022) extended the use of technology to finance domain and suggested convenience is the factor driving consumers to use mobile technology in online trading. The adoption of technology is explored by **Dickinger *et al.* (2008)** together with network externalities, and they discovered that enjoyment and social norms are important predictors of adoption. Another noteworthy study is carried out by **Dulloo (2018),** author explored factors driving trust towards mobile technology like apps and detailed that integrity, benevolence and competence strongly influence consumers' intention to adopt a technology. **Kim *et al.* (2018)**, emphasized that user acceptability is significantly predicted by user support experience, including trust and dependability. Additionally, the study also discovered that user interface, particularly its utility and convenience of use, also contributed to user acceptability. TAM is used to analyse factors that affect customers' intentions to use technological products and services in the literature on information technology systems **(Fernandes and Pedroso, 2017)**. **Dulloo, 2018** stated that determinants for technology adoption in context of mobile devices is perceived ease of use, personal innovativeness, convenience, price saving, perceived usefulness and trust with trust being the more significant determinant based on a critical review of prior theoretical literature.

Yoon *et al.* (2022) found that user acceptability was significantly predicted by social reaction and voice user interface. A human-like voice and a tailored social reaction, according to the study, enhanced user acceptability. **Dulloo (2018)** studied the factors driving consumers to adopt mobile electronic commerce technology and findings stated customer service, innovativeness and convenience have strong and positive influence on user acceptability of technology. According to **Liao *et al.* (2019)**, user approval is significantly negatively predicted by perceived privacy risk. Additionally, the study discovered that perceived utility and usability is highly effective positive predictors of user acceptance. **Rhee and Choi (2020)** looked at the impact of human voice and voice customisation on user adoption of virtual assistants. The research discovered that user acceptability is raised by both voice personalisation and human voice. **Dulloo (2020)** highlighted in her study that perceived risk negatively impacts customer attitude and behavioral intention to purchase via mobile app technology**.**. More specifically, the study discovered that human voice enhanced perceived usability while voice personalisation boosted perceived usefulness. In a study on why customers choose to employ intelligent digital voice assistants by **Fernandes and Oliveira (2021)**, findings demonstrated the modifying effects of experience and the need for social interaction.

Research on the adoption of virtual assistants is now limited to a western individualistic socio-technical setting **(Liao *et al.*, 2019)**, which offers little understanding into eastern collectivist nations as India. While academic interest in this novel topic is growing, the literature still lacks a thorough understanding of the factors influencing Indians' acceptance of the voice based AI technologies. Perceived usefulness, perceived ease of use, consumer attitude and trust have all been noted as important determinants of adoption in several studies carried out in different nations. However, uncertainty surrounds the applicability of these

characteristics in the Indian setting, since there can be many cultural and language elements that affect user approval. By investigating these elements that affect user acceptability of voice based AI in the Indian setting, the author seeks to fill this gap.

RESEARCH FRAMEWORK

Drivers of voice based artificial intelligence, such as perceived usefulness, perceived ease of use, consumer attitude, and perceived trust influencing user acceptance are taken into consideration for the present study's purpose. User acceptance is taken as the dependent variable, and the conceptual framework is shown in Fig. 1 below.

Drivers of Voice Based Artificial Intelligence

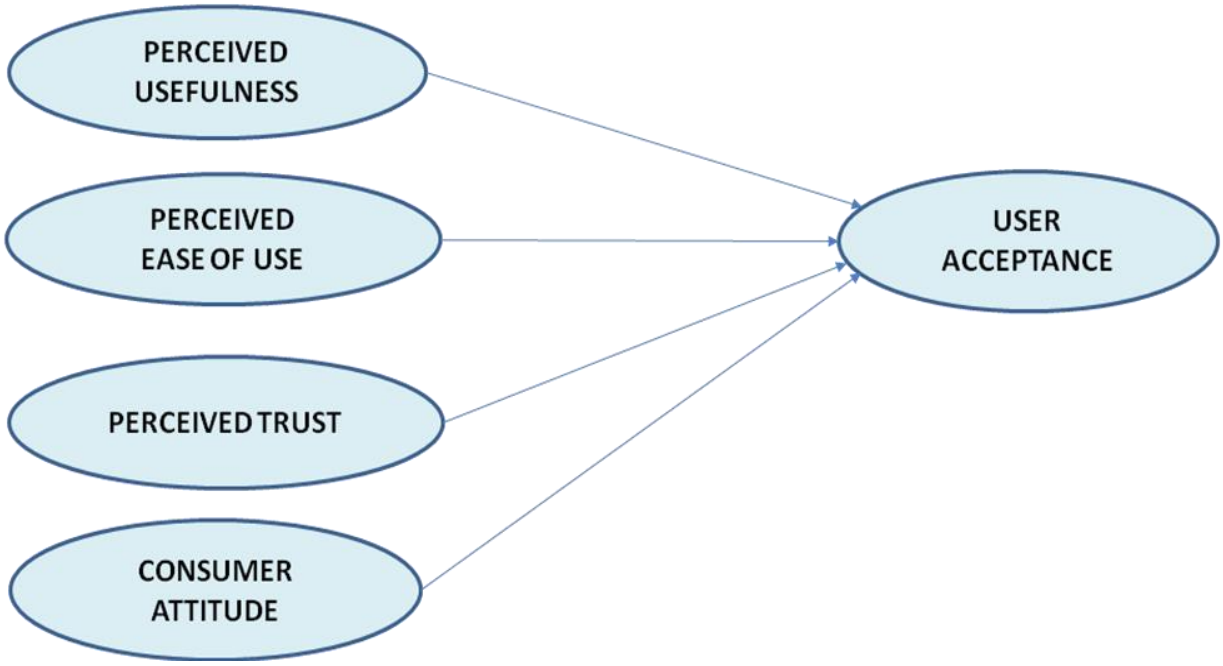


Fig. 1 Conceptual model on User Acceptance of Voice Based Artificial Intelligence

RESEARCH OBJECTIVES

- To study the demographic profile of the respondents using voice based artificial intelligence.
- To identify the drivers of adoption of voice based artificial intelligence.
- To find the relationship between the identified factors and user acceptance of voice based artificial intelligence.
- To study the influence or impact of factors explored on user acceptance of voice based artificial intelligence.

RESEARCH METHODOLOGY

The purpose of the study is to investigate user acceptance of voice based artificial intelligence. Descriptive research design is used for the study. Data will be gathered from both primary and secondary sources. Primary data will be collected for the study utilizing a

survey questionnaire, which is a quantitative research approach. Secondary data will be collected from websites, journals, magazines, newspapers etc. The survey questionnaire will include two sections: the first section will collect participants' demographic data, and the second section will concentrate on the variables of interest. Variables of interest in this study are drivers of adoption of voice based Artificial Intelligence i.e., perceived usefulness, perceived ease of use, consumer attitude, perceived trust and user acceptance. Data will be collected from a sample of 343 participants who have used voice based artificial intelligence atleast once. The sample will be selected using the convenience sampling method. Data collected will be analyzed using descriptive statistics and inferential statistics, and exploratory factor analysis will be used for exploring the factors influencing user acceptance. Drivers of adoption of voice based AI will be measured using a Likert scales ranging from strongly disagree to strongly agree.

RESULTS AND DISCUSSION

In the process of exploring the factors influencing user acceptance in context of voice based Artificial Intelligence questionnaires are circulated to the respondents and the responses are received. In this section, the responses from the consumers' are analysed to know their usage pattern and their opinion regarding voice based artificial intelligence technology used with graphs, diagrams and statistical techniques, by using Statistical Package for Social Science (SPSS v23). An informational sample of 343 respondents from throughout India is taken. Nominal and Likert scales are used to record and estimate responses.

Demographic Profile of the respondents

India is witnessing a tremendous growth in usage of smartphone devices in both android and iOS category and demographics of Indian population is changing rapidly. This section examines demographic variables such as age, gender, educational qualification, occupation, voice based assistant used and years of using voice based assistants on smart devices.

Table I Demographic profile of respondents

Criteria	Frequency	Percent	Cumulative%
AGE			
20-30 yrs	151	44	44%
30-40 yrs	129	37.6	81.6%
40-50 yrs	40	11.7	93.3%
Above 50 yrs	23	6.7	100.0%
GENDER			
Male	118	34.4	34.4%
Female	225	65.6	100.0%
EDUCATIONAL QUALIFICATION			
UG	99	28.9	28.9%

PG	152	44.3	73.2%
Professional Degree	51	14.9	88.0%
Others	41	12.0	100.0%
Occupation			
Student	36	10.5	10.5%
Working Professional	122	35.6	46.1%
Business Owner	113	32.9	79.0%
Homemaker	72	21.0	100.0%
Years of using VBAIs on smart devices			
Less than 1 year	200	58.3	58.3%
1 to 2 years	74	21.6	79.9%
2 to 4 years	59	17.2	82.8%
Above 4 years	10	2.9	100.0%
VOICE BASED AI USED			
SIRI	136	39.4	39.4%
Google Voice Assistant	207	60.6	100.0%

Table I demonstrates gender wise distribution of the respondents. The study comprises of 65.6% females and 34.4% male respondents. Majority of respondents are between age group of 20 to 30 years, i.e., 44 %, it is followed by 30 to 40 years i.e., 37.6% and rest are above 40 years of age. Majority of the respondents are post graduates, i.e., 73.2%. 35.2% of the respondents are working professionals and 32.9% are business owners. It can be seen in case of voice based assistants used, majority of the respondents, i.e., 60.6% use Android based Google voice assistant while 39.4% of the respondents use iOS based Siri . 58.3% have been using voice based assistants on their smart devices for less than 1 year, 21.6 between 1 to 2 years, 17.2% for 2 to 4 years and rest above 4 years.

Exploratory Factor Analysis: Factors influencing user acceptance in context of voice based Artificial Intelligence

Responses of respondents have been examined with the help of a factor analysis method employing principal component technique with varimax rotation in order to research variables impacting user acceptability in the context of voice based artificial intelligence. Tests are conducted to see if there is enough data to apply factor analysis **(Stewart, 1981).**

Table II - KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.808
Bartlett's Test of Sphericity	Approx. Chi-Square	7451.936
	df	253
	Sig.	0.000

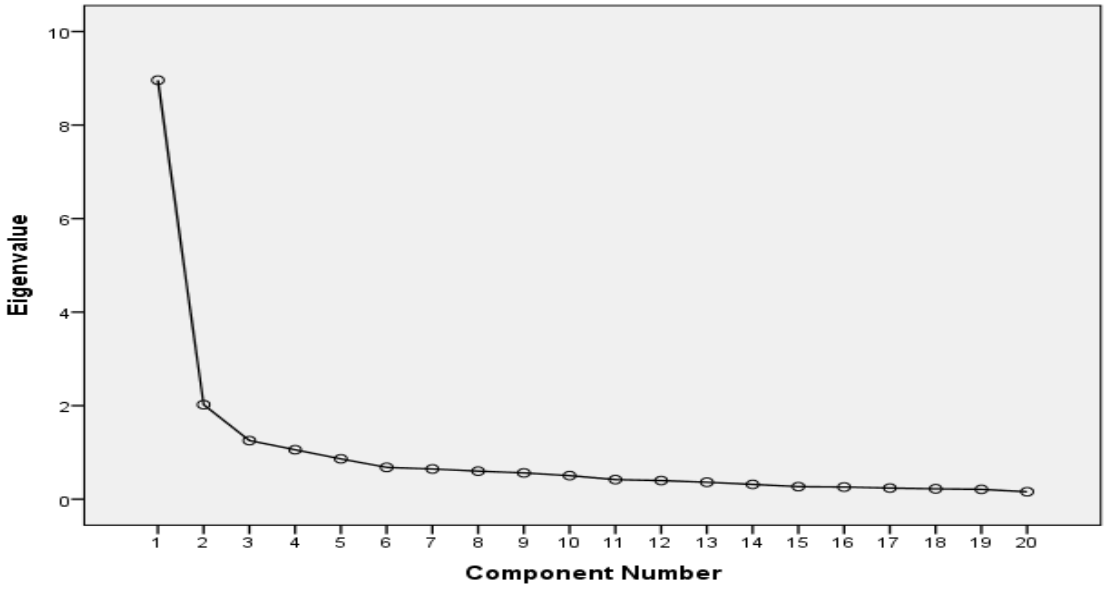
The estimation of the Kaiser-Meyer-Okin (KMO) measure of examining sampling adequacy is observed to be 0.808, well over the prescribed 0.5 level. Further, Bartletts test of sphericity value is found to be 7451.936, which is also significant ($p < 0.001$), in this way guaranteeing the suitability of factor analysis for exploration work. Total variable explained is presented in Table III. In the end, the number of factors to be held are chosen on the basis of latent root criterion, i.e., variables having eigen values greater than1 and furthermore based on scree plot introduced in Table IV. Additionally, factors having loading greater than or equivalent to 0.50 have been considered **(Dixon, 1997)** these yields five interpretable factors. Most commonly used technique, Varimax rotation procedure is used and results for all respondents are displayed in Table V.

Table III - Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.130	39.695	39.695	9.130	39.695	39.695
2	3.350	14.563	54.258	3.350	14.563	54.258
3	1.898	8.252	62.510	1.898	8.252	62.510
4	1.652	7.185	69.695	1.652	7.185	69.695
5	1.033	4.490	74.934	1.033	4.490	74.934

Table III illustrates five rotated factors which together explain 74.934% of the total variance. Eigen values for factors F1 to F5 are 39.69, 14.56, 8.25, 7.18 and 4.49 respectively. Additionally, suitable names have been allotted to all the five factors extracted.

Table IV – Scree Plot



Principal Component Analysis under the rotation method (Varimax with Kaiser Normalization), rotation converged in 13 iterations. The result of rotated component matrix is in Table V, which shows FIVE factors may be extracted:

Table V - Rotated Component Matrix

	Component				
	1 PERCEIVED USEFULNESS	**2 PERCEIVED EASE OF USE**	**3 CONSUMER ATTITUDE**	**4 PERCEIVED TRUST**	**5 USER ACCEPTANCE**
PU_5	0.813				
PU_4	0.801				
PU_1	0.778				
PU_2	0.767				
PU_3	0.701				
PEU_2		0.804			
PEU_1		0.755			
PEU_3		0.691			
PEU_4		0.659			
PEU_5		0.612			
CA_3			0.799		
CA_2			0.779		
CA_3			0.716		
CA_4			0.669		
PT_2				0.802	
PT_4				0.733	
PT_1				0.695	
PT_2				0.678	
UA_3					0.732
UA_1					0.717
UA_2					0.699
UA_4					0.668

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 13 iterations.

Factor 1 : PERCEIVED USEFULNESS

Perceived Usefulness (PU) is generally associated with convenience **(Dulloo, 2020)**. The degree to which a person thinks employing a certain technology will improve their ability to accomplish their jobs is known as perceived usefulness **(Davis, 1989)**. This concept is important for our study because voice based artificial intelligence is seen as novel in the context of digital technologies and because the utility supplied to customers is directly correlated with the benefits it provides. The range of factor loadings is from 0.813 to 0.701. All FIVE statements are kept, and the variables had enough communalities. This factor accounted for a reliability of 78.5%.

Factor 2 : PERCEIVED EASE OF USE

It has been determined that Perceived Ease of Use is a significant predicate of adoption intention. The degree to which a person thinks utilising a system would be effortless is referred to as perceived ease of use **(Davis, 1989)**. If voice based artificial intelligence tools

are simple for users to comprehend and operate, they will be more widely adopted. The range of factor loadings is from 0.804 to 0.612. Additionally, the variables had sufficient communalities, and all FIVE items are kept. This factor accounted for a reliability of 80.2%.

Factor 3 : CONSUMER ATTITUDE

When it comes to forming a behavior, the Theory of Reasoned Action and Technology Acceptance Model have demonstrated that attitude is a crucial antecedent for acceptance. If voice based AIs help the user carry out their daily chores, they will be adopted. The range of factor loadings is from 0.779 to 0.669. The variables also had sufficient communalities, and all FOUR items are kept. This factor accounted for a reliability of 70.7%.

Factor 4 : PERCEIVED TRUST

Trust increases loyalty of users **(Dulloo, 2020)**. Numerous definitions and a wealth of research have been done on trust. According to **Gefen et al. (2003)** trust is "the expectation that with whom one interacts will not take unfair advantage of a dependence upon them." Factor loadings varied from 0.802 to 0.678. Additionally, the variables had sufficient communalities, and all FOUR items are kept. This factor accounted for a reliability of 76.2%.

Factor 5 : USER ACCEPTANCE

User acceptance is a sign of someone's openness to adopting a specific behavior. According to **Wani et al. (2016**), user acceptability is mostly influenced by favourable e-WOM and prior positive experiences. The range of factor loadings is from 0.732 to 0.668. The variables also had sufficient communalities, and all FOUR items are kept. This factor accounted for a reliability of 82.8%.

Regression Test: To study the impact of identified factors on user acceptance of voice based artificial intelligence.

Null hypothesis – There is no significant impact of perceived usefulness, perceived ease of use, consumer attitude and perceived trust on User acceptance of voice based AIs.

Model Summary shows the value of R^2 and adjusted R^2 (Table VI). Here, R^2 is 0.722 with standard error of estimate equal to 0.44. We can interpret this as dependent variable; user acceptance is influenced by all this four explanatory variables by 72.2%, which is a good indicator. The value of coefficient of determination (R^2) is significant and therefore the association can be considered as significant.

Table VI - Model Summary (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	169.353	4	42.338	219.222	0.000[b]
Residual	65.278	338	0.193		
Total	234.631	342			
R Square	0.722	**Adjusted R Square**	0.718	**Std. Error of Estimate**	0.44

a. Dependent Variable: UA
b. Predictors: (Constant), PU, PEU, CA, PT

Further it is seen that for the table that the significant value (p-value) of F-test are 0.0000, which means that all four explanatory variables are highly significant with respect to the explained factor, user acceptance of voice based artificial intelligence.

Table VII – Multiple Regression Coefficient Analysis

Model	**Unstandardized Coefficients**		Standardized Coefficients	**t**	**Sig.**	**Collinearity Statistics**	
	B	**Std. Error**	Beta			**Tolerance**	**VIF**
(Constant)	**1.121**	0.192		**5.824**	**0.000**		
PU	**0.445**	0.051	0.247	**4.453**	**0.000**	0.598	1.672
PEU	**0.396**	0.047	0.223	**4.174**	**0.000**	0.645	1.549
CA	**0.333**	0.023	0.317	**7.56**	**0.000**	0.453	1.546
PT	**0.392**	0.044	0.368	**7.129**	**0.000**	0.690	1.449

a. Dependent Variable: UA

The results of the multiple regression coefficient analysis are shown in Table VII above. The significance level of the model is not over 0.05, according to the aforementioned table, indicating an acceptable outcome. As a result, the research's model is sound. Based on the multiple regression output tables of user acceptance of voice based AI, the following equation can drive:

$$M(Y) = 1.121+0.445PU+0.396PEU+0.333CA+0.392PT$$

From the above table, the coefficient of independent variable (PU) i.e., Perceived usefulness is the highest (0.445) which means that it is the most influencing factor that influences user acceptance for voice based AI, it is followed by perceived ease of use and perceived trust then consumer attitude. Further, it is seen form the table that the significant value (p-value) of t-test for all items are less than 0.01, which means that ***all the four drivers PU, PEU, CA and PT towards Voice based AIs are highly significant with respect to the explained factor, i.e., "user acceptance".*** Thus, null hypothesis is disproved.

CONCLUSION

In conclusion, user adoption of voice based AI tools has been on the rise in recent years, with the proliferation of mobile devices that feature artificial intelligence assistants. The adoption of voice based artificial assistants has been driven by factors such as perceived usefulness, perceived ease of use, perceived trust and consumer attitude, user acceptance. The study found that perceived usefulness highly influences user acceptance of voice based AI and is followed by perceived ease of use, perceived trust and consumer attitude.

The findings of this study have important implications for marketers and developers of voice based AIs, they should examine these aspects and seek to create systems that are not only technologically proficient but also suit their users' requirements and expectations. By doing so, they can increase consumer adoption and usage of voice based AIs, leading to increased market share and revenue. However, the study also highlights the need for further research in

this area, particularly on how these variables may differ across different contexts and user groups. Overall, this study provides valuable insights into the factors that drive user acceptance towards voice based AIs and can help guide future research and development in this rapidly evolving field.

REFERENCES

1. Arun, G., & Dulloo, R. (2023). DIGITAL DISRUPTION: TRANSFORMING THE BANKING LANDSCAPE. *European Chemical Bulletin*, 12(S2), 2542-2549.
2. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
3. Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *International journal of man-machine studies*, *38*(3), 475-487.
4. Dickinger, A., Arami, M., & Meyer, D. (2008). The role of perceived enjoyment and social norm in the adoption of technology with network externalities. *European Journal of Information Systems*, *17*(1), 4-11.
5. Dulloo, R. (2018). Impact of demographic factors on consumers trust towards mobile shopping apps. *Journal of Advanced Research in Dynamical and Control Systems*, 10(7), 926–940.
6. Dulloo, R. (2018). Mobiles reinventing shopping: A critical review. *International Journal of Engineering & Technology*, *7*(2.33), 51-55.
7. Dulloo, R., & Rajeswari, M. (2018). Retail mobility in India's digital age: Exploring determinants of its adoption. *International Journal of Pure and Applied Mathematics*, *120*(6), 10543-10563.
8. Dulloo, R. (2020). 'Consumers' online shopping behavior through use of mobile apps in e tailing industry' (doctoral dissertation). Hindustan Institute of Technology and Science, Chennai, India.
9. Dulloo, R. (2021). *MICROFINANCE: FOSTERING INCLUSIVE GROWTH IN INDIA*. *Pacific Business Review International***,** 13(11), 79-87
10. Dulloo, R. (2022). INFORMATION TECHNOLOGY RESHAPING TRADING: STUDY ON CUSTOMER PERCEPTION TOWARDS ONLINE TRADING. *Journal of Services Research*, *22*(1), 42-68.
11. Fernandes, T., & Pedroso, R. (2017). The effect of self-checkout quality on customer satisfaction and repatronage in a retail context. *Service Business*, *11*, 69-92.
12. Fernandes, T., & Oliveira, E. (2021). Understanding consumers' acceptance of automated technologies in service encounters: Drivers of digital voice assistants adoption. *Journal of Business Research*, *122*, 180-191.
13. Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS quarterly*, 51-90.
14. Hamari, J., Koivisto, J., & Pakkanen, T. (2014). Do persuasive technologies persuade?-a review of empirical studies. In *Persuasive Technology: 9th International Conference, PERSUASIVE 2014, Padua, Italy, May 21-23, 2014. Proceedings 9* (pp. 118-136). Springer International Publishing.

15. Han, S., & Yang, H. (2018). Understanding adoption of intelligent personal assistants: A parasocial relationship perspective. *Industrial Management & Data Systems*, *118*(3), 618-636.
16. Kim, K., Boelling, L., Haesler, S., Bailenson, J., Bruder, G., & Welch, G. F. (2018, October). Does a digital assistant need a body? The influence of visual embodiment and social behavior on the perception of intelligent virtual agents in AR. In *2018 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)* (pp. 105-114). IEEE.
17. Liao, Y., Vitak, J., Kumar, P., Zimmer, M., & Kritikos, K. (2019). Understanding the role of privacy and trust in intelligent personal assistant adoption. In *Information in Contemporary Society: 14th International Conference, iConference 2019, Washington, DC, USA, March 31–April 3, 2019, Proceedings 14* (pp. 102-113). Springer International Publishing.
18. Rhee, C. E., & Choi, J. (2020). Effects of personalization and social role in voice shopping: An experimental study on product recommendation by a conversational voice agent. *Computers in Human Behavior*, *109*, 106359.
19. Santos, J., Rodrigues, J. J., Casal, J., Saleem, K., & Denisov, V. (2016). Intelligent personal assistants based on internet of things approaches. *IEEE Systems Journal*, *12*(2), 1793-1802
20. Stewart, D. W. (1981). The application and misapplication of factor analysis in marketing research. *Journal of marketing research*, *18*(1), 51-62.
21. Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS quarterly*, 115-139.
22. Venkatesh, V., Thong, J. Y., & Xu, X. (2016). Unified theory of acceptance and use of technology: A synthesis and the road ahead. *Journal of the association for Information Systems*, *17*(5), 328-376.
23. Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 157-178.
24. Wani, T. A., Ali, S. W. and Farooq, T. (2016). Determinants of Online Purchase Intentions: A Study of Indian Buyers. *Amity Journal of Management Research*, 1(1): 94-109.
25. Yoon, S. H., Park, G. Y., & Kim, H. W. (2022). Unraveling the relationship between the dimensions of user experience and user satisfaction: a smart speaker case. *Technology in Society*, *71*, 102067.