INTENTION TO USE VOICE ASSISTANT TECHNOLOGY AMONG MALAYSIAN CONSUMERS

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DECLARATION

I declare that this thesis entitled "INTENTION TO USE VOICE ASSISTANT TECHNOLOGY AMONG MALAYSIAN CONSUMERS is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

I hereby declare that I have checked this report entitled “Intention To Use Voice Assistant Technology Among Malaysian Consumers” and in my opinion, this thesis it complies the partial fulfillment for awarding the award of the degree of Technology Management (Innovation Technology) with Honours

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DEDICATION

To my parents, siblings, family, supervisor, lectures, and friends

This thesis paper would not have been done without their continuous support.

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ABSTRACT

Despite all available technology and capabilities, consumer awareness of voice technologies and assistants is still in its early stages. Voice assistant (VA) is a conversational AI technology that receives and interprets orders using voice commands. This study aims to determine the factors influencing Malaysian consumers' intention to use voice assistant technology. This study used the quantitative research method where the questionnaire that applied Likert Scales, was distributed to all smartphone consumers, especially those with the latest smartphone that has the latest technology. The underlying theory used in this study is UTAUT2 (Unified Theory of Acceptance and Use of Technology) by Venkatesh (2012). To answer the objectives, this research used descriptive and explanatory analysis to investigate the factors influencing consumer intention to use and to study the relationship between these factors and intention to use voice assistant technology among Malaysian consumers. The acquired data from 159 respondents were then analysed using SPSS software to carry out this research. The results indicate that two out of the six factors have a significant relationship with the intention to use voice-assistant technology. The facilitating condition and hedonic motivation are the two factors. The other four factors, namely performance expectancy, effort expectancy, social influence, and habit, had an insignificant relationship with the intention to use a voice assistant. In conclusion, some of the factors that influence consumers' intention to use voice assistants were noted in this study. The limitation of the study are discussed and recommendations are made for future research to explore more consumers' intentions to use a voice assistant

ABSTRAK

Walaupun semua teknologi dan keupayaan yang ada, kesedaran pengguna tentang teknologi suara dan pembantu masih di peringkat awal. Pembantu suara (VA) ialah teknologi AI perbualan yang menerima dan mentafsir pesanan menggunakan arahan suara. Kajian ini bertujuan untuk menentukan faktor-faktor yang mempengaruhi hasrat pengguna Malaysia untuk menggunakan teknologi pembantu suara. Kajian ini menggunakan kaedah kajian kuantitatif di mana soal selidik yang mengaplikasikan Skala Likert, telah diedarkan kepada semua pengguna telefon pintar khususnya yang mempunyai telefon pintar terkini yang mempunyai teknologi terkini. Teori asas yang digunakan dalam kajian ini ialah UTAUT2 (Teori Penerimaan dan Penggunaan Teknologi Bersepadu) oleh Venkatesh (2012). Bagi menjawab objektif, kajian ini menggunakan analisis deskriptif dan penjelasan untuk menyiasat faktor-faktor yang mempengaruhi niat pengguna untuk menggunakan dan mengkaji hubungan antara faktor-faktor ini dan niat untuk menggunakan teknologi pembantu suara dalam kalangan pengguna Malaysia. Data yang diperoleh daripada 159 responden kemudiannya dianalisis menggunakan perisian SPSS untuk menjalankan penyelidikan ini. Keputusan menunjukkan bahawa dua daripada enam faktor mempunyai hubungan yang signifikan dengan niat untuk menggunakan teknologi pembantu suara. Keadaan yang memudahkan dan motivasi hedonik adalah dua faktor. Empat faktor lain, iaitu jangkaan prestasi, jangkaan usaha, pengaruh sosial, dan tabiat, mempunyai hubungan yang tidak signifikan dengan niat untuk menggunakan pembantu suara. Kesimpulannya, beberapa faktor yang mempengaruhi niat pengguna untuk menggunakan pembantu suara telah diperhatikan dalam kajian ini. Batasan kajian dibincangkan dan cadangan dibuat untuk penyelidikan masa depan untuk meneroka lebih banyak niat pengguna untuk menggunakan pembantu suara.

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CHAPTER 1

INTRODUCTION

1.1 Chapter Overview

This research has been divided into five chapters which are introduction, literature review, methodology, data analysis, and conclusion and recommendation. Following this introduction, the literature review in the second chapter explained the theoretical framework that researcher used in the study. The methodology section of the third chapter discusses the data collection process and the questionnaire utilised in the analysis. As previously stated, the fourth chapter, data analysis, examines the questionnaire's results. Finally, in the last chapter, chapter five, the investigation will come to a close with conclusions and suggestions.

1.2 Background of research

Smartphones are a relatively recent advancement, even though mobile phones have been regularly used for several decades. They are mobile phones that include not only typical features like voice and text communication but also sophisticated computation and communication capabilities such as Internet access and geo-positioning systems (Ajaegbu et al., 2018). According to an article written by Boulos (2011), due to their strong onboard processing capacity, capacious memory, huge displays, and open operating systems that stimulate application creation, the current generation of smartphones is increasingly seen as portable computers rather than phones.

Smart phones are phone gadgets that have innovative functions that go beyond the traditional functions of phones such as making calls and sending text messages and have greater capabilities of playing videos, surfing the web, sending and receiving emails, taking photos and editing them with embellishments, social interactions through chat groups, and enabling business transactions (Ajaegbu et al., 2018).

As stated in the article (Lincoln, n.d.), smartphones, such as iPhones and Android phones, are tiny, mobile computers that include phones, GPS, and cameras. And, like any other contemporary computer, they can connect to the Internet. That is the major role for

many people. In 2021, the number of mobile internet users was 4.32 billion, showing that mobile devices are used by more than 90% of the worldwide internet population. (L. Ceci, 2022). This growing trend in mobile internet usage is especially noticeable in developing digital economies where mobile networks are the predominant mode of internet access.

As stated in the Internet User Survey by MCMC (Komunikasi et al., 2020) , the percentage of Internet users in Malaysia in 2020 are 88.7 percent, a 1.3 percent rise from 87.4 percent in 2018 and half of Internet users (50%) spent 5 to 12 hours per day on the Internet, a 13 percent increase from 37 percent in 2018. They all used the Internet mostly for social purposes, such as conversing via text, interacting by voice/video, and browsing social networking sites.

Furthermore, according to Department of Statistics Malaysia Official Portal (2022), engagement in social networks was the most popular internet usage activity in 2021, properly accounted for 99.0 %, followed by downloading pictures, movies, videos, or music; playing or downloading games (91.8 %), finding information about goods or services (89.4 %), making phone calls via Internet/ VoIP (89.2 %), and downloading software or applications (86.3 %).

Mobile phones have been developing since their launch. The industry has now entered an era of superior-functioning cell phones by using internet. The characteristics of mobile devices have seen substantial developments in the last 20 years, particularly in artificial intelligence (AI). (TECNO, 2020). In IR 4.0 era, the emerging technologies such as virtual reality, augmented reality, and voice interaction has modifying people's interactions with the environment and altering digital experiences. (Terzopoulos & Satratzemi, 2020). Personal voice assistants (VAs) are the most popular and influential technical devices that employ AI, as evidenced by the large number of expert publications in the subject of AI as well as the market's growth. Voice assistant is a conversational AI technology that receives and interprets orders using voice commands. Devices using this technology can communicate with and react to human enquiries in natural language. (R. Chotia, 2022).

As mentioned in website page (Ramos, 2021) voice assistants allow us to perform a range of things without using our hands, which is why many people enjoy using them, particularly on their phones. Siri is available through Apple. Google phones and the majority of Android devices have Google. Bixby is available from Samsung. Cortana is available on

Windows phones. In May 2020, around one-third of Malaysians utilised voice search or voice command technologies. Voice search and voice command are also widely used by millennial aged 18-34, with a gender and ethnicity balance.(Farzana, 2020).

According website article, (Ramos, 2021) voice assistants can make calls, send text messages, look things up online, provide directions, open apps, set appointments on our calendars, and initiate or complete many other tasks. With the addition of separate apps on the phone, our voice can be a type of remote control for our lives. Many employees in firms that embrace technology utilise voice assistants for various functions during meetings. If the consumers wants to know a fact or an address, the voice assistant can look it up and respond. It can also take notes, record action items, schedule meetings, and build to-do and follow-up lists, all of which save time and keep everyone focused on the meeting (Lucas, 2021). Moreover, as mention in the article (Samuel, 2020), due to the obvious nature of speech technology, students may connect without using a screen and gain valuable life-skills practise in the areas of question formation and attentive listening.

When Siri, the first voice assistant, was introduced in 2011, no one could have guessed that this novelty would become a catalyst of technological progress (C. Bridge, n.d.). The voice assistant's technology initially became widely available in automobiles in 2000, smartphones in 2011, and smart speakers in 2015. As previously indicated, the rate of acceptance varied greatly amongst various gadgets (Bret, 2022). It also demonstrates that smart speaker adoption was swift, but not as fast as voice assistant on smartphone adoption when the Amazon Echo and Apple iPhone were introduced as starting points.

According to a research (Talukder, n.d.), a person's adoption of technology is influenced not just by individual attitudes but also by corporate policies, techniques, and actions. Organizations must create enabling conditions, which include the amount and type of assistance offered to individuals who impact their use of technology.

Previous research has established that the Technology Acceptance Model (TAM) is an acceptable model for understanding the adoption of preceding technologies. It has been often changed since its original appearance to meet the demands of newly-upcoming technologies. TAM was transformed into TAM 2, TAM 3, and finally the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which has been developed throughout time.

The UTAUT 2 model consists of several factors, which determine the total user

adoption of particular technologies. Because individual qualities and psychological aspects might impact technology adoption, it has been suggested that future study should look at the relevance of these elements in IoT value co-creation. As voice assistant technology might be considered as one application inside IoT, it is interesting exploring the UTAUT2 determining factors thoroughly. This research intends to examine the factors and intention to use voice assistant technology and acquire a more deep understanding

1.3 Problem Statement

Personal voice assistants (VAs) are the most popular and influential technical gadgets that employ AI, as evidenced by the large number of expert articles in the subject of AI as well as the market's growth. Voice assistants, which were first launched by Apple with "Siri" in 2011, have recently garnered fresh impetus, raising voice as a channel to a potentially disruptive level, (Kessler & Martin, 2017).

Typing is a time-consuming activity regardless of the device used. While typing, all faculties must be focussed, making multi-tasking extremely difficult. This redundancy is readily eliminated with voice AI technology. AI is capable of detecting speech signals needed to condense information and offer correct findings in real time. (Akshada, 2021)

Many employees in firms that embrace technology utilise voice assistants for various functions during meetings. If the consumers wants to know a fact or an address, the voice assistant can look it up and respond. It can also take notes, record action items, schedule meetings, and build to-do and follow-up lists, all of which save time and keep everyone focused on the meeting (Lucas, 2021). Moreover, as mention in the article (Samuel, 2020), due to the obvious nature of speech technology, students may connect without using a screen and gain valuable life-skills practise in the areas of question formation and attentive listening

Due to the fact that there are security and privacy concerns, as expressed in several studies (Pfeifle, 2018) since the voice assistant devices must be listening at all times so that they can respond to users. Many non-users believe that smartphones with voice assistant technology are not useful at all and can't be trusted.

On the other hand, smart speaker users have fewer privacy concerns and rely on companies to safeguard their personal data which think are not interesting to other. To meet the users' needs for voice assistant's technology applications in the future, the quantity of

private knowledge needed should increase, that at an identical time ends up in higher issues for the users concerning the protection of their data and privacy.(Klein et al., 2020)

According to a research studies, Amazon Alexa and Google Assistant have trouble comprehending persons with thick accents, regardless of how excellent their English is especially people with Indian accents were at a little disadvantage, but overall accuracy dropped by at least 2.6 percent for those with Chinese accents and as much as 4.2 percent for those with Spanish accents (Fingas, 2018).When people read news headlines out loud, voice assistants frequently misinterpreted them. Even the tiniest touch of a non-American accent for example, British would result in weird re-enactments of what consumers said.

Regardless, each of the voice assistants' replies is in some manner flawed. Alexa and Siri's speech capabilities are of little use to visually impaired persons who lack the technological know-how to sift through a slew of websites for reliable information since they provide irrelevant response to the users (Miller, 2021). Based on Baeza & Kumar, (2019) research, trust and cybersecurity are critical in this industry, as 16 percent of individuals who don't possess a voice assistant believe it's because of privacy worries, and none of these possible cybersecurity problems were addressed in the survey.

With all these existing problems and issues in this voice assistant technology, it will affect the user's intention to use this technology. Therefore this study investigate the intention and factors that influence the usage of voice assistant technology among Malaysian consumers to encourage more smartphone users to use voice assistant technology.

1.4 Research Question

In order to investigate the factors concerning the intention to use the voice assistant technology among consumers, below research questions are developed:

1. What determines the consumer's intention to use voice assistant technology?
2. Is there any relationship between the determined factors and consumers' intention to use the voice assistant technology?
3. Which are the factors that could highly influence the intention to use voice assistant technology among consumers?

1.5 Research Objectives

1. To identify factors affecting consumer's intentions to use voice assistant technology.
2. To investigate the relationship between the determined factors and consumers' intention to use the voice assistant technology.
3. To examine the factors that could highly influence the intention to use voice assistant technology among consumers.

1.6 Scope and Limitations

1.6.1 Scope

The study conducted is regarding factors influencing the usage of voice assistants in consumers' daily lives in Malaysia. The scope of this study focus on the users of voice assistant technology in Malaysia. In this study as well, researchers also focus on the consumer's intentions to use voice assistant technology, the relationship between the determining factors and the consumers' intention to use voice assistant technology, and the factors that could highly influence the intention to use voice assistant technology among consumers. The researcher select about 383 respondents among smartphone users in Malaysia, by distributing an online questionnaire to obtain information that is needed more clearly and in detail.

1.6.2 Limitations

There are some limitation in performing this study. The data collection might not accurate and can't represent the Malaysian consumers, since the study conducted focusing about voice assistant technology consumer in Malaysia, while the questionnaire are

distributed through online platform which is WhatsApp and Facebook and it is mostly respondent from Melaka and only 159 from 383 respondent responded to the online questionnaire.

The data obtained may be inaccurate as respondents may not feel motivated to deliver accurate and honest answers. In addition, respondents may also not feel comfortable offering responses that describe them negatively or disclose their privacy to the researcher.

Other than that, the data obtained is likely to be an error because prospective respondents might not interested in participating in this survey which will result in a low response rate and the time to finish the research is limited.

1.6 Significance of the Research

1.6.1 Theoretical Contribution

This research study will provide information on the factors that influence Malaysian consumers' willingness to use voice assistant technology. The study can also utilise this information to assess respondents' understanding of voice assistant technology. This research will also aim to investigate and expound on this area. Furthermore, this study might assist future researchers in obtaining more references on this subject. It may also assist other academics or researchers working on similar study areas, like as intention of consumers to use the voice assistant and factors that influencing the consumers.

1.6.2 Practical Contribution

This research will benefit the community, particularly those who utilise voice assistant technology in their everyday lives. This is done to encourage people to fully utilise voice assistants. The findings of this study will link the respondents' intention to use voice assistant technology with the factors that influence users to use the technology. This study will contribute to the developers of voice assistant technology to improve the voice assistant technology.

1.7 Summary

In short, voice assistants technology are rapidly advancing in a variety of industries, including banking, healthcare, government, security, construction, and retail. Context-based understanding has been a breakthrough in voice assistance technology over the past few years, and it is now becoming a crucial component in people's life. This chapter discussed the background of voice assistant technology. It also went through the issue description, research questions, research objectives, study scope and limitations, and importance. The literature review for this study are discussed in the next chapter. The information presented will be more comprehensive and understandable.

CHAPTER 2

LITERATURE REVIEW

2.1 Chapter Overview

This chapter attempts to review the relevant literature and research on the factors that affect consumer intention in using voice assistant technology. The chapter first discusses the definition of voice assistant technology, followed by factors affecting consumers' intention on voice assistant technology. The second part discusses the underpinning theory, UTAUT2 (Unified Theory of Acceptance and Use of Technology) developed by Venkatesh et al. (2012). The next part discussed the theoretical framework and hypothesis development, and the last part is a summary.

2.2 Voice assistant

Voice assistants are devices/apps that reply to humans using voice recognition technology, natural language processing, and AI technology (Aksheeta Tyagi, 2021). A voice assistant, also known as an intelligent personal assistant or a connected speaker, is a new type of device that is based on natural language speech recognition (Beaulieu, 2020). They let the user do a search using a speech command, as well as retrieve information via voice synthesis (K. Bridge, 2021).

In 1922, Radio Rex was the first voice-activated toy. It was a wooden dog toy that would come out of its house when its name was called. Bell Labs introduced "Audrey," the Automatic Digit Recognition machine, in 1952. The next decade witnessed incredible growth and research in the field of speech recognition, with most voice recognition systems progressing from knowing a few hundred words to comprehending thousands comprehending hundreds of people and gradually finding their way into customers' houses.(Maurya et al., 2021)

In IR 4.0 era, the emerging technologies such as virtual reality, augmented reality,

and voice interaction has modifying people's interactions with the environment and altering digital experiences. (Terzopoulos & Satratzemi, 2020). Personal voice assistants (VAs) are the most popular and influential technical devices that employ AI, as evidenced by the large number of expert publications in the subject of AI as well as the market's growth. Voice assistant is a conversational AI technology that receives and interprets orders using voice commands. Devices using this technology can communicate with and react to human enquiries in natural language. (R. Chotia, 2022).

Voice assistant programmes are built on the Automatic Speech Recognition (ASR) method (Raktim Midya, 2020). ASR systems take voice recordings and break them down into phonemes, which are subsequently processed into text. For human voice recognition, a phoneme is a basic unit of measurement. Whatever type of speech recognition software you choose, the ASR is where all the action takes place,(Haton, 2003). In a brief, the process begins with the device's microphone capturing speech. Speech waveforms are recorded and immediately sent to acoustic analysis, which is done on three levels.

Acoustic modelling is the initial level, and it depicts which phonemes were spoken and what words these phonemes completed. The next stage is Pronunciation modelling, which examines how phonemes are spoken, as well as if there is any accent or other vocal device peculiarities, in order to represent the phonetic variability of speech. Language modelling is the final stage, which aims to discover contextual probabilities based on which phonemes were collected.

The gadget uses technology to synthesise the user's message, break it down, assess it, and respond with a relevant response. The science fiction ideal of connecting with our computers by talking to them has come true with voice assistants. Siri from Apple, Cortana from Microsoft, Alexa from Amazon, and Assistant from Google are all software agents that operate on purpose-built speaker devices or smartphones. (Matthew, 2018)

According to the website of Amazon.com, Alexa is Amazon's voice artificial intelligence assistant. Alexa is a cloud-based service that can be used everywhere there is an internet connection and a device that can connect to Alexa. With the Google Pixel phone in 2016, Google Assistant was first launched to Android phones. According to Maggie (2022), after saying the "OK Google" or "Hey Google" wake words, Google Assistant provides voice commands, speech searches, and voice-activated device control, allowing users to execute a variety of activities. It is intended to allow users to engage in conversational