MASTER THESIS

Hey Google! Why would I use you?

A research into the intention to use of smart home devices among Dutch consumers, in particular the smart speaker.

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ABSTRACT

Purpose

In recent years, there has been an enormous growth in the area of intelligent devices for home automation. Such technologies are designed to facilitate people to control their home environments faster and more efficiently. As the Internet of Things (IoT) is becoming more and more integrated into consumer lives, enormous amounts of data will be generated. This comes along with the concerns about how personal data will be used and secured. Currently, 3.3 million Dutch households own one or more smart home products. The smart speaker has grown the fastest in the past period. Since the current marketing methods are shifting, it is interesting to investigate which factors influence the intention to use Smart Home devices. The UTAUT-model has been used and expanded with privacy risk, level of autonomy, consumer trust and self-innovativeness. This research will discover the factors of the intention to use of the smart speaker among Dutch consumers.

Method

The different variables were measured using an online survey. The survey includes nine independent variables measured using a 5-point Likert scale, which ranges from strongly agree (1) to strongly disagree (5). Furthermore, experience and demographic questions were asked. The sampling method is a non-random sample method, and the snowball technique was utilized to collect respondents. 272 responses were used for analysis. The age range of the respondents was from 18 to 49 years (M = 25.34; SD = 14.10). In total, 66.9 percent was female, and 33.1 percent was male.

Findings

A Pearson correlation analysis and a hierarchical regression analysis were performed. The findings showed that the intention to use a smart speaker is affected by hedonic motivation, self-innovativeness, trust, performance expectancy, descriptive social norm, and effort expectancy. In which hedonic motivation was the strongest predictor, followed by self-innovativeness and trust. Surprisingly, the results showed that effort expectancy has a negative influence on the intention to use a smart speaker. Furthermore, Inductive social norm, price value, privacy risk and level of autonomy showed no significant effect on the intention to use. As well as the demographic (gender, education, and age) and experience questions, these also showed no significant effect on the dependent variable; the intention to use.

Conclusion

This study has found that hedonic motivation is the most important factor in technology adoption of the smart speaker. As a result, from a practical standpoint, this study suggests that marketers should establish the enjoyment of the smart speakers. This can be done by considering the looks and other features that will encourage consumers to enjoy the smart speaker. The self-innovativeness from people and trust were also found to be a good predictor. From a theoretical standpoint, this study demonstrates that technology adoption is closely linked to uncertainty, and as a result, customers place their faith before deciding to embrace IoT or a smart speaker. As a result, from a practical standpoint, this study suggests that marketers should establish customer trust in the firm and the product. The descriptive social norm was found to be a predictor of the intention to use a smart speaker. It is from a practical point of view important to establish the desire to utilise a smart speaker. Thinking of commercials that give the impression that a large number of people are already utilising a speaker.

Keywords: Intention to Use, UTAUT, Smart Home, Internet of Things, Smart Speaker

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I hope you enjoy reading my thesis!

Aniek Steggink
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List of Abbreviations

Below is a table of the most relevant abbreviations.

Table 1. List of Abbreviations

Abbreviation	Meaning
IoT	Internet of Things
UTAUT	Unified Theory of Acceptance and Use of Technology
UTAUT2	The extended version of the UTAUT. UTAUT2 incorporates three constructs into UTAUT: hedonic motivation, price value, and habit.
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
IDT	Innovation Diffusion Theory
PE	Performance Expectancy
EE	Effort Expectancy
SI	Self-Innovativeness
ISN	Injunctive Social Norm
DSN	Descriptive Social Norm
HM	Hedonic Motivation
PV	Price Value
LA	Level of Autonomy
PR	Privacy Risk
TR	Trust
SPSS	Statistical Package for the Social Sciences
VIF	Variance Inflation Factor

1 Introduction

“Hey Google, I want to watch a movie!” Suddenly, the TV switches on, the music is muted, the lights dimmed to a good level and the curtains are closed. All by itself! For a while now, it has not been a scene from a movie in the future, but reality. In recent years, there has been an enormous growth in the area of intelligent devices for home automation. Such technologies are designed to facilitate people to control their home environments faster and more efficiently (Patru, Carabas, Barbluscu, & Gheorghe, 2016). This trend is driven by a phenomenon called the Internet of Things (IoT). In smart environments, IoT can be described as the interconnection of home devices and sensors that are capable of sharing information across platforms through a unified framework (Gubbi, Buyya, Marusic, & Palaniswami, 2013). Due to the attributes IoT can be used in home networks, many IoT corporates have developed smart home platforms. The Internet of Things makes it possible for people to use the internet in their lives in endless ways (Want, Schilt & Jenson, 2015). IoT technology is being used in a growing number of industries, such as healthcare, retail and also at the consumer in smart homes. The uniqueness, innovativeness, and potential implications of technologies are the reason that these kind of technology in home environments and particularly in the field of marketing deserves an extended understanding.

A smart home is a home automation system which uses the Internet of Things (loT) to link sensors, monitors, devices, and gadgets to gain overall management of the domestic setting (for example, heating, lighting, security) (Cook et al., 2012). Beyond that, sensors and processors may ‘obtain and apply knowledge' concerning a home, changing control settings without the need for direct human intervention (Das & Cook, 2005; p. 337). In the idealized version of a connected future, all smart home devices interact effortlessly with each other. IoT-based smart home technology has transformed human existence by offering connectivity to everyone, regardless of time or location (Gaikwad et al., 2015, Samuel, 2016).

Lately, voice technology has emerged as a serious candidate for becoming the main form of humans interaction with computer systems in the future (due to increasing advances in the fields of machine learning and natural language processing). Considering voice's direct, effortless, intuitive, flexible, and sophisticated nature, it is likely that "spoken dialogue interfaces will become the future gateway to many key services" (Luger & Sellen, 2016; pp. 5286). The most popular of the voice assistants are smart speakers. Which some claim, will be central to homes in the future where everything is integrated. The smart speaker is a wireless device with a built-in virtual assistant, which can be controlled with voice. A smart speaker is a good example of a IoT device and works closely together with other smart devices in home if they are connected to the same network. For example, the smart speaker can dim the lights or turn up the heat.

According to Hobsbawn (2014), the future of IoT depends on how brands and consumers will interact and implement it in their lives. On the one hand, (artificial) intelligence will be used to gain insights into patterns of behaviour and how to react to them. On the other hand, when providing these

personal data, people expect useful and personalized products, but also services that make life more comfortable, fun, and safe in the home environment (Brush et al., 2011; Taib, De Coster, Sabri, & Tekantape, 2017). As IoT is becoming increasingly integrated into consumer lives, enormous amounts of data will be generated. This comes along with the concerns about how personal data will be used and secured. As a result, the IoT Privacy Paradox arises. This refers to the consumer's demand to use IoT technology, but simultaneously defend against potential threats to personal security and privacy. This comes along with the possible misuse of available personal data (Williams, Nurse, & Creese, 2016). People seem to become less and less aware of what kind of data they are giving away (Arabo, 2012). With today's society increasingly valuing privacy, companies need to be transparent about what happens to this data.

In the Netherlands, the smart speaker is not yet as popular as in countries like the United States, but it is becoming increasingly popular. In 2019, a total of 147 million smart speakers were sold worldwide (Strategy Analytics, 2019). GlobalWebIndex has made a trend report in 2020 about smart home devices and smart speakers. One of the key insights was that working from home is driving smart product adoption. As remote working becomes more commonplace, people are starting to see more benefit in home products (GlobalWebIndex, 2020). Every year in July, Multiscope publishes the Smart Home Monitor, a survey into the use of smart home devices among the Dutch population. Currently, 3.3 million households (42%) own one or more smart home products. Possession of a smart home product is growing within all segments, but most households owning products in the segments 'energy & heating', 'speakers' and 'lighting'. The smart speaker has grown fastest in the past years (6% in 2018, compared to 19% in 2020 and 23% in 2021) (Multiscope, 2021).

The pandemic has also its influence in the popularity of smart home products. COVID-19 has a great impact on our daily lives and more time is spent at home. The need to create a pleasant living environment has therefore visibly increased. This has accelerated the interest in smart solutions and virtual assistants and has also contributed to an increase in the number of smart speakers sold in the Netherlands (GfK, 2021).

Given the lack of understanding of why people would or would not prefer to use a smart speaker, combined with the fact that the use of the smart speaker is increasing, this is a current and relevant research area. This study will concentrate on the Dutch market because of the preceding. This raises the following research question:

"Which factors influence the intention of Dutch consumers to use smart home devices, in particular, the smart speaker?"

The UTAUT-model is used to explain the intention to use a smart speaker. UTAUT provides an indication of the intention to utilize a specific technology. In 2012, the UTAUT model was expanded to make it applicable to the context of consumer use (Venkatesh et al., 2012). The existing model can still

be evolved by adding relevant factors. For example, trust and privacy risk are predictors of the intention to use (Chung, Iorga, Voas, & Sangjin, 2017; Pridmore et al., 2019; Zeng, Mare, & Roesner, 2017). When customers feel a high risk towards their privacy, they will be less likely to use a smart home device. Menard and Bott (2018) also found that privacy concerns may influence attitudes concerning technology acceptance. In addition, privacy concerns have a negative impact on the willingness of consumers to share personal information on the internet and to use online services (Fortes, Rita, & Pagani, 2017). Furthermore, trust can play a role in conquering risk perceptions and uncertainty in using and accepting a new technology. Therefore, it is good to understand how trust is formed to stimulate the application of a new system (Li, Hess & Valacich, 2008). By adding these new factors, the predictive performance of the model can be increased.

The emergence of smart speakers in the last year (also due to the pandemic) in the Netherlands has inspired research into the elements that influence Dutch consumers' willingness to use a smart speaker. This study distinguishes on the one hand the focus on a sector in the smart home and the technology of Internet of Things. On the other hand, the testing of a comprehensive model aimed at identifying the key factors of intention to use. From an academic standpoint, this study will contribute to the literature on adoption of smart speakers in the Netherlands. Although there are already several studies with smart speakers in combination with UTAUT, the novelty of this study is that the innovation: the smart speaker is also constantly changing and developing, which can also change the opinions of consumers. In practise, these findings can raise awareness to the industry and professionals about the aspects that influence a person's desire to use a smart speaker and can be used as a basis for further research into smart home products and will led to improvement of knowledge and understanding of the adoption of the smart products.

2 Literature Framework

This literature framework will investigate the factors, which influence the adoption and intention to use of a smart speaker. The Unified Theory of Acceptance and Use of Technology (UTAUT) is the primary theory that will be used in this research. The extended UTAUT2 model will be modified, and multiple variables will be added. Several variables will be examined as potential factors for the use and adoption of a technology, in specific the smart speaker. This framework starts with the explanation of the smart speakers and the intention to use, followed by the UTAUT2 model and a clarification of the variables and the extensive variables.

2.1 Smart Speakers

Already in 2016, Luger and Sellen (2016) predicted that voice based interfaces and devices are expected to be the next natural form of Human Computer Interaction. According to Gaultier (2016) the competition for voice assistants has shifted "into the homes of consumers" in the form of smart speakers (p. 3). The purpose of the voice assistant was originally to help users with simple tasks in everyday situations in which they could not use their hands, like while driving or cooking. Tasks like checking the weather, contacting a friend, setting a timer. Initially designed for smartphones, but almost all the industry's major players have quickly shifted their focus to other media devices and are exploring the possibility of incorporating voice assistants into home systems and devices. Smart speakers are Bluetooth and WiFi-enabled devices with the same voice assistant technology found in smartphones. These speakers have many microphones that the user can utilise to activate and deliver commands to the voice assistant. A smart speaker is a good example of an Internet of Things (IoT) device and works closely together with other smart devices in home if they are connected to the same network (Hoy, 2018). Smart speakers can monitor their environment and acquire information about users throughout the day due to their always-listening nature. Nasirian et al. (2017) claim that this results in greater service quality and more implicit and transparent forms of interaction.

The intention to use can be described as the motivation that customers have towards planning to use or not to use a specific technology (Venkatesh et al., 2003). According to research done by Multiscope (2021), the smart speaker is the fastest growing technology and 23% of the households in the Netherlands use a smart speaker. This is while in 2019 only 3% of Dutch households (Multiscope, 2019) were planning to buy a smart speaker. The smart speaker has thus gained enormous popularity. In this study, the intention to use is a dependent variable because it is a great predictor of the usage of a technology (Lee et al., 2012). This study investigates the opinion of what the Dutch consumer value about a smart speaker. The goal is to predict the consumer's intention to employ a technology, and therefore an elaborated model of UTAUT is used.

2.2 Unified Theory of Acceptance and Use of Technology

The use of technology has been researched in-depth in the past. Researchers try to find the perfect formula to clarify but also predict the behaviour of adoption by working together and build upon each other's performances. New technologies will always emerge, and their use depends on many different factors. Nowadays more and more technologies are developed. Therefore, it is interesting to know why a certain technology is used a lot and the others fail. Davis (1989) took the first steps in his research towards the use of technologies. Later, Venkatesh and Davis (2000) came up with the Technology Acceptance Model (TAM), which found that the perceived ease of using a system and the perceived usefulness are the key components of technology acceptance. The TAM was primarily based on the main principles of the Theory of Reasoned Action (TRA) model (Fishbein, 1967). However, with the increasing diversity of users and the diversity of all the technologies, more elements seemed to be important for the acceptance and have been added to future models. Venkatesh et al., (2003) analysed eight different user acceptance of technology theories, including TRA, TAM1 and the TAM2 and combined them in the Unified Theory of Acceptance and Use of Technology model (UTAUT). In this model, multiple new variables are added but he also suggested factors like 'Gender', 'Age' and 'Experience' have a significant moderating effect. The UTAUT model has different elements which influence the intention to use a specific technology. However, until then all the models had the same limitation: the intention to clarify the acceptance of technology in organizational contexts. Venkatesh et al. (2012) appealed the demanding need to expand the UTAUT model to other circumstances and conducted research into additional variables to make it applicable to the context of consumer use. Venkatesh et al. (2012) declared the following new main elements in the UTAUT2. They found significant relations between the technology use and hedonic motivation. Furthermore, customers must deal with the cost of the technology, which creates a new variable: price value.

2.2.1. Performance Expectancy

Performance expectancy (PE) refers in the first UTAUT model to the degree to which an individual expects that a system will help him or her to attain a gain in job performance (Venkatesh et al., 2003). In this study, performance expectancy reflects the belief of the Dutch consumers that smart speaker adoption will increase the personal performance. Performance expectancy is similar to the perceived usefulness of the TAM (Venkatesh, 1996). The Innovation Diffusion Theory (IDT) of Rogers (2003) accentuates that only if innovations can offer a unique advantage over existing solutions, consumers will decide to use innovations. In this research, the efficiency and functionality could be summed up as perceived usefulness and performance expectancy. Research disclosed that the privacy trade-off is generally accepted by smart speaker users because they value the high usefulness of the products more (Pridmore et al., 2019). So, people will accept that a smart speaker gets a lot of personal (private) information, in return for the fact that it makes your life easier and more efficient. Other research assumes that convenience is the main reason to affirm any loss in privacy (Chhetri & Motti, 2019; Zheng

et al., 2018). Performance expectancy refers in this research onto the customers' feelings of improved performance in life when they use the smart home technology. Performance expectancy has a direct relevance when using a smart home device like a smart speaker because people rely on the use of smart home devices to improve their digital lives and make life easier (Onaolapo, 2018). Furthermore, performance expectancy has been analysed in the past in the context of the adoption of the smart speaker (Kowalczuk, 2018; Yang & Lee, 2018). These studies assume a positive attitude towards a smart speaker among a great performance expectancy. Princi and Krämer (2020) also recently disclosed that the effect of convenience influences the willingness of engaging and using smart technology. The proposal of the hypothesis is, therefore, as follows:

Hypothesis 1: Performance expectancy is positively related to the intention to use a smart speaker.

2.2.2. Effort Expectancy

Effort expectancy (EE) is defined as the degree of ease associated with the usage of the smart home device (Venkatesh et al., 2003). The intention to adopt a new technology is not only determined by how positively evaluated the performance of the technology is. Also by how convenient it is to use the technology itself and how much effort it takes to use it (Alalwan, Dwivedi, & Rana, 2017). For customers to gain a positive attitude towards IoT in home environments, they need to feel that this technology is easy to use. If consumers consider that a smart speaker is very difficult to operate, the intention to use will be affected. Several previous studies conclude that perceived ease of use affects customer attitudes and thus behavioural intentions towards technology significantly (Davis et., 1989; Lee et al., 2012). So, the proposal of the hypothesis is as follows:

Hypothesis 2: Effort Expectancy is positively related to the intention to use a smart speaker.

2.2.3. Social Influence

Social Influence (SI) is defined as the degree to which an individual perceives that important others expect he or she should use the new technology (Venkatesh et al., 2003). Venkatesh et al. have classified social influence into different concepts which refer to the fact that the social environment influences the style of people to behave in certain situations (Venkatesh et al., 2003). The subjective norm is first used by Ajzen and Fishbein in 1977 in the Theory of Reasoned Action with the perception how to behave according to others (Ajzen & Fishbein, 1977). The social factors include agreements in cultural and social factors (Venkatesh et al., 2003). The concept ‘image’ is first introduced by Rogers in the Innovation of Diffusion Theory (1995) and can be explained as the perception the new technology will enhance the status or image of a person. Nonetheless, although research has shown that subjective norm predicts the intention to adopt a technology (Venkatesh & Davis, 2000), previous studies also were constrained by the consideration of the subjective norm as an interpretation of social influence (Lee, Lee, & Lee, 2006). However, Cialdini and Goldstein (2004) declare this definition as too narrow and therefore expanded it and accentuated the differentiation of social influence into two norms, the injunctive and the descriptive social norm. The injunctive social norm (ISN) is closely comparable with

the subjective norm and is indicating to what often people commonly approve or disapprove. The descriptive social norm (DSN) is, on the other hand, referring to what most people generally do (Cialdini & Goldstein, 2004). From previous research is known that both injunctive social norm (such as Yang, Lu, Gupta, Cao, & Zhang, 2012., for mobile payment and Lee & Kozar, 2008., for anti-spy software) as well as, the descriptive social norm (in for example an online social networking context; Chen, Yen, & Hwang, 2012) influence people to adopt the technology.

Because people can start using technology by being informed that a smart speaker is pleasant to use (ISN) but also by observing people using a smart speaker in their environment (DSN), the following hypotheses could be proposed:

Hypothesis 3: Injunctive Social Norm is positively related to the intention to use a smart speaker.

Hypothesis 4: Descriptive Social Norm is positively related to the intention to use a smart speaker.

2.2.4. Hedonic Motivation

When smart speakers bring enjoyment, users would have an inevitable drive to embrace the technology. In 1989, Davis et al. already determined this as a potential incentive considering a TAM factor. Venkatesh (2012, p. 401.) stated that Hedonic Motivation (HM) is directly influencing the adoption of the technology: "fun or pleasure derived from using a technology has been shown to play an important role in determining technology acceptance and use". Bruner and Kumar (2005) observed that pleasure is capable of prompting users to adopt the technology. Some researchers have emphasised the relationship between perceived enjoyment and the other expectation of customers (Shiau & Luo, 2013; Sun & Zhang, 2006). Hedonic items are described as ones "whose consumption is primarily characterized by an aesthetic or sensual pleasure, fantasy, and fun affective and sensory experience" (Dhar & Wertenbroch, 2000, p.2.). Users are more willing to think of pleasure, excitement, satisfaction, and escapism while consuming hedonic goods (Babin et. al., 1994). Kowalczuk (2018) describes in his research about smart speakers that "perceived enjoyment is the degree to which the use of smart speakers is felt to be enjoyable in its own right." (p.7). Besides, in current literature, the value of enjoyment is emphasized as a significant factor in the adoption of smart speakers (Kowalczuk, 2018; Pridmore et al., 2019). The proposal of the hypothesis is, therefore, as follows:

Hypothesis 5: Hedonic Motivation is positively related to the intention to use a smart speaker.

2.2.5 Price Value

Price value can be seen as a possible variable that influences the intention to use. When the price value is positive, the benefits of using the technology are perceived to be greater than the monetary costs and such price value has a positive effect on the intention to use (Venkatesh, 2012). Venkatesh et al., (2012) defines Price Value (PV) as "Consumers' cognitive trade-offs between the perceived benefits of the applications and the monetary cost for using them" (p.170.). So, if the user likes the service or the performance of the technology, which outweighs the costs, it will have a positive impact on the intention to use it. Kim and Ammeter (2014), found that the financial burden is a significant factor, which hinders

consumers accepting it. Shin (2009), on the other hand, indicates that it is not only the purchase cost that matters but also the cost of maintaining and repairing the product or service. Previous research on emerging technology has provided strong evidence of the relationship between the adoption by customers and perceived costs. William, Bernold and Lu (2007) found that the perceived expenses played a significant role in the decision of consumers to implement information-oriented technologies. Similar findings in the field of IoT, showing cost as a notable indicator of intention, were also found by Park et al. (2017). Since smart speakers are still at an early stage in the competitive market, the financial part of the success of the market is also essential. Although not all research considers price value to affect the decision to use a technology positively (Hew et al., 2012; Nguyen et al., 2014). Nevertheless, sufficient research show evidence to expect price value to have a positive effect on the intention to use the latest technologies (Venkatesh et al., 2012; Yuan et al., 2015). The proposal of the hypothesis is, therefore, as follows:

Hypothesis 6: Price Value is positively related to the intention to use a smart speaker.

2.3 Additional Variables

The suggested UTAUT2 model, which builds on an already unified model that incorporates several models and concepts of technology acceptance, inevitably provides a well-theorized understanding of technology acceptance in a consumer context. However, still some gaps can be found in the model. Although it is not a problem at first, it does create space for other research to explore. In this research, the UTAUT-model will be extended with the variables: 'Privacy Risk', 'Level of Autonomy', 'Consumer Trust' and 'Level of Innovativeness'. By adding these new factors, the predictive performance of the model may be increase.

2.3.1. Privacy Risk

In this age of digitalization, the needs and concerns of consumers are also changing. Increasingly more physical products are combined with (digital) elements of the internet and collects data to control the smart home environment. Although technology can improve consumers' lives in a variety of ways, the desire from companies for personal customer data causes consumer concerns about the security of this data (Holmes, 2016). The concerns about the security of the smart home products have also led to more concerns about privacy, which is why the variable Privacy Risk (PR) has been added to the extended model in this research. Privacy risk refers to the concern of losing authority over (own) personal data (Keith, Babb & Lowry, 2014). Because smart speakers are always on and can always listen and record, customers can be worried that personal data ends up in the hands of the wrong person. When customers feel a high risk towards their privacy, they will be less likely to use a smart home device. Privacy problems are classified as concerns about the potential loss of information (Wottrich et al., 2018). Research has found that privacy concerns have a negative impact on the willingness of consumers to share personal information on the internet and to use online services (Fortes, Rita, & Pagani, 2017). In addition, Menard and Bott (2018) also found that privacy concerns may influence attitudes concerning

technology acceptance.

From a user-centred viewpoint, Chhetri and Motti (2019) explored privacy issues for smart speakers like Amazon Echo or Google Home. They discovered that many users are concerned about privacy and categorized concerns. The most commonly reported concern was that smart speakers often listen to conversations and monitor the behaviour of users as well as the user desires (Chhetri & Motti, 2019). The findings of the research reveal that the unintended activation of smart speakers by voice contributes to security and privacy concerns among smart speaker users (Olson & Kemery, 2019). A common problem for users is that smart speakers frequently react to conversations, providing a sense of "creepiness." The home assistant is then seen as a "spy," but consumers nevertheless consider surveillance as a trade-off for their devices' convenience and usability (Fruchter & Liccards, 2018; Pridmore et al., 2019). Another characteristic of smart speakers that people find particularly disruptive is that actual humans listen to analyse the recordings. For instance, Amazon employees are tasked with transcribing commands from users, comparing the user-machine interaction (Day et al., 2019).

The top user privacy concerns, as Chhetri and Motti (2019) note in their report are: always paying attention to conversations, user monitoring, cloud data storage, data protection and data hacking and distributing (public/third-party/government). Most consumers are afraid that microphones embedded in smart speakers record personal conversations (Pridmore et al., 2019) as well as background discussions and noises, which are not directed to the speaker (Chhetri & Motti 2019; Lau et al., 2018). Such concerns can lead to a reduced willingness to share private information with the device. These concerns are not without reason, because it is true that the company does employ sound recordings. For instance, the news that Amazon hires thousands of employees to listen to voice recordings of Amazon's echo, enlarges the awareness of the privacy risk for consumers (Day, Turner, & Drozdiak, 2019).

Additionally, Wueest (2017) has examined several risks associated with the security of smart speakers. Several incidents of TV commercials and shows that activated a smart speaker are described, whereas Wueest (2017) also disclosed situations where children manage to use Alexa to order things, like toys, only using their voice.

Previous studies of smart speakers found that privacy concerns are the primary reason for the non-adoption of those devices. The proposal of the hypothesis is, therefore, as follows :

Hypothesis 7: Privacy Risk is negatively related to the intention to use a smart speaker.

2.3.2. Customer Trust

Customer trust is fundamental for establishing long-term relationships with customers. Mayer, Davis, and Schoorman (1995) described trust as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other party will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (p.712). Garbarino and Johnson (1999, p.71.) state; "Trust is seen as an expression of security between partners when making an exchange, or in another type of relationship". This is particularly the case in the context of this study,

given the pervasiveness of the things connected to the internet, the high level of IT involvement, and the amount of data that will be generated through these things (Fugard, Beck & Gärtner, 2011). Technological devices (e.g., computers) have increasingly been considered appropriate trust objectives particularly when computers are imbued with human-like features. The risks identified with mobile applications do not emerge without human interventions but are precipitated by actions and decisions of the developers (Li, Hess, & Valacich, 2008).

In the context of IoT, trust can be considered as the extent to which consumers believe the device, in this case the smart speakers, will keep their data safe and will have a positive impact for their life (Corritore, Kracher, & Wiedenbeck, 2013). Trust is commonly known to affect the risks of privacy and the attitudes of IoT users (Worthy et al., 2016; Zheng et al., 2018). Many smart speaker owners distrust their product (Fruchter & Liccardi, 2018), but research has shown that customers usually trust famous and successful companies such as Google or Amazon. (Pridmore et al., 2019). The GDPR, (the EU Data Protection and Privacy Law), which became effective in 2016, have raised the trust of internet and online users. Nevertheless, multiple reports in the media assert that commonly used smart speakers are not always reliable (Chung, Iorga, Voas, & Sangjin, 2017; Pridmore et al., 2019; Zeng, Mare, & Roesner, 2017). When it comes to data processing, users consider computers to be more trustworthy than humans (Winder, 2019). However, once a smart speaker can act trustworthy by seemingly revealing private sensitive details about itself, they could be able to persuade people into disclosing more information than they might do in other situations (Saffarizadeh et al., 2017). When people experience uncertainty or concerns in using a new technology, trust is an important predictor of what people expect from the circumstance, both in social interaction and in business interaction (Awad & Ragowsky, 2008). Awad and Ragowsky (2008) indicated that increasing confidence levels is related to an increased usage rate. Consumers are inclined to feel unsure and sceptical about the adoption of the smart speaker because of the high participation of IT in IoT technology. Trust can effectively reduce ambiguity and to some extent, ensure security. When a consumer has more trust in a device or technology, the person will keep using the technology and the smart speaker, so the following hypothesis can be formulated:

Hypothesis 9: Customer Trust in smart speakers is positively related to the intention to use a smart speaker.

2.3.3. Self-Innovativeness

Midgley and Dowling (1978) defined innovativeness as the degree to which an individual is receptive to new ideas and makes decisions on innovations independent of the communicated experience of others. Rogers (1995) used it as a concrete measure for the adoption of new products in the Diffusion of Innovation Theory. Here, Rogers argues that diffusion is the process by which an innovation is communicated over time among the participants in a social system. Also, Rogers (1995) stated that people are only willing to accept a new technology over another technology if it affords a unique improvement or convenience. Furthermore, Woszczynski et al. (2002) argued that individuals who score

high on personal innovativeness tend to be the first ones to adopt a new product. If someone is willing to seek and try out new technologies, the person will adopt technology earlier than others (Sanchez-Franco et al., 2011). Although the smart speaker was invented some time ago, it can still be seen as an innovation. Looking at the Gartner's hype cycle for emerging technologies, the voice assistants has just reached the peak in 2017 but are expected to reach the plateau of productivity in five to ten years from then. At the same time, connected houses are reported to be at the top of their hype while also approaching a productivity plateau during the same time span. This suggests that these two trends are related or at least go hand in hand in some way (Gartner, 2017).

So, the following hypothesis can be suggested:

Hypothesis 10: A higher level of Self-innovativeness is positively related to the intention to use a smart speaker.

2.4 Research Model

Combining all the above-mentioned hypotheses, the conceptual research model is presented in Figure 1, on the next page.

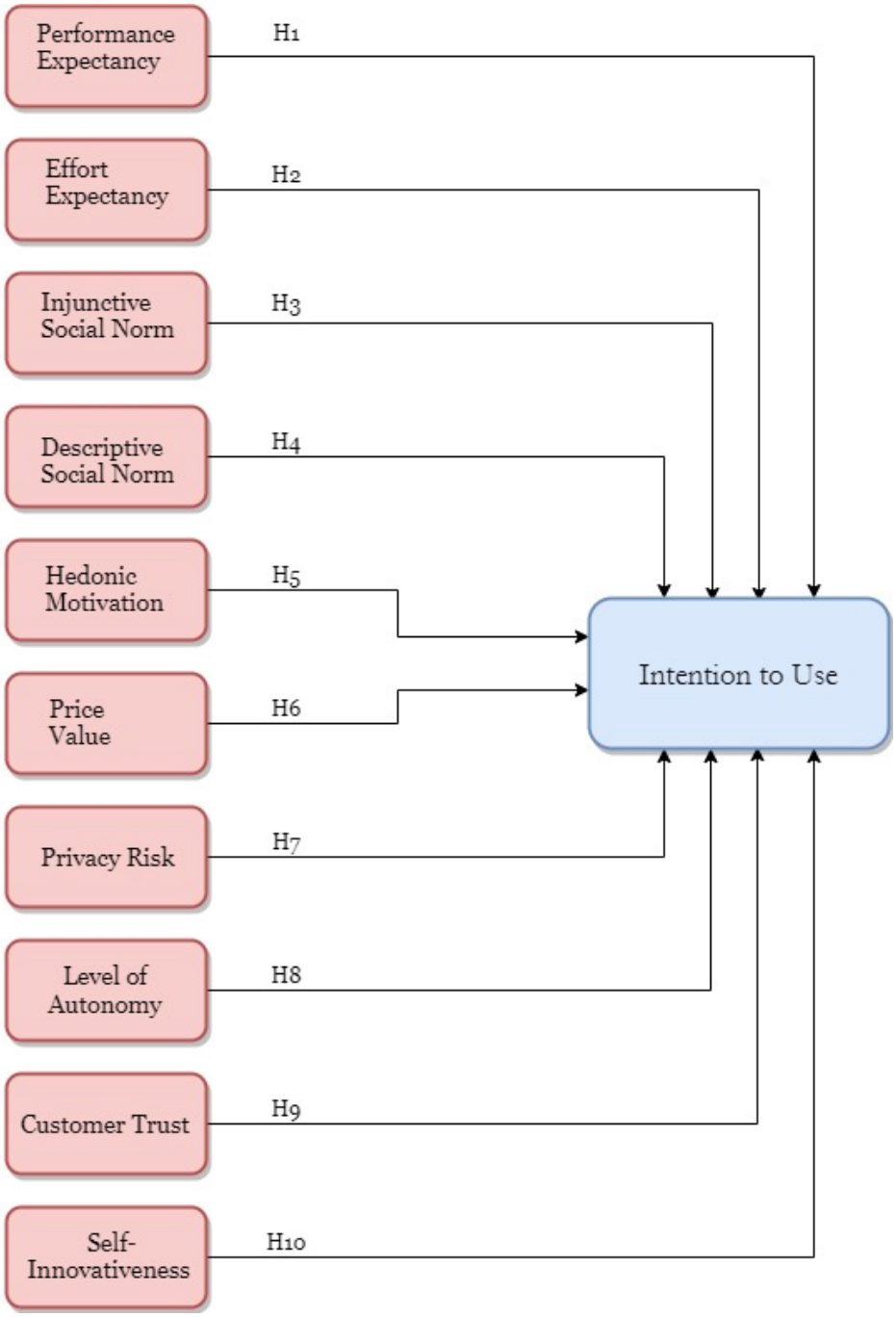


Figure 1. Research Model illustrating the intention to use smart speakers.

3 Methodology

This chapter focuses on the methodology of the research. First, the research design and the procedure of the research will be explained. Followed by information about the participants, clarification of the measures and testing of the validity and reliability of the factors.

3.1 Research Design

A survey is used as research design. Several variables were added to the UTAUT model of Venkatesh et al., (2003). A total of nine independent variables for the intention to use were selected to be tested in the survey. A pre-test was conducted with seven Dutch participants (age: M=24.14, range 20-29; 57% female, 43% male) to ensure that the statements were clearly and unambiguously formulated and interpreted in the same way by everyone. None of them took part in the final survey. Utilising the plus-min method, respondents were asked to put a plus for everything if it was clear and a minus if it was not clear. This was done for an introductory text and the statements. Furthermore, they could give general remarks. Based on the pre-test, some minor adjustments were made to the formulations. The results of the pre-test can be found in Appendix A.

Since most consumers have little to no experience with a smart speaker measuring attitudes can be challenging because they lack practical knowledge of the smart speaker. Therefore, people were primed with an introduction text at the beginning of the survey. In this text the technology and its applications were explained to provide the respondents a good impression of the possibilities of a smart speaker. The whole introduction text can be found in Appendix B. The statements of the survey were maintained from literature, so it was possible to ensure that the relevant scales generated accurate measurements. The survey was set up in online survey software Qualtrics, from which the data was afterwards exported and analysed in SPSS.

3.2 Procedure

The survey used a non-random sampling method. The snowball sampling technique is used to collect respondents. First, the own personal network of friends and family was asked to fill in the survey. Afterwards, these people were asked to share the survey with their network. Everyone between 18 years and 49 years old with a Dutch nationality could fill in the questionnaire. Also, media channels like Facebook, Instagram, Linked In, Whatsapp and the Sona system of the University of Twente were used to obtain more respondents. Data collection was conducted from the 17th of May 2021 until the 11th of June 2021. The average time to complete the questionnaire was around seven minutes.

The survey started with informed consent, in which respondents were provided with some background information and informed that participation was anonymous, there were no right or wrong answers and the participants could stop at any time. When people consented and wanted to participate in the study, they were first asked some demographic questions, along with how much experience they already had with a smart speaker. After that, the introductory text about the smart speaker was provided.

Everyone was shown the introductory text (and could not click through immediately) to ensure everyone would start the survey with the same amount of knowledge. Next, the respondents filled in the statements. All the collected data has analysed in the statistics program SPSS, version 22.

3.3 Participants

A total of 325 people participated the survey, 53 responses did not meet the requirements or did not complete the whole survey and were thus excluded from analysis. The remaining 272 responses were used for analysis. In total, 66.9 percent was female, and 33.1 percent was male. Furthermore, the age range of the respondents was from 18 to 49 years (M = 25.34; SD = 14.10*)*. According to the amount of experience, the largest group has 'little' experience (39.3%, N=107). Table 2 gives an enlarged overview of the demographic information about the respondents from the survey.

Table 2. Demographic information about survey respondents

Measures	**Items**	**Frequency**	**Percentage**
Gender	Female	182	66.9 %
	Male	90	33.1 %
Education	Primary education	2	0.7 %
	Secondary education (HAVO)	32	11.8 %
	Secondary higher education (VWO)	43	15.8 %
	Secondary vocational (MBO)	9	3.3 %
	University of Applied Science (HBO)	70	25.7 %
	University (WO)	116	42.6 %
Experience	None	70	25.7 %
	A little	107	39.3 %
	Average	58	21.3 %
	Much	28	10.3 %
	Very much	9	3.3 %
Total		**272**	**100%**

3.4 Measures

To measure the attitude and the intention to use of a smart home device, the nine independent variables were questioned using statements with a 5-point Likert scale. The Likert scale ranges from "strongly agree" (1) to "strongly disagree" (5). Since this research is about Dutch consumers, the statements were translated into Dutch. For each variable, various statements had been compiled from the literature. The respondents indicated to what extent each statement suited them. For each variable is the composition of the scale clarified below. The complete set of items can be found in the Appendix (C and D).

The items which measure the dependent variable *intention to use* refer to a person's intention to going to use a smart speaker. The extent to which different factors influence the intention to use has been determined with three statements. These statements were established by improving and

combining existing statements from Venkatesh, Morris, Davis, & Davis (2003) and Pavlou (2003). An example is: "If I would be able to use a smart speaker, I would do it."

For the variable *Performance Expectancy*, four statements were created using the existing scale of Venkatesh, Thong and Xu (2012). This scale measures to what extent a smart speaker will be able to improve a person's productivity. An example is "I expect that with a smart speaker I will be able to do my daily tasks more efficiently."

Effort Expectancy was also measured using the scale of Venkatesh et al. (2012). Three statements were made which measures the extent to which a smart speaker is easy in learning using. An example is: "I expect that it is easy to learn how to use a smart speaker."

The items of the social norm were measured with statements about the *injunctive social norm* and the *descriptive social norm*. Social norm refers to the extent to which an individual perceives that an important other assume he or she should use the new technology (Venkatesh, 2012). The injunctive social norm refers to the extent what people agree and disagree. Three statements were made with the use of the scale of Venkatesh et al. (2012). An example is: "I expect that people whose opinions I value, would support me using this smart home speaker". On the other hand, the descriptive social norm is referring to what most people generally do. Three statements were made by revising and modifying the scales of Venkatesh et al.(2012), Beldad and Hegner (2018) and Bhattacherjee, (2000). An example is: "People within my immediate environment use a smart home speaker".

For *Hedonic Motivation*, three statements were made by using and optimizing the scales of Venkatesh et al (2012) and measured the perceived enjoyment of the use of a smart speaker. An example is: "I think using a smart speaker is enjoyable".

For the variable *Price Value*, three statements were made by combining and revising the scales of Venkatesh et al. (2012) and Adaval and Monroe (2002). This scale was adapted to measure the customer's trade-offs between the perceived benefits of the applications and the monetary cost of using them. This scale contains statements such as: "Buying a smart home speaker is a financial burden to me".

The measure of *Privacy Risk* was assessed with four statements, which were optimized and revised by the scale of van Bloemendaal (2019). It measured the extent people are concerned about their personal data and contained statements such as: "I am worried that a smart speaker will misuse my personal data."

The variable *Level of Autonomy* was measured with three statements which were combined and revised from van Bloemendaal (2019) and Balta-Ozkan et al. (2013). These statements measure to what extent people feel an increased or decreased level of autonomy while using a smart speaker. An example is: "I think I will feel less autonomy when I let a smart speaker control things around me."

For measuring the variable *Trust*, four statements were created by revising the scales of Yang, Lee, and Zo (2017). The statements measure a person's trust in a smart speaker provider. An example of a statement is: "I think smart speaker providers are honest with the data".

The *Self-Innovativeness* measures to what extent people find themselves self-innovative with new technologies. Four statements were modified and improved from the scales of the studies of Oliver and Bearden (1985) and Pavlou (2003). An example of a statement is: "I like to use innovative technology before the majority of people does".

3.5 Reliability of the Constructs

The reliability was measured with Cronbach's Alpha for each of the variable. Kline (2015) recommended the criterion of reliability to be higher than 0.6-0.7. In Table 3, on the next page, the results of the reliability analysis are shown. The values for the Cronbach's Alpha ranged from 0.72 to 0.87, except for the Injunctive Social Norm, which has a Cronbach's Alpha of 0.64. Removing a statement did not result in a higher value but since it was above the 0.6, it was nevertheless considered to be acceptable for this research.

Some constructs did not fulfil a good reliability threshold at first and had a weak Cronbach's Alpha. In four constructs, one statement is removed from each to get a higher Cronbach's Alpha and thus increase the reliability. These constructs were: *Descriptive Social Norm (*earlier α= .66) where DSN4 ('The mass media influences me to use a smart speaker') was removed. *Price Value (*earlier α= .40), where PV1 (I expect a smart speaker to be a good value for its price) was removed. From *Privacy Risk (*earlier α= .59) was PR3 ('I think no one else can see and use my personal information stored in smart speakers') removed and in the construct *Level of Autonomy (*earlier α= .67) the item LA3 ('I will feel less independent if I let a smart speaker take care of things around me') was removed.

Table 3. Reliability Analysis

Constructs	N of Items	Cronbach alpha
1. Performance Expectancy	4	.85
2. Effort Expectancy	3	.73
3. Injunctive Social Norm	3	.64
4. Descriptive Social Norm	3	.72
5. Hedonic Motivation	3	.77
6. Price Value	2	.73
7. Privacy Risk	3	.85
8. Level of Autonomy	2	.74
9. Trust	4	.81
10. Self-Innovativeness	4	.87
11. Intention to Use	2	.74

4. Results

This chapter presents the findings of the research, focusing on three sections. The first section describes the descriptives of this research. In the second section the results of the correlation analyses are discussed and at last the hierarchical regression analysis is dissertated. The various constructs are examined for correlations by a Pearson correlation analysis, which presented the correlation between the dependent variable, intention to use, and the independent variables. In the regression analysis, the relationship between the independent variables is measured.

4.1 Descriptives

Table 4 gives an overview of the descriptives of the mean scores (M) and the standard deviation (SD) of the constructs. Trust (M=3,36) has the most positive mean, followed by Level of Autonomy (M=3.22) and Self-Innovativeness (M=3.04). The following six constructs have a more neutral mean: Inductive Social Norm (M=2.99), Descriptive Social Norm (M=2.99), Price Value (M=2.85), Performance Expectancy (M=2.76), Privacy Risk (M=2.61) and Hedonic Motivation (M=2.50). Effort Expectancy (M= 1.88) has the least positive mean. The dependent variable, Intention to Use (M=3.02) also has a mean which is above average.

Table 4. Descriptive information

Constructs	N	Mean	Std. Deviation
1. Performance Expectancy	272	2.76	.85
2. Effort Expectancy	272	1.88	.66
3. Inductive Social Norm	272	2.99	.74
4. Descriptive Social Norm	272	2.99	.79
5. Hedonic Motivation	272	2.50	.79
6. Price Value	272	2.85	.72
7. Privacy Risk	272	2.61	.71
8. Level of Autonomy	272	3.22	.92
9. Trust	272	3.37	.86
10. Self-Innovativeness	272	3.04	.96
11. Intention to Use	272	3.02	1.06

All scores are measured using a 5-point Likert-scale from (1) totally agree to (5) totally disagree

4.2 Correlations

Before measuring the correlation between the different factors, it is important to investigate multicollinearity. When there are high correlations between factors, multicollinearity occurs, resulting in an unreliable calculation of the regression coefficients. The Variance Inflation Factor (VIF) is used to quantify multicollinearity in the regression model, which indicates the independent variables'

correlation and the strength of that correlation. When the VIF is higher than 5, it is generally regarded as harmful and can cause problems in the correlation and with interpreting the results. The values in this study are between 1.08 and 2.02 (See Appendix F), showing that the multicollinearity is within acceptable ranges (Frost, 2017).

Table 5 shows an overview of the results of the correlation analysis using a Pearson Correlation analysis. The results show that various variables are in correlation with each other, but the positive linear relations are rather weak. When looking at the correlation between the dependent and independent variables, there are several salient points. The strongest correlation is found between the intention to use and hedonic motivation (.61), followed by performance expectancy (.54) and self-innovativeness (.53). Furthermore, correlation can be identified between hedonic motivation and performance expectancy (.64) and between trust and privacy risk (.40). In addition, more moderate correlations can be found at the inter-relation with experience and the intention to use (.48), the descriptive social norm (.47) and the self-innovativeness (.41). Also a correlation can be found between experience and the intention to use (-.48).

Table 5. Correlations between the variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Performance Expectancy	1														
2. Effort Expectancy	,16**	1													
3. Inductive Social Norm	,41**	,13*	1												
4. Descriptive Social Norm	,26**	,14*	,35**	1											
5. Hedonic Motivation	,64**	,22**	,33**	,32**	1										
6. Price Value	-,03	,05	,03	,10	,08	1									
7. Privacy Risk	-,07	-,07	-,09	,02	-,09	,02	1								
8. Level of Autonomy	-,06	-,09	-,04	,03	-,16**	,13*	,37**	1							
9. Trust	,27**	,19**	,34**	,18**	,28**	,17**	-,40**	-,17**	1						
10. Self-Innovativeness	,31**	,16**	,28**	,32**	,34**	-,07	-,07	-,11	,23**	1					
11. Intention to Use	,54**	,09	,44**	,42**	,61**	,05	-,17**	-,12*	,45**	,53**	1				
12. Gender	,11	,07	,08	-,07	,14*	-,04	-,19**	-,07	,09	,22**	,17**	1			
13. Education	,06	,03	,03	,11	,11	,09	-,02	,11	,11	,03	,11	,08	1		
14. Experience	-,27**	-,13*	-,22**	-,47**	-,29**	,02	,11	,09	-,24**	-,41**	-,48**	-,15*	-,02	1	
15. Age	,07	-,09	,08	-,14*	,01	-,23**	-,05	-,04	-,05	-,05	,05	,14*	-,15*	,15*	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

4.3 Hierarchical Regression Analysis on the Intention to Use

The hypotheses from this study are tested through hierarchical regression analysis. Multiple regression is a variation of linear regression and a statistical technique for predicting a variable from a set of independent factors. In hierarchical regression, variables are systematically added to the regression model. Each stage involves adding new items to the model and calculating the change in R^2. To see if the change in R^2 differs significantly from zero, a hypothesis test is used.

The regression analysis was done in three steps. The first model had the purpose of testing the variables of the UTAUT-model. The second model tested all the proposed variables, so the constructs from the UTAUT and the additional variables. In the third model all the variables of the second model are added plus new demographic information as: gender, education, the possession, and the experience of smart speaker Table 6 shows the summary of the three models of the regression analyses by showing the adjusted R^2, standard error and the R^2 change. Model 1 proved that 48% (adjusted R^2 =.48, $F(6,265)$= 41,95, p <.001) of the variance of the Intention to Use could be examined with the variables of UTAUT. When adding the extra four variables (see Table 7), this amount of variance increases by 11% ($\triangle R^2$= .11). This means that this model explains the relationship of all variables with the intention to use with a total variance of 59% (adjusted R^2= .59, $F(4,261) = 39.46$, p < .001). The last model, where demographic information is included, has a variance of 60% (adjusted R^2= .60, $F(4,257) = 30.48$, p<.01) so in this model the amount of variance has increase with 2% compared to the second model. Since the proposed model in this research has not included the demographic info, the second model (The UTAUT including the four extra variables) is used as final research model.

Table 6. Regression Model Summary

Model	Adjusted R^2	Std. Error	$\triangle R^2$	F	df	Sig
1	.476	.766		**41.95****	6,265	.000
2	.587	.680	.11	**39.46****	4,261	.000
3	.604	.665	.02	30.48	4,257	.005

* Dependent variable is intention to use

Table 7 contains the data of the unstandardized coefficients (beta and standard error), the standardized coefficients (beta), the test value and the significance of all the tested variables. In the second model, the constructs with significant coefficients (p < .01) are marked in bold. Hedonic Motivation (HM) is the statistically strongest significance predictor of the Intention to use (β = .318; t(272) = 5,88; p < .001), followed by Self-Innovativeness (SI) (β = .274; t(272) = 6,22; p < .001), and Trust (TR) (β = .219; t(272) = 4,62; P < .001). Also, Performance Expectancy (PE) (β = .141; t (272) = 2,63; P < .01) and Descriptive Social Norm (DSN) (β = .135; t(272) = 3,056; P < .01) are significantly a predictor, whereas Effort Expectancy (EE) (β = -.121; t(272) = -2,98 P < .01) is a negative predictor of the intention to use a smart speaker. Besides, Injunctive Social Norm (ISN), Price Value (PV), Privacy Risk (PR) and Level of Autonomy (LA) does not have a significantly effect on the intention to use a

smart speaker. In the third model, demographical information and the experience are added. None of these turns out to be a significant predictor of the intention to use a smart speaker.

Table 7. Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-,204	,303		-,674	,501
	Performance Expectancy	,228	,074	,183	3,062	,002
	Effort Expectancy	-,118	,072	-,074	-1,633	,104
	Injunctive Social Norm	,252	,071	,177	3,532	,000
	Descriptive Social Norm	,256	,065	,192	3,960	,000
	Hedonic Motivation	,516	,079	,389	6,547	,000
	Price Value	,002	,065	,002	,038	,970
2	(Constant)	-,820	,364		-2,255	,025
	Performance Expectancy	,175	,067	**,141***	2,632	,009
	Effort Expectancy	-,193	,065	-,**121***	-2,981	,003
	Injunctive Social Norm	,132	,065	,093	2,031	,043
	Descriptive Social Norm	,181	,059	,**135***	3,056	,002
	Hedonic Motivation	,422	,072	,**318****	5,882	,000
	Price Value	-,003	,060	-,002	-,047	,963
	Privacy Risk	-,038	,067	-,025	-,558	,577
	Level of Autonomy	,003	,050	,003	,070	,945
	Customer trust	,270	,058	,**219****	4,624	,000
	Self-Innovativeness	,301	,048	**,274****	6,222	,000
3	(Constant)	-,521	,504		-1,033	,302
	Performance Expectancy	,159	,065	,128	2,441	,015
	Effort Expectancy	-,185	,064	**-,116***	-2,901	,004
	Injunctive Social Norm	,143	,064	,101	2,230	,027
	Descriptive Social Norm	,086	,065	,064	1,321	,188
	Hedonic Motivation	,408	,071	**,307****	5,768	,000
	Price Value	,023	,060	,016	,379	,705
	Privacy Risk	-,026	,067	-,017	-,383	,702
	Level of Autonomy	,010	,049	,009	,206	,837
	Customer trust	,240	,058	**,195****	4,134	,000
	Self-Innovativeness	,256	,050	**,233****	5,138	,000
	Gender	,052	,093	,023	,557	,578
	Education	,016	,028	,023	,572	,568
	Possession of smart speaker	,095	,069	,072	1,386	,167
	Experience	-,125	,054	-,125	-2,299	,022

Dependent variable is intention to use. ** p < .001, * p < .01

4.4 Final Research Model

4.4.1 Overview of the Hypotheses

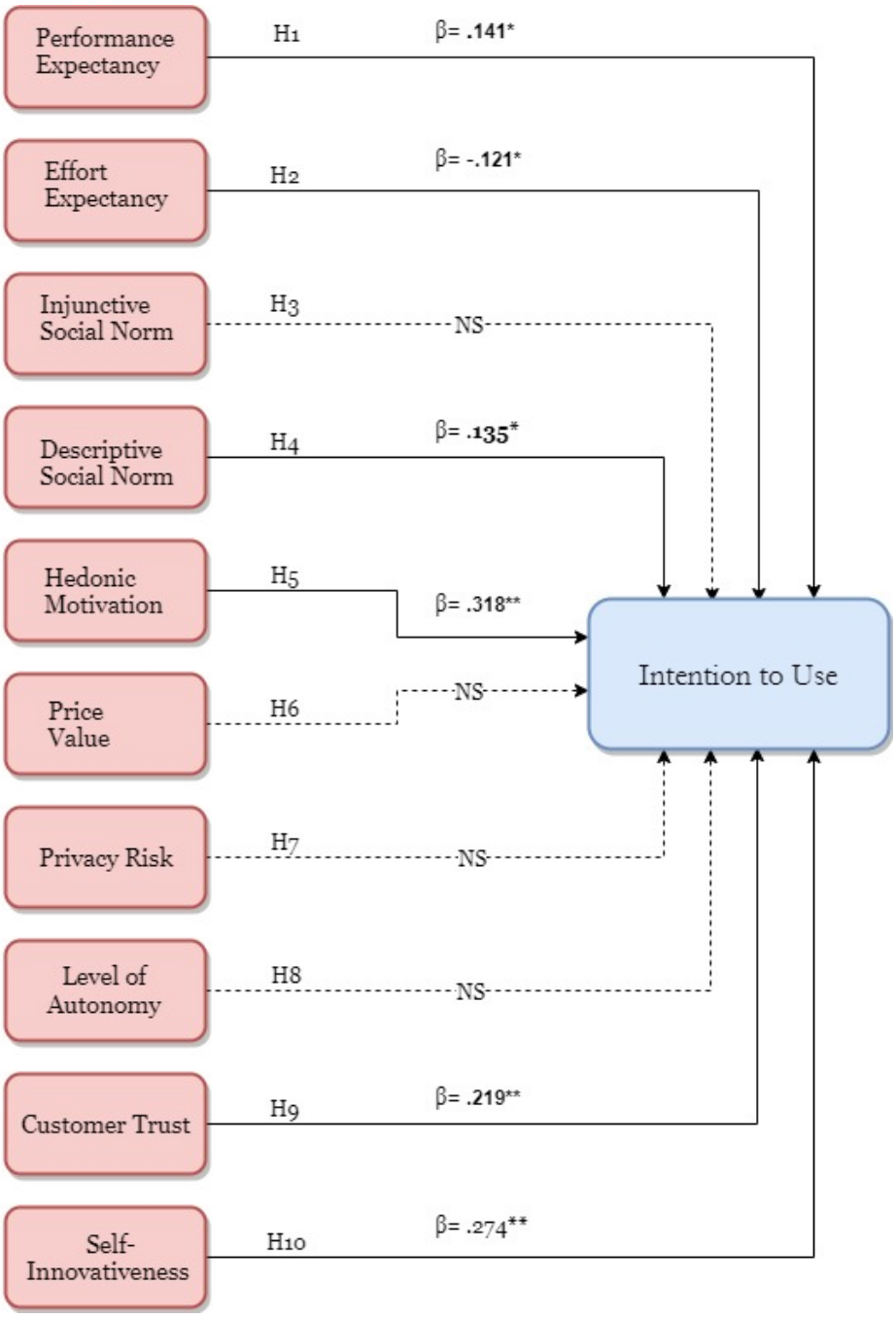
In Table 8, is presented an overview of which of the stated hypotheses is supported and had a significant effect and which of the stated hypotheses are rejected, and therefore had no significant effect.

Table 8. List of Hypotheses

Hypotheses		**Result**
H1	Performance expectancy has a positive influence on the intention to use a smart speaker.	Supported
H2	Effort Expectancy has a positive influence on the intention to use a smart speaker.	Rejected
H3	Injunctive Social Norm has a positive influence on the intention to use a smart speaker.	Rejected
H4	Descriptive Social Norm has a positive influence on the intention to use a smart speaker.	Supported
H5	Hedonic Motivation has a positive influence on the intention to use a smart speaker.	Supported
H6	Price Value has a positive influence on the intention to use a smart speaker.	Rejected
H7	Privacy Risk has a negative influence on intention to use a smart speaker.	Rejected
H8	The level of Autonomy has a positive influence on the intention to use a smart speaker.	Rejected
H9	Customer trust has a positive influence on the intention to use a smart speaker.	Supported
H10	A higher level of personal innovativeness will have a positive influence on the intention to use a smart speaker.	Supported

4.4.2 Research Model with Coefficients

Figure 2 shows the final research model with the corresponding regression coefficients



** p < .001, * p < .01; NS: Not significant

Adjusted R^2= .59, F (4,261) = 39.46, p<.001

Figure 2. Final research model with corresponding coefficients illustrating the intention to use a smart speaker.

5. Discussion

The primary aim of this study was to answer the following question: Which factors influence the intention of Dutch consumers to use a smart speaker? This question was investigated through an online survey with mainly persons who had no prior experience with smart speakers in their homes. The factors that influence the intention to use a smart speaker are described in this part, starting with the most significant and ending with the insignificant variables. Followed by the limitations of this research, the theoretical and the practical implications. This chapter ends with a conclusion.

5.1 Main Findings

The findings showed that the intention to use a smart speaker is affected by hedonic motivation, self-innovativeness, trust, performance expectancy, descriptive social norm, and effort expectancy. In which hedonic motivation was the strongest predictor, followed by self-innovativeness and trust. Nonetheless, against the expectation, the results showed that effort expectancy has a negative influence on the intention to use a smart speaker. Furthermore, inductive social norm, price value, privacy risk and level of autonomy showed no significant effect on the intention to use. As well as, the demographic (gender, education, and age) and experience questions, these also showed no significant effect on the intention to use a smart speaker.

Conforming the results, *hedonic motivation* is the strongest significant predictor of the intention to use a smart speaker. Also, according to the UTAUT2, this was a predictor for a person's intention, however, this also confirms that for Dutch consumers it is very important whether a smart speaker gives pleasure and that people want to have fun using a smart speaker. According to earlier research (Sun & Zhang, 2006; Venkatesh, 2012) fun or pleasure derived from using a technology plays an important role in the intention to adopt a technology. Kowalczuk (2018) also stated in his research that a smart speaker needs to feel enjoyable to keep using it. Research indicates that the higher the level of fun linked with technology, the more likely it is to be used (Bruner & Kumar, 2005). It is also a powerful internal desire to motivate people to use the smart speaker. So, from the findings of this research, linked with other literature, it can be confirmed that Dutch consumers are looking for the hedonic motivation in technology of a smart speaker when thinking about an intention to use it.

In line with previous studies of technology acceptance, *Self-innovativeness* was the variable with the second highest score to predict the intention to use a smart speaker (Agarwal & Prasad, 1998; Woszczynski et al., 2002). When someone scores high on innovativeness, the person is willing to try new technologies in the earlier stages and this person will also adopt it faster than others (Sanchez-Franco et al., 2011). The result of this study shows us that innovative people who are curious about new technology tend to have a strong intention to use a smart speaker. This also reflects the fact that the smart speaker was not very popular in the first years and people in the Netherlands were in the early adopters and the early majority group according to the diffusion of innovation from Rogers (1995).

However, in recent years the Dutch consumers are shifting towards the late majority and the usage has been increasing (Edquist et al., 2021).

Furthermore, *trust* was added new in this study, but earlier studies (Awad & Ragowsky, 2008; Zhang et al.,2019) identified that trust is an important factor for the intention to use or adopt a technology. When people are faced with uncertainty, their level of trust is a key indicator of what they expect from the situation. Uncertainty in the smart speaker can be caused by the feeling of the consumer in the desire from companies for personal customer data, which raises concerns about the security of the smart home products. Greater levels of confidence are linked to a higher rate of usage (Awad & Ragowsky, 2008). To some extent, trust can successfully decrease ambiguity and provide security. This is also reflected in this research where trust significantly correlated with privacy risk (.40). When a consumer has more confidence in a technology, they will continue to use it. According to this research Dutch consumers rely on the trust of the device, the smart speakers. As a result, companies must establish a trustworthy brand and a solid product in order to enhance consumers' willingness to use a technology like a smart speaker.

According to Venkatesh et al. (2003), one of the strongest indicators of a person's intentions is *performance expectancy*. Several studies are in line with the original study of UTAUT, where performance expectancy is the most powerful predictor (Venkatesh et al., 2003; Zhou, 2008). In this research, performance expectancy was not the strongest predictor, but it was a significant predictor of intention to use a smart speaker. This is also aligned with various other studies (Alalwan, Dwivedi, & Rana, 2017; Im, Hong, & Kang, 2011) where they stated that performance expectancy has a positive addition to the prediction of the intention to use. Furthermore, it correlated with multiple other independent variables such as hedonic motivation (.64) This may explain that the Dutch consumers get pleasure (HM) from a smart speaker when their lives are made easier (PE). Combining this study with the previous literature, it can be affirmed that Dutch consumers take care of the performance of a smart speaker before using it.

The outcome of the *effort expectancy* was rather surprising. It does have a significant effect on the intention to use a smart speaker, but in a negative way. This is remarkable, because many literature studies (Davis et., 1989; Lee et al., 2012) indicate that there should be a positive relationship between intention to use and effort expectancy. A technology should be easy to use for a user to adopt or use it. An explanation for the negative predictor of the intention to use a smart speaker (β = -.121) could be that people estimate in advance that it will be too difficult to use. Davis (1989, p320) declared that "even if potential users believe that a given application is useful, they may, at the same time, believe that the system is too hard to use and that the performance benefits of usage are out-weighed by the effort of using the application". According to a study by Zuiderwijk, Janssen & Dwivedi (2015), into the factors of intention to use open data, effort expectancy has a negative influence on new technology. Zuiderwijk et al. (2015) refer to the quotation of Davis (1989, p. 320) which found that "even if potential users

believe that a given application is useful, they may, at the same time, believe that the system is too hard to use and that the performance benefits of usage are out-weighed by the effort of using the application" In addition, Zuiderwijk et al. (2015, p. 435) believe that "people analyse their expectations of the extent to which open data systems are easy or difficult to use, and that this perceived ease of use influences their intention to use open data technologies". This may also apply to the smart speaker as Hoffmann and Thuesen (2018) has found that people often have high expectations of a smart speaker and therefore assume the smart speaker is complex to use. Moreover, Davies and Bawa (2012) also indicate that people's capacities for accessing and using open data vary, and that these capacities determine the technology's impacts, consequences, and distribution to a certain extent. Besides, Martin (2014) points out that many potential consumers of new technology believe they lack the specialised skills needed to evaluate this technology. This can also be the case with a smart speaker. People do see it as useful but consider that they need further knowledge and skills to master a smart speaker.

The factor of the social norm had two different outcomes; the *injunctive social norm* does not appear to have a significant effect of the intention to use a smart speaker. This indicates that consumers do not use a smart speaker only because it is expected of them by others. On the other hand, the variable of *descriptive social norm* did have a significant effect on the intention to use of a smart speaker, so people would rather use a smart speaker because of an observation of what other people do or use than what is expected from others. When comparing this construct with the original study of the UTAUT, in this study descriptive social norms is included. The social influence would be more coherent if the interpersonal influence is added. The extended factor of the social influence concept also appeared in earlier literature (Bhattacherjee, 2000; Cialdini and Goldstein, 2004). In this study the interpersonal influence, what others approve or disapprove, is not significant, in contrast to external influence.

Surprisingly, according to the findings, there is no link between *price value* and the intention to use a smart speaker. One explanation for this insignificant effect could be that if the benefits of a smart speaker outweigh the purchase cost and pricing would not be an issue. Furthermore, as smart speakers and other smart home products becoming more popular around the world, brands and manufacturers are attempting to reduce costs to remain competitive. According to Williams (2020), Amazon and Google are willing to sell their smart speakers at such a low price that they almost likely will lose money on the sale since they will almost certainly compensate for it with your data and future purchases. Furthermore, whichever device you purchase initially is more likely to use the services it recommends. Williams (2020), also stated that the true cost of smart speakers is the consumers' data, privacy, and loyalty. Furthermore, given that most survey respondents are between the ages of 20 and 35, possess a college degree and above, it may be presumed that most people have a decent employment and the cost of purchasing and operating a smart speaker is not a significant financial concern for them.

Moreover, also the factors *privacy risk* and *level of autonomy* were added to the new model. However, the correlations had both no significant results. The privacy paradox can explain this (Williams, Nurse, & Creese, 2016). Consumers report that privacy is essential and that they are cautious

about how companies use their data. Saffarizadeh et al. (2017) argue the effects of the concerns on user self-disclosure. People with fewer worries about privacy are more likely to unveil more personal information, which gives a better service by the smart speaker. Also, people know there are risks involved in using the technology nevertheless it is decided to use it because of the benefits (Saffarizadeh et al., 2017). Most young consumers (under the age of 40) are afraid that microphones embedded in smart speakers record personal conversations (Pridmore et al., 2019) as well as background discussions and noises, which are not directed to the speaker. (Chhetri & Motti 2019; Lau et al., 2018).

Other research from Menard and Bott (2018), have explored expectations of privacy with an emphasis on consumers who use at least one smart home device. Menard and Bott (2018) highlight similar privacy concerns resulting from adoption when examining the adoption decisions of smart home devices. For example, Olson and Kemery (2019) observed that 41 percent of smart voice assistant users have privacy concerns. In analysing the adoption decisions of smart home devices, the authors highlighted similar privacy issues arising from adoption. Privacy issues range from the security of information to concerns about passive listening. Furthermore, 24 percent of the study participants disclosed that they do not know how their data is used (Olson & Kemery, 2019).

5.2 Limitations and recommendations for future research

Despite having interesting theoretical and practical implications, this study has several limitations due to a variety of reasons. This section explains the study's limitations and makes recommendations for further research. First, the study was performed with only Dutch consumers, with only 294 respondents from the Netherlands. The sample was chosen based on the snowball sampling method's convenience. It is important to remember that Dutch consumers may think differently about new technologies and may find other factors important. Therefore, the research cannot be generalised to populations of other countries. Also, the sample of this study has 66,9 percent female and 33,1 percent male, while the actual population distribution in the Netherlands is approximately equal (CBS, 2021). Because the sample size is not distributed evenly across the population, this might be seen as less representative because the sample does not reflect the population. This imbalance in distribution in gender could have given a distorted picture as an outcome. This is because men are more often seen as progressive and always looking for new technologies (Bouman & Labots, 2019). To ensure that demographic data in the sample is distributed evenly, future study might improve the sampling method to a probability sampling strategy which uses randomization techniques to pick the sample.

Furthermore, this study reveals that smart speaker technology is still in its early stages, with few people familiar with it. As a result, variables and associated statements may seem unclear to persons since it is difficult to anticipate how they would operate. Future study should focus on creative approaches that make it easier for respondents to comprehend the research's purpose, allowing them to provide more accurate responses. For example, providing real experience by using a smart speaker for a certain time first and then ask for feedback.

Third, the smart speaker is identified as a smart home product with IoT technology in this study. There were several varieties of IoT product for smart homes accessible. Particularly in the case of IoT devices that serve an entirely other purpose than personal assistance. Future research could look at the adoption of additional IoT product categories to see where the results differ or coincide.

Finally, it is interesting that the variable trust offers significant results, but the variable privacy risk does not. People must then still feel a risk, which was not revealed in this study and not tested. Future research could be conducted to determine which risks, other than privacy risk, are a significant predictor of intention to use a smart speaker.

5.3 Theoretical Implications

In theoretical perspective, this study contributes to comprehend the Internet of Things adoption through the expansion of the UTAUT model with a specific focus on smart speakers. After conducting the study, it is valuable to discuss the value of UTAUT. Various research has already defined technological acceptance to explain the future acceptance of a technology. New constructs have been incorporated and modified over the years. A new version of the UTAUT-2 model was employed in this research. According to Dwivedi et al. (2019), only 25% of research using the UTAUT model do not include additional components. This indicates that UTAUT is an excellent base, but it frequently needs to be adapted to the subject. This was also done in this research. The variables trust, privacy risk, level of autonomy and self-innovativeness were added to the model. When analysed critically, the UTAUT model does not tend to focus on the negative effects of technology use. This is also crucial in the acceptance of new technology; hence the factors of privacy risk and trust were included in the current research model. Since smart speakers goes hand in hand with personal data, trust and privacy risks are an important determinant. Even though these two factors were not found to be significant with the dependent variable, the model used did increased in explained variance on intention to use from an adjusted R^2 value of .48 to an adjusted R^2 value of .59. According to Hair et al. (2016), R^2 values above 0.75 are regarded substantial, 0.50 are considered moderate, and 0.25 are perceived as weak. The model established has moderate explanatory power based on these criteria. Based on these data, it is possible to conclude (similar to the conclusion of Dwivedi et al., 2019) that variables must be added to make the model suitable for the context.

5.4 Practical Implications

The findings of this research have a variety of practical implications. First, the findings show that hedonic motivation or enjoyment is the most important element influencing the smart speaker's use intentions. Followed by the self-innovativeness of people. So, rather than evaluating the effectiveness of the smart speakers, people are more interested in the technology and products themselves. As a result, it is critical for smart speaker producers to consider the features and designs that will stimulate people's enjoyment and interest in these devices. However, users will not feel a demand for the smart speaker

items if the focus is only on strengthening people's interests, and therefore may resist from using them. As a result, smart speaker producers must establish product development methods that consider the "usefulness" element. To do so, manufacturers should give a wide variety of high-quality contents to boost the utility aspect. The most crucial part of every service, regardless of how innovative it is, is to maintain the quality of the services provided. Nonetheless, the quality of the speakers must also remain high. For the reason that when the speakers are made of low-quality material, consumers will begin to doubt the smart speakers' functionality and eventually stop or avoid using them. One of the indicators of intention to use the smart speaker is social norm, especially the descriptive social norm, which can be triggered by the mass media. Through marketing communications an environment may be established that encourages the desire to utilise a smart speaker. Thinking of commercials that give the impression that many people are already utilising a speaker. So not only the functionality of the smart speaker can be improved, the effect of observation can also be enhanced. People get information about the popularity of a smart speaker too from their social environment. Therefore, the awareness of the usage of a smart speaker among others can also be emphasised. Although early adopters might be familiar with smart speakers for a "long" time, to the mass majority, smart speaker still sounds new (Pridmore et al., 2019). The elements which influence smart speaker usage may be used as effective and helpful indicators for future product development, marketing, and enhancing overall user experiences, based on the findings of this study.

5.5 Conclusion

This research has brought empirical results to an enlargement of UTAUT. This is done by integrating Privacy Risk, Level of Autonomy, Trust and Level of Self-Innovativeness into the UTAUT2. Although UTAUT argues that performance expectancy is the most important element in technology adoption, this study has found that hedonic motivation is the most important factor in technology adoption of the smart speaker. As a result, from a practical standpoint, this study suggests that marketers should establish the enjoyment of the smart speakers. This can be done to take into account the looks and other features that will encourage consumers to enjoy the smart speaker.

The self-innovativeness from people and trust were also found to be a good predictor. From a theoretical standpoint, this study demonstrates that technology adoption is closely linked to uncertainty, and as a result, customers place their faith before deciding to embrace IoT or a smart speaker. As a result, from a practical standpoint, this study suggests that marketers should establish customer trust in the firm and the product. Furthermore, this research also introduces the division of the social norm into the descriptive social norm and the injunctive social norm, where the descriptive social norm was found to be a predictor of the intention to use a smart speaker. It is from a practical point of view important to establish the desire to utilise a smart speaker. Thinking of commercials that give the impression that many people are already utilising a speaker. Lastly, customers will be more likely to trust a product if they find it useful, encouraging marketers also to focus on the product's performance.

6. References

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.

Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, *37*(3), 99-110.

Arabo, A., Brown, I., & El-Moussa, F. (2012). Privacy in the age of mobility and smart devices in smart homes. In *2012 International Conference on Privacy, Security, Risk and Trust and 2012 International Conference on Social Computing* (pp. 819-826). IEEE.

Awad, N. F., & Ragowsky, A. (2008). Establishing trust in electronic commerce through online word of mouth: an examination across genders. *Journal of Management Information Systems*, *24*(4), 101-121.

Babin, B. J., Darden, W. R., & Griffin, M. (1994). Work and/or fun: measuring hedonic and utilitarian shopping value. *Journal of consumer research*, *20*(4), 644-656.

Barnes, S. B. (2006). A privacy paradox: Social networking in the United States. *First Monday*, 11(9). DOI: 10.5210/fm.v11i9.1394

Bhattacherjee, A. (2000). Acceptance of E-Commerce Services: The Case of Electronic Brokerages. *IEEE Transactions of Systems, Man, and Cybernetics - Part A: System and Humans*, 411-420.

Bouman, J.M.,& Labots, M. (2019) 'De digitale wereld moet gelijker' *Het Parool*. . Retrieved 9 August, 2021 from https://www.parool.nl/nieuws/de-digitale-wereld-moet-gelijker~b3c226fc

Brush, A., Lee, B., Mahajan, R., Agarwal, S., Saroiu, S., & Dixon, C. (2011). Home automation in the wild: challenges and opportunities. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. 2115-2124.

CBS. (2021, January). Mannen en vrouwen per leeftijdsgroep. Retrieved from https://www.cbs.nl/nl-nl/visualisaties/dashboard-bevolking/mannen-en-vrouwen

Chen, S. C., Yen, D. C., & Hwang, M. I. (2012). Factors influencing the continuance intention to the usage of Web 2.0: An empirical study. *Computers in Human Behavior*, *28*(3), 933-941.

Chhetri, C., & Motti, V. G. (2019). Eliciting Privacy Concerns for Smart Home Devices from a User Centered Perspective. *Lecture Notes in Computer Science*, 91–101, *https://doi:10.1007/978-3-030-15742-5_8*

Chung, H., Iorga, M., Voas, J., & Lee, S. (2017). "Alexa, Can I Trust You?". *Computer*, *50*(9), 100-104. https://doi.org/10.1109/mc.2017.3571053

Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annu. Rev. Psychol.*, *55*, 591-621.

Cook, D. J., Crandall, A. S., Thomas, B. L., & Krishnan, N. C. (2012). CASAS: A smart home in a box. *Computer*, *46*(7), 62-69.

Corritore, C. L., Kracher, B., & Wiedenbeck, S. (2003). Online trust: Concepts, evolving themes, a model. *International Journal of Human-Computer Studies, 58*(6), 737-758. https://doi:10.1016/s1071-5819(03)00041-7

Das, S. K., & Cook, D. J. (2005). Designing smart environments: A paradigm based on learning and prediction. In *International Conference on Pattern Recognition and Machine Intelligence* (pp. 80-90). Springer, Berlin, Heidelberg.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science, 35*(8), 982–1003. Hannover: INFORMS.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Davies, T. G., & Bawa, Z. A. (2012). The promises and perils of open government data (OGD). *The Journal of Community Informatics*, *8*(2), 1-6.

Day, M., Turner, G., & Drozdiak, N. (2019*). Amazon Workers Are Listening to What You Tell Alexa*. Bloomberg. Retrieved February 19, 2020, from https://www.bloomberg.com/news/articles/ 2019-04-10/is-anyone-listening-to-you-on-alexa-a-global-team-reviews-audio

Dhar, R., & Wertenbroch, K. (2000). Consumer choice between hedonic and utilitarian goods. *Journal of marketing research*, *37*(1), 60-71.

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers, 21*(3), 719-734. DOI: 10.1007/s10796- 017-9774-y

Edquist, H., Goodridge, P., & Haskel, J. (2021). The Internet of Things and economic growth in a panel of countries. Economics of Innovation and New Technology, 30(3), 262-283.

Fishbein, M. & Azjen, I. (1975). Belief, attitude, intention, and behaviour: an introduction to theory and research. *Journal of Business Venturing*, 5. 177-189.

Fortes, N., Pagani, M., & Rita, P. (2017). The effects of privacy concerns, perceived risk, and trust on online purchasing behaviour. *International Journal of Internet Marketing And Advertising, 11*(4), 307–329. https://doi.org/10.1504/ijima.2017.10007887

Frost, J. (2017). Multicollinearity in regression analysis: problems, detection, and solutions. Retrieved from https://statisticsbyjim.com/regression/multicollinearity-inregression-analysis/

Fruchter, N., & Liccardi, I. (2018). Consumer Attitudes Towards Privacy and Security in Home Assistants. *Extended Abstracts of The 2018 CHI Conference On Human Factors In Computing Systems*. https://doi.org/10.1145/3170427.3188448

Fugard, A., Beck, E., & Gartner, M. (2011). How will software engineers of the Internet of Things reason about trust? *International Joint Conference on Ambient Intelligence.* 274-279.

Gaikwad, P. P., Gabhane, J. P., & Golait, S. S. (2015, April). A survey based on Smart Homes system using Internet-of-Things. In *2015 International Conference on Computation of Power, Energy, Information and Communication (ICCPEIC)* (pp. 0330-0335). IEEE.

Garbarino, E., & Johnson, M. S. (1999). The different roles of satisfaction, trust, and commitment in customer relationships. *Journal of marketing*, *63*(2), 70-87.

Gautier, B. & Gestanes, P. (2016). The rise of intelligent voice assistants: new gadget for your living room or window of opportunity to reshuffle the cards in the web economy? *Wavestone.*

GfK (2020) 'Smart Home in stroomversnelling door impact COVID-19 in Nederland.' *Growth from Knowledge.* Retrieved 5 August, 2021 from https://www.gfk.com/press/smart-home-in-stroomversnelling-onder-nederlandse-consumenten-door-impact-covid-19

Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. *Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education.*

Google. (2020). Maak kennis met Google Home. *Google.* Retrieved 02 May, 2020 from https://madeby.google.com/home

Gubbi, J., Buyya, R., Marusic, S., & Palaniswami, M. (2013). Internet of things (IoT): a vision, architectural elements, and future directions. *Future Generation Computer Systems*, *29*(7), 1645-1660.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.

Hennig-Thurau, T., Gwinner, K., & Gremler, D. (2002). Understanding relationship marketing outcomes: an integration of relational benefits and relationship. *Journal of Service Research*, 4. 230-247.

Hew, J. J., Lee, V. H., Ooi, K. B., & Wei, J. (2015). What catalyses mobile apps usage intention: an empirical analysis. *Industrial Management & Data Systems*.

Hobsbawn, A. (2014). The internet of things: what role will humans play? *The Guardian.* Retrieved 02 May, 2020 from https://www.theguardian.com/media-network/media-network-blog/2014/feb/06/internet-of-things-humans-smart

Holmes, R. (2016). We let technology into our lives and now it's controlling us. The Guardian. Retrieved 17 June, 2021 from https://www.theguardian.com/uk/technology

Hoy, M. B. (2018). The "Internet of Things": What it is and what it means for libraries. *Medical reference services quarterly*, *34*(3), 353-358.

Im, I., Hong, S., & Kang, M. S. (2011). An international comparison of technology adoption: Testing the UTAUT model. *Information & management*, *48*(1), 1-8.

Keith, M. J., Babb, J. S., & Lowry, P. B. (2014). A longitudinal study of information privacy on mobile devices. In *2014 47th Hawaii International Conference on System Sciences* (pp. 3149-3158). IEEE.

Kim, D., & Ammeter, T. (2014). Predicting personal information system adoption using an integrated diffusion model. *Information & Management, 51*(4), 451-464.

Kowalczuk, P. (2018). Consumer acceptance of smart speakers: a mixed-methods approach. *Journal of Research in Interactive Marketing*. doi:10.1108/jrim-01-2018-0022

Lau, J., Zimmerman, B., & Schaub, F. (2018). Alexa, stop recording": Mismatches between smart speaker privacy controls and user needs. In *Poster at the 14th Symposium on Usable Privacy and Security (SOUPS 2018)*.

Lee, Y., & Kozar, K. A. (2008). An empirical investigation of anti-spyware software adoption: A multi-theoretical perspective. *Information & Management*, *45*(2), 109-119.

Lee, Y., Lee, J., & Lee, Z. (2006). Social influence on technology acceptance behavior: self-identity theory perspective. *ACM SIGMIS Database: The DATABASE for Advances in Information Systems*, *37*(2-3), 60-75.

Lee, Y., Park, J., Chung, N., & Blakeney, A. (2012). A unified perspective on the factors influencing usage intention toward mobile financial services. *Journal of Business Research*, 11. 1590-1599.

Li, X., Hess, T. J., & Valacich, J. S. (2008). Why do we trust new technology? A study of initial trust formation with organizational information systems. *The Journal of Strategic Information Systems*, *17*(1), 39-71.

Luger, E., & Sellen, A. (2016). "Like Having a Really Bad PA": The Gulf between User Expectation and Experience of Conversational Agents. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* - CHI '16, 5286–5297.

Martin, C. (2014). Barriers to the open government data agenda: Taking a multi-level perspective. *Policy & Internet*, *6*(3), 217-240.

Mayer, R., Davis, J., & Schoorman, F. (1995). An Integrative Model of Organizational Trust. *Academy Of Management Review*, *20*(3), 709-734. https://doi.org/10.5465/amr.1995.9508080335

Menard, P., & Bott, G. (2018). Investigating Privacy Concerns of Internet of Things (IoT) Users. *AMCIS*.

Midgley, D. F., & Dowling, G. R. (1978). Innovativeness: The concept and its measurement. *Journal of consumer research*, *4*(4), 229-242.

Morgan, R. & Hunt, S. (1994) The commitment-trust theory of relationship marketing. *Journal of Marketing*, 3. 20-38.

Multiscope, Smart home markt groeit tot 2,5 miljard euro. Retrieved 01 May 2020 from http://www.multiscope.nl/persberichten/smart-home-markt-groeit.html

Nasirian, F., Ahmadian, M., & Lee, O.-K. (2017). AI-Based Voice Assistant Systems:

Evaluating from the Interaction and Trust Perspectives. *23rd Americas Conference on Information Systems (AMCIS)*.

Nguyen, T. D., Nguyen, T. M., Pham, Q. T., & Misra, S. (2014). Acceptance and use of e-learning based on cloud computing: the role of consumer innovativeness. In *International Conference on Computational Science and Its Applications* (pp. 159-174). Springer, Cham.

Olson, C., & Kemery, K. (2019). Voice report: Consumer adoption of voice technology and digital assistants. *Microsoft: Seattle, DC, USA*.

Onaolapo, S., & Oyewole, O. (2018). Performance expectancy, effort expectancy, and facilitating conditions as factors influencing smartphones use for mobile learning by postgraduate students at the University of Ibadan, Nigeria. *Interdisciplinary Journal of e-Skills and Lifelong Learning*, 14, 95-115. https://doi.org/10.28945/4085

Park, E., Cho, Y., Han, J., & Sang, J. K. (2017). Comprehensive approaches to user acceptance of the internet of things in a smart home environment. *IEEE Internet of Things Journal*, 99.

Park, E., Kim, S., Kim, Y. S., & Sang, J. K. (2017). Smart home services as the next mainstream of the ICT industry: determinants of the adoption of smart home services. *Universal Access in the Information Society* (1), 1-16.

Patru, I., Carabas, M., & Barbulescu, M.,& Gheorghe, L. (2016). *Smart home IoT system.* 1-6.

Pridmore, J., Zimmer, M., Vitak, J., Mols, A., Trottier, D., Kumar, P., & Liao, Y. (2019). Intelligent Personal Assistants and the Intercultural Negotiations of Dataveillance in Platformed Households. *Surveillance & Society, 17*(1/2), 125-131. https://doi.org/10.24908/ss.v17i1/2.12936

Princi, E., & Krämer, N. (2020). I Spy with my Little Sensor Eye - Effect of Data-Tracking and Convenience on the Intention to Use Smart Technology. *Proceedings Of The 53Rd Hawaii International Conference on System Sciences*. https://doi.org/10.24251/hicss.2020.171

PWC (2018). Consumer Intelligence Series: Prepare for the voice revolution. Retrieved June 1, 2020. from https://www.pwc.com/us/en/services/consulting/library/consumer-intelligence-series/voice assistants.html

Rogers, E.M., 2003. *Diffusion of Innovations*. Free Press, New York.

Saffarizadeh, K., Boodraj, M., & Alashoor, T. (2017). Conversational Assistants: Investigating Privacy Concerns, Trust, and Self-Disclosure. *ICIS 2017 Proceedings*.

Samuel, S. S. I. (2016, March). A review of connectivity challenges in IoT-smart home. In *2016 3rd MEC International conference on big data and smart city (ICBDSC)* (pp. 1-4). IEEE.

Sánchez-Franco, M. J., Carballar-Falcón, J. A., Martínez-López, F. J., & Gázquez-Abad, J. C. (2011). The influence of customer familiarity and personal innovativeness toward information technologies on the sense of virtual community and participation. In *IFIP Conference on Human-Computer Interaction* (pp. 265-279). Springer, Berlin, Heidelberg.

Shin, D. H. (2009). An empirical investigation of a modified technology acceptance model of IPTV. *Behaviour & Information Technology*, *28*(4), 361-372.

Spector, P. E. (1992). Summated rating scale construction: an introduction sage. *Newbury Park, CA*.

Taib, S., De Coster, R., & Sabri Tekantape, E. (2017). Co-creative design developments for accessibility and home automation. *Third International Colloquium of Design, Branding, and Marketing.*

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal Studies. *Management Science*, *46*(2), 186–205.

Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: Development and test. *Decision sciences*, 27(3), 451-481.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, *27*(3), 425–478.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS quarterly*, 157-178

Want, R., Schilit, B. N., & Jenson, S. (2015). Enabling the internet of things. *Computer*, *48*(1), 28-35.

Williams, T., Bernold, L., & Lu, H. (2007). Adoption patterns of advanced information technologies in the construction industries of the United States and Korea. *Journal of Construction Engineering & Management, 133*(10), 780-790.

Williams, M., Nurse, J., & Creese, S. (2016). The perfect storm: the privacy paradox and the Internet-of-Things. *Availability, Reliability and Security (ARES).* 644-652.

Winder, D. (2019). *People increasingly trust machines more than humans to man-age cyber-security*. Scmagazineuk.com. Retrieved 20 November 2020, from https://www.scmagazineuk.com/people-increasingly-trust-machines-humans-manage-cyber security/article/1590049.

Worthy, P., Matthews, B., & Viller, S. (2016). Trust Me. *Proceedings of the 2016 ACM Conference on Designing Interactive Systems - DIS '16*. https://doi:10.1145/2901790.2901890

Woszczynski, A. B., Roth, P. L., & Segars, A. H. (2002). Exploring the theoretical foundations of playfulness in computer interactions. *Computers in Human Behavior*, *18*(4), 369-388.

Wottrich, V., van Reijmersdal, E., & Smit, E. (2018). The privacy trade-off for mobile app downloads: The roles of an app value, intrusiveness, and privacy concerns. *Decision Support Systems*, *106*, 44-52. https://doi.org/10.1016/j.dss.2017.12.003

Wueest, C. (2017). A guide to the security of voice-activated smart speakers. *Symantec – AN ISTR Special Report.*

Yang, H., & Lee, H. (2018). Understanding user behavior of virtual personal assistant devices. *Information Systems and E-Business Management*, *17*(1), 65-87. https://doi.org/10.1007/s10257-018-0375-1

Yang, S., Lu, Y., Gupta, S., Cao, Y., & Zhang, R. (2012). Mobile payment services adoption across time: An empirical study of the effects of behavioral beliefs, social influences, and personal traits. *Computers in Human Behavior*, *28*(1), 129-142.

Yuan, S., Ma, W., Kanthawala, S., & Peng, W. (2015). Keep using my health apps: Discover users' perception of health and fitness apps with the UTAUT2 model. *Telemedicine and e-Health*, *21*(9), 735-741.

Zeng, E., Mare, S., & Roesner, F. (2017). End-user security and privacy concerns with smart homes. In *Thirteenth Symposium on Usable Privacy and Security (SOUPS 2017)* (pp. 65-80).

Zhang, K., Cheung, C., & Lee, M. (2014). Examining the moderating effect of inconsistent reviews and its gender on consumers' online shopping decision. *International Journal of Information Management*, *34*, 89-98.

Zheng, S., Apthorpe, N., Chetty, M., & Feamster, N. (2018). User Perceptions of Smart Home IoT Privacy. Proceedings of the ACM on *Human-Computer Interaction*, *2(CSCW)*, 1-20. https://doi.org/10.1145/3274469

Zhou, T., Lu, Y., & Wang, B. (2010). Integrating TTF and UTAUT to explain mobile banking user adoption. *Computers in Human Behavior*, *26*, 760-767.

Zuiderwijk, A., Janssen, M., & Dwivedi, Y. K. (2015). Acceptance and use predictors of open data technologies: Drawing upon the unified theory of acceptance and use of technology. *Government information quarterly*, *32*(4), 429-440.

7. Appendices

7.1 Appendix A: Results Pre-Test

Item	Opmerking
Introductietekst	
Inleiding smart speaker	
Verklaring	
Intention to Use: De Intentie om het te gebruiken	
Als ik een smart speaker zou kunnen gebruiken, zou ik het doen.	
Ik voorspel dat ik in de nabije toekomst een smart speaker zou gebruiken	**Zou=ga**
Ik twijfel niet om een smart speaker te gaan gebruiken.	**De "niet" weghalen, dat maakt het duidelijker.**
Performance Expectancy	
Ik denk dat een smart speaker mijn leven comfortabeler maakt.	
Ik verwacht dat ik door een smart speaker mijn dagelijkse taken efficiënter kan uitvoeren.	**Lijkt in praktijk veel op de onderste stelling**
Ik denk dat een smart speaker mijn leven makkelijker zal maken.	
Ik verwacht dat door een smart speaker mijn persoonlijke productiviteit zal verhogen.	**Zie hierboven**
Effort expectancy	
Ik verwacht dat het makkelijk is om te leren hoe een smart speaker werkt.	
Ik verwacht dat de interactie met een smart speaker duidelijk en begrijpelijk is.	
Ik verwacht dat een smart speaker makkelijk te gebruiken is.	
Injunctive social norm:	
Ik verwacht dat mensen die belangrijk voor mij zijn, deze smart home speaker zouden aanbevelen.	
Ik verwacht dat mensen waarvan ik de mening waardeer, mij zouden steunen bij het gebruik van deze smart home speaker.	**Zouden= zullen**
Ik denk dat vrienden, familie en collega's van mij verwachten dat ik een smart home speaker zou gebruiken	
Descriptive social norm	
Ik denk dat een smart home speaker momenteel door veel mensen wordt gebruikt	**Wat is veel?**
Mensen in mijn directe omgeving gebruiken een smart home speaker	
Ik heb gehoord dat andere mensen positieve ervaringen hebben met een smart home speaker	
De massamedia, inclusief sociale media, beïnvloedt mij om een smart speaker te gaan gebruiken	**Wat is precies de massa media**
Hedonic Motivation	
Ik denk dat ik plezier zal hebben aan een smart speaker.	
Ik verwacht dat het gebruik van een slimme speaker vermakelijk is.	
Ik denk dat het gebruik van een smart speaker mij geen voldoening zal doen	
Price Value	
Ik denk dat een smart home speaker een goede prijs-kwaliteit verhouding heeft	
Het kopen van een smart speaker is voor mij een financiële last.	
Ik zal geen smart speakers kopen vanwege de (dure) prijs.	**Hoge prijs ipv dure**
Privacy Risk	
Ik ben bezorgd dat een smart speaker relevante persoonlijke gegevens kan opslaan en delen zonder dat ik dat weet.	
Ik denk dat niemand mijn opgeslagen, persoonlijke gegevens kan zien en gebruiken	**De speaker of het bedrijf?**
Ik ben bezorgd dat een smart speaker misbruik zal maken van mijn persoonlijke gegevens.	**- Zie hierboven** **- Enigszins vaag.**

Ik ben bang dat een smart speaker mijn persoonlijke gegevens gebruikt voor het belang van een bedrijf.	
Level of Autonomy	
Ik verwacht dat een smart speaker beslissingen zal maken zonder mijn goedkeuring.	
Ik verwacht dat een smart speaker mijn thuisomgeving kan beheren zonder dat ik daar controle over heb.	
Ik zal minder autonomie voelen wanneer ik een smart home speaker dingen om mij heen laat regelen.	**-Ik weet niet wat autonomie betekend** **- Dingen is vaag, beter zou zijn, activiteiten.**
Trust	**Algemeen: lijkt dit veel op Privacy?**
Ik verwacht dat ik een smart home speaker kan vertrouwen met mijn persoonlijke gegevens.	
Ik denk dat leveranciers van smart speakers eerlijk zijn met de gegevens	
Ik denk dat de leveranciers van smart home speakers betrouwbaar zijn	
Ik verwacht dat de leveranciers van smart home speakers de belangen van de klant op 1 zet.	**"Op één"**
Self-Innovativeness:	
Ik geef om nieuwe trends en innovaties in technologieën	
Ik beschouw mezelf als 'early adapter' (iemand die vroeg gebruik maakt) van innovatieve technologie.	
Ik beschouw mezelf als een expert/kenner als het gaat om nieuwe trends in technologie.	
Ik gebruik innovatieve technologie graag voor de meerderheid van de mensen het gebruikt.	**Misschien weet niet iedereen wat een innovatieve technologie is.**
Demografische gegevens	
Wat is uw geslacht?	
Wat is uw leeftijd?	**18-24**
Wat is uw hoogst genoten opleiding?	**MBO voor HBO.**
Heeft u zelf een smart home speaker?	**"Een huisgenoot" is redelijke studententaal**
Hoeveel ervaring heeft u met een smart home speaker?	
Overige opmerkingen	**- Suggestief geef je een negatieve blik op smart speakers** **- Apple smart speaker mist (Homepod)**

7.2 Appendix B: Introduction Text Questionnaire (Dutch)

Beste deelnemer,

Leuk dat u wilt deelnemen aan mijn onderzoek! Voor mijn master Communication Studies aan de Universiteit Twente doe ik onderzoek naar het (potentiële) gebruik van smart speakers.

Het onderzoek neemt ongeveer 10 minuten van uw tijd in beslag en bestaat uit een vragenlijst met stellingen. Bij elke stelling kunt u aangeven in welke mate u het eens bent met deze stelling. Bij het invullen van de vragenlijst is het van belang dat u deze zo eerlijk mogelijk invult. Er bestaan geen goede of foute antwoorden. U krijgt straks eerst nog een introductietekst over smart speakers en de functies/ mogelijkheden.

Alle gegevens worden vertrouwelijk behandeld en niet aan derden verstrekt. Deelname is geheel anoniem. U kunt uw deelname te allen tijde beëindigen. Met uw deelname aan dit onderzoek geeft u toestemming dat uw antwoorden gebruikt worden voor educatieve doeleinden.

Voor eventuele vragen of opmerkingen kunt u contact opnemen met mij via:
a.l.steggink@student.utwente.nl
Alvast bedankt!

"Ik ga akkoord om deel te nemen aan dit onderzoek."

O

Hieronder volgt een introductietekst, lees dit goed door!

Een smart speaker (of slimme luidspreker) is een draadloos apparaat met een ingebouwde virtuele assistent. Je kunt de smart speaker besturen met je stem en opdrachten geven door tegen de smart speaker te praten.
Een smart speaker werkt nauw samen met andere slimme apparatuur in je huis als ze op hetzelfde netwerk zijn aangesloten. Zo kun je de smart speaker vragen om de verlichting te dimmen, je verwarming hoger te zetten of alvast koffie te zetten.

Het apparaat kan als het ware je persoonlijke assistent zijn gedurende de hele dag. Van 's ochtends wakker worden van een wekker, je lampen aan- en uitzetten tot het nieuws en weerbericht voorlezen. Maar ook het bijhouden van je boodschappenlijst, of snel iets opzoeken op internet. De mogelijkheden zijn ongekend.

Een praktijkvoorbeeld: je komt thuis en zegt tegen de smart speaker: “Ik ben thuis”, vervolgens zal de slimme thermostaat je huis verwarmen, de speaker zal je favoriete muziek opzetten en de slimme verlichting zal aangaan. Een smart speaker kun je in de woonkamer, slaapkamer of bijvoorbeeld de keuken zetten. Je kan zelfs de smart speaker pizza’s laten bezorgen als je geen zin hebt om te koken.

De smart speakers kunnen in de toekomst vrijwel alles doen wat jij nu via je telefoon, tablet of computer doet, dit alles via spraakgestuurde besturing. Klinkt handig, maar het heeft ook een keerzijde. De apparaten worden geactiveerd door een commando (‘Hello Alexa, Siri, Google’ etc.), maar staan feitelijk continu aan. De fabrikanten zeggen dat de systemen pas actief beginnen te luisteren zodra ze geactiveerd zijn. Toch moet je je afvragen hoe de speaker dan wel je commando’s altijd hoort.

De grootste smart speakers merken zijn op dit moment Google, Amazon, Sonos, Apple, en JBL en de prijzen variëren van €50 tot €250, waarbij de gemiddelde prijs rond de €100 ligt.

Wanneer je de tekst hebt gelezen kun je doorklikken naar volgende onderdeel. Let op! Dit kan pas na 5 sec.

7.3 Appendix C: Dutch Statements of Questionnaire

1. Intention to Use: IU
   - Als ik een smart speaker zou kunnen gebruiken, zou ik het doen.
   - Ik voorspel dat ik in de nabije toekomst een smart speaker zou gebruiken
   - Ik twijfel niet om een smart speaker te gaan gebruiken.

2. Performance Expectancy: PE

   1. Ik denk dat een smart speaker mijn leven comfortabeler maakt.
   2. Ik verwacht dat ik door een smart speaker mijn dagelijkse taken efficiënter kan uitvoeren.
   3. Ik denk dat een smart speaker mijn leven makkelijker zal maken.
   4. Ik verwacht dat door een smart speaker mijn persoonlijke productiviteit zal verhogen.

3. Effort expectancy: EE

   1. Ik verwacht dat het makkelijk is om te leren hoe een smart speaker werkt.
   2. Ik verwacht dat de interactie met een smart speaker duidelijk en begrijpelijk is.
   3. Ik verwacht dat een smart speaker makkelijk te gebruiken is.

4. Injunctive social norm: ISN

   1. Ik verwacht dat mensen die belangrijk voor mij zijn, deze smart home speaker zouden aanbevelen.
   2. Ik verwacht dat mensen waarvan ik de mening waardeer, mij zouden steunen bij het gebruik van deze smart home speaker.
   3. Ik denk dat vrienden, familie en collega's van mij verwachten dat ik een smart home speaker zou gebruiken

5. Descriptive social norm: DSN

   1. Ik denk dat een smart home speaker momenteel door veel mensen wordt gebruikt
   2. Mensen in mijn directe omgeving gebruiken een smart home speaker
   3. Ik heb gehoord dat andere mensen positieve ervaringen hebben met een smart home speaker
   4. De massamedia, inclusief sociale media, beïnvloedt mij om een smart speaker te gaan gebruiken.

6. Hedonic Motivation: HM

   1. Ik denk dat ik plezier zal hebben aan een smart speaker.
   2. Ik verwacht dat het gebruik van een slimme speaker vermakelijk is.
   3. Ik denk dat het gebruik van een smart speaker mij geen voldoening zal doen

7. Price Value: PV

   1. Ik denk dat een smart home speaker een goede prijs-kwaliteit verhouding heeft
   2. Het kopen van een smart speaker is voor mij een financiële last.
   3. Ik zal geen smart speakers kopen vanwege de (dure) prijs.

8. Privacy Risk: PR

   1. Ik ben bezorgd dat een smart speaker relevante persoonlijke gegevens kan opslaan en delen zonder dat ik dat weet.
   2. Ik denk dat niemand mijn opgeslagen, persoonlijke gegevens kan zien en gebruiken
   3. Ik ben bezorgd dat een smart speaker misbruik zal maken van mijn persoonlijke gegevens.
   4. Ik ben bang dat een smart speaker mijn persoonlijke gegevens gebruikt voor het belang van een bedrijf.

9. Level of Autonomy: LA

   1. Ik verwacht dat een smart speaker beslissingen zal maken zonder mijn goedkeuring.
   2. Ik verwacht dat een smart speaker mijn thuisomgeving kan beheren zonder dat ik daar controle over heb.
   3. Ik zal minder autonomie voelen wanneer ik een smart home speaker dingen om mij heen laat regelen.

10. Trust: TR

    1. Ik verwacht dat ik een smart home speaker kan vertrouwen met mijn persoonlijke gegevens.
    2. Ik denk dat leveranciers van smart speakers eerlijk zijn met de gegevens
    3. Ik denk dat de leveranciers van smart home speakers betrouwbaar zijn
    4. Ik verwacht dat de leveranciers van smart home speakers de belangen van de klant op 1 zet.

11. Self-Innovativeness: SI

1. Ik geef om nieuwe trends en innovaties in technologieën
2. Ik beschouw mezelf als 'early adapter' (iemand die vroeg gebruik maakt) van innovatieve technologie.
3. Ik beschouw mezelf als een expert/kenner als het gaat om nieuwe trends in technologie.
4. Ik gebruik innovatieve technologie graag voor de meerderheid van de mensen het gebruikt.

Demografische vragen

- Wat is uw geslacht?
- Wat is uw leeftijd?
- Wat is uw hoogst genoten opleiding?
  Heeft u zelf een smart home speaker?
  Hoeveel ervaring heeft u met een smart home speaker (schaal van 5)

7.4 Appendix D: English Statements of the Questionnaire

ENGLISH STATEMENTS

Intention to Use

If I would be able to use a smart speaker, I would do it.
I predict that I would use a smart home speaker in the near future
I will not hesitate to use a smart speaker.

Performance Expectancy

I expect that a smart speaker will make my life more comfortable
I expect that with a smart speaker I would be able to do my daily tasks more efficiently.
I expect that a smart home speaker would make my life easier.
I expect that with a smart speaker my personal productivity would increase

Effort expectancy

I expect that it is easy to learn how to use a smart speaker.
I expect that interaction with a smart home speaker is clear and understandable.
I expect that using a smart speaker is easy.

Injunctive social norm

I expect that people who are important to me, would recommend this smart home speaker.
I expect that people whose opinions I value, would support me using this smart home speaker
I think that friends, family, and colleagues would expect me to use a smart home speaker
Descriptive social norm
I think that currently smart home speakers are used by a lot of people
People within my immediate environment use a smart home speaker
I heard that other people have positive experiences with using a smart home speaker
The mass media and social media, influence me to use a smart speaker.

Hedonic Motivation:

I think using a smart speaker is enjoyable.
I think I will have fun using a smart speaker.
I think using a smart speaker will give me pleasure

Price Value:

I expect a smart home speaker is a good value for the money.
Buying a smart home speaker is a financial burden to me.
I will not buy smart speakers because of its (expensive) price.

Privacy Risk:

I think no one else can see and use my personal information stored in smart speakers.
I am worried that a smart speaker will misuse my personal data.

I am concerned that a smart speaker uses my personal data for the company's benefits.
I am concerned that a smart speaker saves and shares relevant personal data without my knowledge.

Level of Autonomy
I expect a smart home speaker is able to make decisions without my approval.
I expect a smart speaker is able to manage my home environment without my control.
I think I will feel less autonomy when I let a smart speaker control thing around me.

Trust
I expect to trust a smart speaker with my personal data.
I think smart speakers' providers are honest with the data
I think smart home speaker service providers are reliable
I expect that the smart home speaker providers keep customers' best interests in mind

Self-Innovativeness
I consider myself as an early adopter of new technologies
I consider myself as an expert when it comes to new trends in technology.
I use new technological devices, before others have tried them
I care about new trends in technology

7.5 Appendix E: Descriptive information

Table 9. Descriptive information

Constructs	N	Mean	Std. Deviation
1. Performance Expectancy	272	2.76	.85
2. Effort Expectancy	272	1.88	.66
3. Inductive Social Norm	272	2.99	.74
4. Descriptive Social Norm	272	2.99	.79
5. Hedonic Motivation	272	2.50	.79
6. Price Value	272	2.85	.72
7. Privacy Risk	272	2.61	.71
8. Level of Autonomy	272	3.22	.92
9. Trust	272	3.37	.86
10. Self-Innovativeness	272	3.04	.96
11. Intention to Use	272	3.02	1.06

All scores are measured using a 5-point Likert-scale from (1) totally agree to (5) totally disagree

7.6 Appendix F: Collinearity Statistics

Table 10. Collinearity Statistics with the Variance Inflation Factor

Constructs	VIF
1. Performance Expectancy	1,88
2. Effort Expectancy	1,08
3. Inductive Social Norm	1,38
4. Descriptive Social Norm	1,29
5. Hedonic Motivation	1,91
6. Price Value	1,10
7. Privacy Risk	1,35
8. Level of Autonomy	1,22
9. Trust	1,48
10. Self-Innovativeness	1,27
11. Intention to Use	1,88
12. Gender	1,41
13. Education	1,17
14. Experience	2,02