Exploring the perception of VAPA devices and how it influences millennials' daily activities

A qualitative approach

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Abstract

The recent technology advancements have resulted the relationship between human and non-human element to become more intertwined than ever before. With the rise of innovative technologies such as VAPA (Voice Activated Personal Assistant), the influence of its usage on individuals and society has resulted more emotional interactions formed by human and technology. VAPA is an Artificial Intelligence (AI) based device that incorporated its most unique element, which is voice-recognition. VAPA devices are used to perform daily tasks by delivering speech messages such as playing music, input appointments or sending messages/email. Most well-known VAPA devices for example are Amazon's Alexa, Google's Home and Apple's Homepod. Since VAPA is tracking personal activities based on user's data, it raises more complex issues regarding privacy concerns. The most important factor regarding privacy is the fact that user's personal data are connected directly to third parties or companies. Therefore, the users do not have full control of how their personal data are being used. Knowing that young adults known as millennials are heavy users of technology, this research aims to bring nuance to previous researches focuses on understanding the perception of this target group and how VAPA devices influence their daily activities.

The rise of VAPA devices has also resulted the usage expansion in other countries such as Europe. Therefore, by focusing on a more international audience, this research would bring a new perspective on how VAPA devices are perceived by users from different general knowledge and backgrounds of VAPA. Therefore, the following research question and sub-questions are formulated: *How does diversity of millennials experience VAPA as part of their daily activities?* And, *how do these millennials respond to their personal data being used in relation to the usage of VAPA? What do these millennials see as the benefits and concerns in the use of VAPA?* The research focuses on exploring the perception of the target group and therefore qualitative approach is used by conducting focus groups discussion. There were 5 focus groups and a total of 22 individuals participated in the discussion. The participants were chosen using snowball-sampling procedure and Google Home was used as a stimulus material to enhance the participants' experience of using VAPA devices. Constructivist grounded theory was used to analyze the transcripts since the research is inductive. The main outcomes of this research identify that emotional attachment of individuals towards VAPA devices has nurtured a new type of interaction and considered to be the determinant factor when using VAPA devices. It is important to understand that the influence of VAPA devices has also impacted social practices in a more collective level. The potential benefits of VAPA devices are countless when relating it to its functionality in performing daily activities. However, it is vital to acknowledge its drawbacks and implications, especially concerning privacy issues. It is noticeable from this research that privacy is still an ongoing debate that are still considered to be the determinant factor when using VAPA devices.

Keywords: Artificial Intelligence, Home Personal Assistant, VAPA, Privacy Management, Innovative Technologies

Table of Contents

1.Introduction

Advances in digital technology in today's world have become increasingly seamlessly integrated into our daily life. Current research emphasizing people's attachment to the use of technology has analyzed the relationship from a more emotional and behavioral aspects (Trub & Starks, 2017). In part, this intimacy is made possible through technology that incorporates artificial intelligence (AI). Artificial intelligence has rapidly become part of one of the most regularly used devices, the smartphone (Centric Digital, 2017). AI is a computer-based intelligent machine that can adjust user inputs and perform human tasks (SAS, 2017). Artificial intelligence-based devices are new form of technology. Though science fiction, the film *Her* illustrates the connection between a human being and a non-human in forming a new type of interaction using an AI-equipped technological device. The film develops in a fictional manner the emotional bond between human beings and technology derived from interactions with smart machines. The film suggests a connection between humans and technology and impact on the expansion of what is considered normal in the performance of the daily activities of social practice. Though this does not depict a certain future, it seems an increasingly possible future. As certain forms of technology are being incorporated into daily life, the voice-activated personal assistant (VAPA), an AI-based technology, is one such technology that enhances communication between humans and technology. It serves as a mediator between humans and innovation (Lazarevich, 2017). This device enables humans to adjust to technology use in their professional and personal lives.

According to *Tech Crunch* (2017), audio-driven technology has expanded and has become an ever-growing aspect of today's daily life practices. VAPAs have become a standard feature on smartphones. Most well-known smartphones have a VAPA among their features, for example, Siri on Apple, Google Now on Android phones, Bixby on Samsung, and Cortana on Microsoft. There has also been an increase in the use of third-party voice assistants such as Maluuba, Evi, and Vlingo (Khan, 2017). VAPAs provide users with the capability to perform programmed daily life practices such as setting a reminder, calling a contact, inputting events to a calendar, and delivering messages through voice recognition, a form of verbal process (Selinger, 2014). Voice recognition is the unique element of VAPA technology since it provides a new form of understanding the dynamic conversation between humans and technology (Forbes, 2017). VAPA technology has also become increasingly

prevalent in completing complicated tasks with home appliances or in automobiles, signifying the evolving role of technology in human daily activities (Mallat, Tuunainen & Wittkowski, 2017). Rapid advances in VAPA-enabled devices have also nurtured the emotional aspect of human interaction. This is achieved by integrating a more "human-like" aspect to voice recognition. According to *Wired* (2017), people tend to feel more comfortable or are more prone to use a VAPA if it is able to interact in a more "contingent interaction," that is, if it is capable of engaging in a dynamic conversation. Additionally, Amazon's Alexa has recently integrating a personality function, "speech cons," a feature that allows the device to pronounce words and phrases in a more expressive manner (Amazon Alexa Blog, 2017). This feature increases the natural conversational ways in which human and technology interact (*Wired,* 2017). This "natural" aspect of VAPAs has somewhat blurred the distinction between human and non-human elements.

The available technology has grown rapidly, and tech-savvy users are more devoted to the use of smartphones on which VAPA are in part present (Trub & Starks, 2017). According to research conducted by Smith (2015), almost 46% of young adults claim that they cannot live without the features on their smartphones. These young adults, often described as "millennials," are described as comfortably using technology and continuously adapt to the most recent technological inventions (York, 2017). These millennials have today have become technology-dependent and technology has become more integrated into their everyday life activities (York, 2017). VAPAs, such as Siri, integrated in smartphones, may have prompted an increase in their dependency on these technologies and in the way, they experience these devices on a daily basis.

As an AI-based intelligent technology, VAPAs have instigated an intimate feeling for such technology as a result of their functionality. The development of VAPA devices has also resulted in its capability to implement autonomous and cognitive abilities, as it constantly makes associations linked to human thoughts, emotions and life events (Selinger, 2014). Additionally, the implementation of AI in VAPA devices allows them to track, analyze, and gather information on individuals' daily activities based on their behavioral patterns (Lozada, 2014). VAPA devices can also perform transactional tasks such as fulfilling orders, booking appointments, and providing flight information (Compton, 2017). In recent years, advances in AI technology have enhanced the capability of the technology to not only track, but also predict and respond to individuals' activities regarding their personal location, the communication tools they prefer, and their previous keyword search, based on the association of their personal information (Afeyan, in Lozada, 2014). While VAPA platforms provide

users with data that are beneficial and improve their quality of life, these data are also disseminated to third parties and used for the latter's own, usually profitable, benefit too (Boughman, 2017).

Such activities have, however, raised another important concern in using VAPAs. The use of users' personal information has prompted several issues, most importantly privacy concerns. The use of Global Positioning System (GPS) in smartphone applications such as VAPAs enables third parties to track users' locations. Users may therefore feel less secure if they do not have control of how their personal data are being used (Morthy & Vu, 2015). By agreeing to the terms and conditions, users provide VAPA platforms with the right to use their data to the extent specified in those terms and conditions so that users have less control of how their personal data are being used (Moorthy & Vu, 2015). The voice recognition aspect of VAPA is considered to be a threat to individual's personal information. For instance, the use of Google Home (smart home personal assistant) has impacted users' security as it concerns the use of their personal information, which could potentially be sold to third parties (Piesse, 2017). The fact that the device is constantly recording and is responsive to verbal commands means that the chance that it could be hacked by third parties increases (Piesse, 2017). Comparing to other VAPA platforms, Amazon's Alexa allows user's activity to be measured, captured, and profiled and therefore may trigger a feeling of being constantly tracked (Hill & Mattu, 2018). The new updated version of Alexa integrates a camera (Cloud Cam) into the device and raises even more privacy concerns regarding how users' personal information is treated (Liedtke, 2018). The fact is that, in most cases, users do not know how their personal data are being used because the term and conditions provided when the device is purchased are too long and complicated to read or understand (Piesse, 2017). Additionally, the camera update may aggravate privacy concerns and the availability of the information, which could be used for the purpose of profit by targeting users with ads based on their profiles (Liedtke, 2018). The fact that these devices are connected principally to the company itself allows it to use users' data in the form of the personal information shared by them when they input their requests to the device. This information sharing happens without users noticing it since the verbal commands/requests are mostly encrypted by these companies (Hill & Mattu, 2018).

According to *The Verge* (2017), VAPA platforms, such Amazon's Echo and Google's Home (smart home personal assistants) have become popular in the United States and will soon be available in European countries such as the Netherlands, Germany, Sweden, and Finland (Verge, 2017). That is, the use of VAPAs is expanding to different countries and

demand for the use of this technology is increasing. With such an expansion, it is most probable that users' activities may vary across cultures. This might have impact on users' perceptions of VAPAs themselves and how they are integrated into their daily life activities. However, minimal research has been conducted to understand how these differing backgrounds may shift and change as these devices become part of people's everyday activities.

Based on the information above, the research question in this study is formulated as follows: *How do diverse millennials experience VAPA as part of their daily activities?* In order to delimit the research more exactly, the sub questions are formulated:

1. How do these millennials respond to their personal data being used by VAPAs?
2. What do these millennials see as benefits and concerns in the use of VAPAs?

The present study aims to understand the perceptions of millennials who use VAPAs and how it might affect their daily life activities. Additionally, the outcome of the research might generate a new perspective on the rapid development of VAPA platforms and their use in European countries, that is, in a more international setting. Furthermore, the study attempts to understand whether privacy concerns significantly impact on the use of VAPA devices.

2. Theoretical Concepts

Voice-activated personal assistants have become a standard feature on smartphones. VAPAs result in the technology being embedded in peoples' daily activities. This intelligent technology allows human activities to be predicted by linking it to their behavioral patterns and life events. Nonetheless, there remain concerns about privacy in terms of the use of personal data in VAPAs. Based on these contentions, the literature review focuses on humans' adaptive behavior towards technology, which is explored in terms of the frameworks of the technology acceptance model (TAM) and the mobile phone technology acceptance model (MOPTAM). These frameworks delve into the elements that influence social factors that are fundamental to understanding the influence these factors have as on the use of VAPAs. Additionally, privacy issues regarding the use and sharing of personal information are elaborated from communication privacy management (CPM) theory and contextual integrity theory. These frameworks consider the system of communicating decision principles that concern individuals' choices to reveal or conceal their private information. Furthermore, these theories are used to understand attitudes towards and behaviors regarding privacy. From a social practices perspective, actor network theory (ANT) and technological determinism vs instrumentalism are used to understand the interaction of humans and non-humans and how the role of technology is integrated into people's daily activities.

2.1. Social Practices of Technology

A common approach to explaining the role of technology is to observe its impact in terms of both its technical aspect and its social context. Combining these elements allows one to understand how they are interconnected. In terms of social context, communication has become the major influence on how technology forms part of life as it has an impact on social structure (Fleck & Howells, 2010). Social practices have a vital role as regards how technology is used and accepted (Yao, 2015). Yao (2015) explains that innovations of technology occur when social practices evolve. For instance, new forms of technologies are developed with the aim of fulfilling the needs of people and essentially create meaning-making value in linking the technology and its impact on the social context. The value of these two elements could allow technology to create new forms of social practices. This

means the use of technology may at least indirectly influence social change (Tuomi, in Yao, 2015). Grandwell (1999) also views technology as a force that has an impact on how social patterns and values are constructed. In some ways, technology is seen as an extensive invasion of all aspects of life (Synder, 2002). Technology has become so fundamental to various social practices that it transforms how humans communicate and interact (Synder, 2002). Moreover, constant innovation in technologies may have an impact on how people live and work (Saperstein & Ruoach, 2002).

The use value of technology in a social context also depends on the demands and needs of different social groups (MacKenzie & Wajcman, 1999). While technology is constructed in different ways, the interpretation of how it influences social context is seen from different perspectives. According to Howcroft, Mitev and Wilson (2004), there are no technological implications without the influence of social aspects and vice versa. It is therefore important to analyze technology and society by integrating different though intertwining elements, such as the construction of the physical artifacts and social environmental settings or institutions, that enhance the understanding of the role of technology in social practices.

With the rise of the use of VAPA devices, it has become apparent that human and non-human elements are being nurtured in a new type of interaction. This interaction underscores how technology is becoming an essential aspect of people's daily life practices. According to Wise (2010), new forms of technology, such as smart machines and personal assistants are created based on how humans use technology and increased demand for the functionality of these technologies. These new technologies are considered unfamiliar or threatening in that they create an "unnatural" interaction in terms of how humans normally communicate (Cho, 2018). The capability of VAPAs to understand natural human language is constantly evolving, and they are now seen as being similar to a real human assistant (Han & Yang, 2018). Advances in these technologies increase the importance of the interaction between humans and technology in a conversational manner since these devices are becoming more integral in people's daily life practices. Existing forms of VAPA devices, such as Siri or Google Now, are primarily used in smartphones.

VAPA technology focuses on integrating of speech recognition, allowing the device to process dialogue in a more human-like manner (Noda, 2017). The values of most VAPA devices for social practices remains limited, though it is constantly growing. VAPA devices are capable of performing tasks such as setting an alarm, playing music, sending a text message, or creating a shopping list (Kelley, 2017). With the rise of home personal assistant

devices (e.g. Google Home or Amazon's Alexa), natural human conversation has become more complex in its relationship (Cho, 2018). This complex relationship is one of the practical concerns when using such devices. This practical concern relates to speaking directly without having a visual representation of the interaction, which makes it difficult for its users to construct specific questions compared to more dynamic face-to-face conversations (Cho, 2018). In natural human language, expressions and responses are signs of mutual understanding; these aspects are not recognizable by VAPA devices in conversations with them (Cho, 2018). The complexity of interactions between humans and technology is perceived as a gap in understanding the development of VAPA devices.

VAPA devices have allowed individuals' personal information relating to their daily activities to be tracked, gathered, and analyzed (Riggins & Keskin, 2018). VAPA devices with the form of quantified-self movement have evolved beyond the agency of mere individuals (Riggins & Keskin, 2018). For example, devices such as smartphones and tablets have become part of individuals' activities, allowing identification of the person they are talking to, their own previous keyword searches, and their personal location; this means that technology plays an important role in people's daily activities—it is becoming one of the factors that determine their behavior (Afeyan in Lozada, 2014). That is, technology plays a significant role in humans' daily activities. It therefore allows the understanding that not only do humans have their own capabilities, but that technology has its own type of capabilities, as well as being a part of humans' lives. This provides an understanding of the role of technology in human social practices.

The aim of VAPA devices is to track individuals' activities, to respond to verbal commands connected to personal calendars, and, ultimately, to answer individuals' future questions based on their behavioral patterns, which is an extension of what the normal social world is imagined to be (Lozada, 2014). These behavioral patterns are then conceptualized based on their functionality and their use by individuals. Noda (2017) classifies these behavioral patterns into three categories: *information retrieval use*, *multimedia control*, and *environment use control.* The author of current study focuses on the functionality of home personal assistants such as Google Home and Amazon's Alexa. These devices allow users full control of their homes and personal activities and are seen to incorporate major advances, especially in terms of words' meaning-making (Noda, 2017). *Informational retrieval use* emphasizes the importance of providing users' general data with daily updates, such as checking the weather, news, their personal agendas, or traffic information. *Multimedia control* involves the use of connected home applications or devices such as TV and radio:

individuals use the VAPA device as a shortcut to perform tasks such as playing music or movies or turning on external speakers. *Environmental use control* is primarily associated with household conveniences such as smart lights, smart fridges, and vacuum cleaners. This demonstrates that VAPA devices bring nuances to the normal ways that people perform their daily life practices.

In the light of recent developments in VAPA technology, it is important to analyze how emerging trends in this technology shape society. Additionally, it is essential to understand the potential effects and implications of this technology in order to develop a better interpretation of the future paths of VAPA use.

2.1.1. Technological Determinism and Instrumentalism

The impact that technology has on social structure is informed by different views and approaches. One view of the role of technology is known as technological determinism, which emphasizes how technology shapes society (Fleck & Howells, 2010). The technological **determinism** view holds that technology is out of one's control and that it controls people (Dankert, 2011). In some ways, this view implies that some people are not aware of how technology constructs the paths of their lives. Although this view acknowledges the role of technological innovation, it raises several questions regarding how this influence society, in particular, its unintended consequences (Bijker, 2001). Some researchers hold that this view neglects unintended results that are difficult to anticipate and control. These are often associated with human interests or environmental issues. For instance, the creation of the automobile was once thought to improve the environment as it replaced earlier forms of transportation (Dorgathen, 2013). However, the environmental destruction caused by this development was unintended and was therefore difficult to control or anticipate. Additionally, technological determinism omits the capacity of people to intervene and therefore some people have less understanding of the impact of technology and its unintended results (Wyatt, 2013).

Moreover, this view is often criticized as treating the deterministic perception of technology as merely a given and of perceiving it as an instrument of change in social and organizational contexts (Howcroft, Debra, Taylor & Philip, 2009). The oversimplification of the approach raises questions about the authenticity that considers the various implications that are factors in understanding the role of technology. This interpretation is criticized for

perceiving technology as the main reason for mobile change and for neglecting the fact that technology is seen as being beyond humans' beliefs and values (Howcroft et al., 2009). Additionally, this perspective also excludes the role of social context in technological developments, despite the fact that it emphasizes the idea that technology plays a vital role in changing society (Howcroft et al., 2009). In this case, the oversimplification of this approach sometimes negatively affects people's general understanding by excluding the drawbacks, implications, and potential failures of technology, thereby constructing a specific understanding by some people of the role of technology (Howcroft et al., 2009).

On the other hand, there is an opposing perspective in terms of which people perceive technology as an instrument; this is referred to as technological **instrumentalism** This perspective holds that technology is merely an instrument that exists to serve people's demands and needs. Its advocates hold that technology has no force to control people, and that, in the end, people are fully capable of controlling technology (Dankert, 2011). Additionally, this concept holds that technology is shaped by human history and, in the end, that people have the most say in shaping how technology functions in society as a whole (Dankert, 2011). The relationship between technology and culture has created an inference about how technology is accepted in the modern era (Voigt, 2016). Constant advances in innovative technologies such as VAPAs have resulted complex new relationships between people and technology. Instrumentalism views technology as a "neutral" instrument rather than considering how it is beneficial based on its use (Feenberg, 1991, p.6). The neutrality of technology means that it is perceived as being indifferent in its roles, meaning that technology is seen as an object that serves as a specific complementary aspect when it is considered in its social context (Feenberg, 1991). The common view of technological instrumentalism involves the fear of the constant evolution of technology, which might endanger people's capabilities to construct their own social life practices (Knievel, 2006). Subsequently, technology has been seen to influence tensions regarding society's norms and values, which are generated from socio-technical change (Feenberg, 1991). Advocates of this view believe that technology cannot transform society as a whole.

However, looking at today's modern lifestyles, it is impossible not to acknowledge the direct impact of technology in shaping today's societies. It is apparent that the use of technology is greatly influenced by social forces. It is also understood that different norms and values are established as regards how social agents interpret the role of technology. Continual advances in innovative technologies have resulted in fundamental changes in how people perceive their lives. Understandings of these changes vary based on differences in

individuals' personal values, such as concerns their religious beliefs, personal relationships, or their belonging to specific social groups (Linturi, 2000). Moreover, the opposing perceptions of technological determinism and instrumentalism challenge people's perceptions of themselves. Linturi (2000) asserts that, in some ways, such changes increase people's fears, so that they question their own capabilities as human beings. However, it is important to comprehend that acknowledging and understanding the role of technology will eventually increase people's general understanding of its impact and their awareness of the uses of technology (Linturi, 2000). Linturi (2000) asserts that we are currently moving towards unpredictable chaos—not solely because of technology, but also because of human beings themselves. If such is the case, it is vital to understand that, in order to reach a stable state, the impact or changes wrought by technology also begin with human beings (Linturi, 2000). Hopefully then, the complex relationship between humans and technology can be resolved by the positive impacts it has on society. Understanding these two perceptions will enhance the comprehension of how individuals perceive the role of technology in their own lives.

2.1.2. Actor Network Theory

This research focuses on the interaction and interrelationship of human and non-human entities, of people and technology. It is therefore important to understand the elements that constructed from human and non-human sources and how technology fosters a new relationship between these entities. Actor network theory explains that the world comprises different entities, both human and non-human (Tatnall & Gilding, 1999). However, ANT does not make an analytical distinction between these two elements, instead holding that the non-human element also has its own agency (Tatnall & Gilding, 1999). According to Sismondo (2010), while ANT is considered to be a more general theory, it aids us in understanding technology and science in their contemporary practice. Actor network theory aims to understand the fluid, complicated, and evolving social dynamics between these two types of entities (Baron & Gomez, 2016). It tends to be closely associated with constructivist theory, which emphasizes sociological approaches to technology and science studies (Baron & Gomez, 2016). It is associated with material and semiotic, which these two elements constitute and act as a whole. According to Latour (2007), ANT consists of three aspects: the role of non-human elements, the manner of conceiving the adoption of social practices, and the reconstruction the social. Actor network theory employs the

metaphor of the heterogeneous network, which focuses on how organizations, society, agents, and machines are constituted in a diverse network of materials and are not bounded by human agency (Law, 1992).

Baron and Gomez (2016) identify three concepts that derive from ANT as regards social interactions with technology. The first relates to *the association of human and non-human elements* achieved in practice. Association in this case pertains to individual meanings as derived from interactions, change, flows, and movement, which are vital to understanding social practices (Baron & Gomez, 2016). The second concept is related to *materiality*, which involves the condition in which human and non-human elements can have their own agency. Actor network theory holds that the construction of "reality" is a result of complex relationships emerging from heterogeneous networks (Howcroft et al., 2009). It is seen as the foundation for understanding important aspects of the material, which includes factors such as its tangible capabilities and the characteristics required from technological objects themselves (Mutch, as cited in Baron & Gomez, 2012). The third concept emphasizes the *mediation* aspect. Actor network theory holds that non-human elements can create diverse means of mediation that involve the influence of these heterogeneous networks, which takes into account the agency of non-human elements (Baron & Gomez, 2012). These three concepts are used to further understand the role of VAPA devices in people's daily activities. Additionally, these concepts help conceptualize an understanding of whether humans and technology are perceived as different in agency or are becoming more intertwined with each other.

Actor network theory is the most common approach used when viewing the relationship between technology and humans as non-distinctive. It argues that human and system networks or devices should be contextualized using the same elements. The principal idea of the ANT approach is to understand the perspectives of how these heterogeneous networks are present and how "actors" are integrated in the network. Additionally, the theory aims to understand how such networks may reach temporary stability (Cresswell, Worth & Sheikh, 2010). However, since the function of networks is continuously evolving, their outcomes in a social context are complex and adaptable (Cresswell, Worth & Sheikh, 2010). From this perspective, Cresswell, Worth and Sheikh (2010) explain that since ANT integrates different mediators, changes in society result in unpredictable ways (Cresswell, Worth & Sheikh, 2010).

Technology and science have explicitly engaged in developing situations in which humans and non-humans affect each other (Sismondo, 2010). Technology is considered to be

responsible for the contemporary world as it fosters the combination of activities of human and non-human elements, enabling the expansion of the normal social world, which constitutes by having common activities, symbols and organizations that emerge together (Sismondo, 2010). For example, in the case of VAPAs, it has created a social world that is on more intimate terms with technology as it also deals with human emotions, thoughts, and feelings. Furthermore, technology and science have created a world in which non-humans are incorporated into the human world to establish new forces of change (Sismondo, 2010). This can be seen in the manner in which ANT interprets how VAPA technology has solved and shaped problems in everyday life practices. For example, VAPAs such as Amazon's Alexa assist in tracking and purchasing things online, for instance, groceries. In this case, the focus of ANT is on acknowledging the role of technology in comprehending that the path of society is not constant, but rather has been innovated with the use of VAPAs. Technological developments have become one of the factors that continually shape and change society, creating new meanings for social practices. Actor network theory is a foundation for understanding our attachment to the using of non-human entities that have become important aspects of people's daily activities and social practices.

2.2. Adaptive Behavior Towards Technology

The use of technology depends on users' attitudes, which are based on their perceptions and adaptations of technological functionality. Therefore, it is important to identify the determinant factors that influence the behavioral intentions of people (Hong, Thong & Tam, 2014). Behavioral intention is vital to understanding the decision-making process when individuals choose to use a particular technology or system. In analyzing such behavior, prior studies have addressed this topic using the theory of reasoned action, innovation diffusion theory, or the TAM. These theories provide a foundation for analyzing users' intention of using a particular technology, focusing on the current use the users has adopted. For this study, the TAM is employed to evaluate adaptations in the target group's behavior as a result of the use of a VAPA device. The TAM is the most common approach when assessing users' attitudes to new technology (Biljon & Renaud, 2009). Therefore, the TAM is used as a foundation for an in-depth understanding of the behavioral patterns of users. Additionally, the extended version of TAM, MOPTAM, is used specifically to evaluate use of mobile phone technology. The latter model provides a more comprehensive

understanding of users' experiences of technology use as it integrates external considerations such as demographic factors, the social influence of peers, and users' intrinsic motivation.

2.2.1. The TAM and the MOPTAM

To understand the interaction of humans and non-humans, especially how technology influences human behavior, in this study it is important to comprehend how certain behaviors affect the use and application of technology. Therefore, the most well-known theory concerning technology based on information systems, the TAM, is used to understand such behavior. This theory emphasizes users' perceptions of ease and utility that play a vital role in the actual use of technological systems or devices (Davis, 1989). The theory identifies variables that pertain to the characteristics of users, such as cognitive and demographic variables, user-training and organizational characteristics (Davis, 1989). Organizational characteristics focus on analyzing the integration process and how users perceive the advantages of their interaction with technology, that is, its utility and ease of use (Moorthy & Vu, 2015). The TAM originally comprised four different variables: perceived usefulness, perceived ease of use, attitude towards use, and behavioral intention of use (Turner, Kitchenham, Brereton, Charters & Budgen, 2010). These four factors include both independent and dependent variables and were later revised by Venkatesh and Davis (2000) to omit the last two. These authors included additional factors, such as subjective norms and experiences in the theory; however, the core aspects remain the same. The TAM aims to allow an understanding of the choices of individuals based on their adopting of a specific technology when they perform daily tasks and activities (Wallace & Sheetz, 2014). Interestingly, the TAM can also be used to understand the acceptance of users of a particular system or software (Wallace & Sheetz, 2014).

In terms of the theory, both perceived ease of use and perceived usefulness influence the adoption of a technology. Perceived ease of use entails understanding that the use of technology should be limited to use of physical and mental effort (Melendez, Obra & Moreno, 2013). Perceived usefulness concerns the functionality of a specific type of technology that may increase the job performance of individuals (Melendez, Obra & Moreno, 2013). These two factors have a direct positive or negative influence on users' behavior and attitudes towards technology (Ooi & Tan, 2016). This study attempts to understand these factors in relation to the direct influences on users' conscious behavior when they use

technology. Perceived ease of use has a direct impact on perceived usefulness and therefore affects behavioral patterns (Moorthy & Vu, 2015). These two factors are crucial to this study as they represent an understanding of how the functionality of a particular technological device or system can predict actual use. The validity and reliability of these two factors have been proven in many studies on technology use. The TAM is also applicable to the analysis of user behavior as this concerns organizational relationships. Lee and Rehto (2013) analyze this relation and identify two behavioral patterns: predicting behavioral intention and behavior under the volitional control of the user. *Predicting behavioral intention* focuses on how users employ a particular system based on how specific organization or companies intended the system to be used; germane implementations here include applications for studying at university or e-learning systems (Lee & Rehto, 2013). *Volitional control*, on the other hand, analyzes the goal of using a specific system based on users' motivation to achieve a particular goal (Lee & Rehto, 2013). Therefore, it indicates that the organizational relation plays an important role in motivating actual use of a particular system or technology; this might influence the use of a VAPA device.

Nevertheless, the TAM is limited in its approach as it does not focus on external variables that might be pertinent to the analysis, such as social factors, or information that may influence critical understanding of ease of use and perceived usefulness. For this reason, the TAM has been extended to what is referred to as the MOPTAM. This model was constructed to introduce a unified theory that focuses primarily on the impact of mobile phone use on behavior patterns (Renaud & Biljon, 2008). The model was originally proposed by Kwon and Chidambaram (2000)—they discovered that the two factors of perceived usefulness and perceived ease of use have a direct influence in relationship with external factors such as demographic variables, social peers' factors, apprehensiveness, and intrinsic motivation.

The model is employed here since it enhances understanding of user interaction, in this case with VAPAs, and how these communicates information. The models are quite similar; MOPTAM, however, potentially better predicts users' behavioral patterns based on the functionality aspect of mobile use than do common models related to technology such as TAM (Moorthy& Vu, 2015). Van Biljon and Kotzé (2007) integrated the outcome of findings from the TAM to develop the MOPTAM. The authors explain that when applications such as VAPAs are included in mobile phones, according to the MOPTAM, social influence has an effect on the two factors of perceived usefulness and perceived ease of use (Van Biljon & Kotze, 2007). Perceived ease of use has a strong correlation with perceived usefulness as

these directly impact on each other (Renaud & Biljon, 2008). However, it is important to understand that this model is considered to lack integration of infrastructural elements such as motivational factors or quality of usage; these are vital when evaluating behavioral patterns, particularly as regards mobile phone technology (Biljon & Renaud, 2008).

For this study, it is important to evaluate the feasibility of these two factors as a foundation for understanding the relevance of these concepts to user behavior; this is explored further in the study. Moreover, one valuable point of the MOPTAM is the ability to assess the direct effect of perceived usefulness on behavioral intention and perceived ease of use (Ooi & Tan, 2016). It is critical to be further examine the ongoing tensions surrounding privacy since this is one of the core considerations when analyzing individuals' behavior when using technology, in this case, predictive technology. Understanding these two factors will provide insight into individuals' perceptions of the benefits and concerns of using VAPA and may elaborate on the issue of privacy.

However, the MOPTAM is limited as regards its implementation in practical research. Although it has been used to explain use by demographic groups, for example, older people, it has not been widely justified by previous research. Therefore, the model still needs to be further examined in terms of the factors that determine the use of different types of mobile applications (Moorthy & Vu, 2015). Additionally, in a manner similar to the TAM, the MOPTAM does not integrate verbal factors, which are vital to understand the use of VAPA devices. The MOPTAM is relevant to the analysis in this study as it may provide a framework to predict the determinant factors that influence the use of mobile phone features such as VAPAs. Nonetheless, it is vital to understand the effect of social influence on the use of VAPAs; therefore, it of interest to examine whether the social setting has an effect on using VAPAs. It is important to understand that both the models employ quantitative approaches in their frameworks when defining the use of technology. By conducting a qualitative analysis, this research provides an in-depth understanding of how technology is seen to be part of people's behavior and daily practices.

2.3. Privacy Tensions in Technology Usage

The new digital revolution has resulted an increase in the use of advanced online platforms and in the development of innovative technologies. This revolution also allows for easier gathering and combining of data (Solove, 2004). Personal information has become more valuable as access to incomplete or fake information is relatively easy, which increases the tensions of privacy since this information could still be obtained by third parties companies for targeted profiling (Solove, 2004). The issue of privacy and technology has progressed considerably since the early 1960's when it was first introduced by Mayer-Schonberg (Agre & Rottenberg, 2001). In that era, the matter of privacy tensions still concerned rather small amount of data. The well-known Code of Information practices acknowledge the responsibilities of organizations to protect individuals' personal information and individuals have the right to refuse the collection or ownership of their personal data by organizations (Agre & Rottenberg, 2001). In the digital age, databases have grown to include an extensive amount of data. The structure of databases has not changed completely; however, their functions and techniques for using them have expanded in many different ways. For example, data-mining processes can be used to analyze significant patterns in large amounts of information (Agre & Rottenberg, 2001). The digital era has also seen the rise of online platforms and the use of mobile phone applications. These developments have increased the flow of personal information and its accessibility. Issues of privacy has become more complex as the use of personal information has increased since most of the data collected is used to create profiles of people (Solove, 2004).

As advances in mobile phone applications increase, this raises concerns for consumers and parties that collect a considerable amount of data from users' personal information. As concerns the discussion of smart machines that incorporate AI and VAPAs, issues of willingness and trust in sharing private and personal information become more important for individuals to feel secure (Schroeder & Schroeder, 2018). Additionally, there are clear implications for big data as organizations have acquired privacy rights at the expense of ordinary users, which even further increases concerns about privacy (Morizio, 2016). Despite regulations and laws protecting personal data, there is a lack of individual understanding of topics such as privacy and the substantial amount of personal information that is collected by other parties on a daily basis (Morizio, 2016). Additionally, the fact that digital material can be obtained that contains users' personal information raises questions concerning the ethics of how the data is used (Morizio, 2016). Without realizing it, users

create profiles containing sensitive data without having any control over how it is used (Crossler & Belanger, 2017).

Many individuals tend to disclose their personal information in order to obtain benefits (Morizio, 2016). Nevertheless, the sharing of their personal information has a direct impact on the security breaches that individuals experience (Crossler & Belanger, 2017). Many third parties use this information for targeted marketing or, more dangerously, as a result of identity theft (Crossler & Belanger, 2017). Moreover, the recent development of mobile devices has been complemented by mobile cloud-computing applications. These are multi-platform applications that use users' data and send them to anonymous parties (Crossler & Belanger, 2017). For example, in the case of wearable devices, users have little information on how their data are being used as there is a lack of transparency about this (Crawford, Lingel & Karppi, 2015). Users in fact provide more information than they receive. Therefore, despite of its many benefits, this advance in technology leads to more serious privacy issues. One of the principal concerns is the remote location feature by means of which users' personal information can be tracked (Nikkhah & Sabherwal, 2017). The implementation of this feature on mobile phones is also the principal issue in the use of predictive technology.

As the use of VAPAs has been increasing consistently in recent years, privacy issues and tensions concerning their use have become more complex (Mallat, Tuunainen &Wittkowski, 2017). In the case of VAPA use, the main privacy concern relates to the understanding of mutual trust (Jackson & Orebaugh, 2018). One of the issues regarding mutual trust is cloud data storage by most VAPA devices. Jackson and Orebaugh (2018) provide the example of Amazon's Alexa: dialogue produced by its users could be used for the company's benefit when the data are sent to its data center. Additionally, the authors acknowledge that dialogue data could be transmitted to Alexa's neural network, allowing the AI can learn from the extensive amount of data produced. Since VAPAs are based on voice recognition, the more the devices gather dialogue data, the better they are at recognizing and understanding it (Jackson & Orebaugh, 2018).

Moorthy and Vu (2015) explain two elements of privacy concerns with the use of VAPAs—concerns relating to *physical interaction* and to *remote locations.* Privacy concerns regarding physical interactions focus on social norms, especially in public spaces where individuals engage with one another while using mobile phones and apps such as VAPAs. This study recognizes that individuals wish to protect their information when they use their phones since interacting with their phones is considered to be in their private environment. A

study by Humphrey (2005) added to this statement that individuals employ certain behavioral patterns when interacting in public spaces. For example, their body language may predict their attitude to the use of their mobile phones. In public spaces, certain body gestures, such as turning their heads or answering their phones at the distance, represent people's protection of their private space. In return, the behavior exhibited by people around them, such as turning and looking away, or performing different activities, helps individuals to maintain their private space. In this manner, the study discovered that mobile phone users feel more secure when they lower their voices in public spaces and that this is a reflection of their attitude to protecting their personal information. The second privacy concern relates to remote locations. The growth of GPS-based functions in mobile phone applications has exacerbated the issue of privacy, specifically as it concerns individuals' willingness to share data. Moorthy and Vu (2015) discovered that preferences for disclosing personal information depend on the location and whether it occurs within the users' social circle (friends and family) or involves third parties (Moorthy & Vu, 2015).

Types of information are also classified into two categories: personal information (e.g. address, contact number, and credit card information) and contextual information (e.g. personal messages, current location, and daily activities). The results of the study by Moorthy and Vu (2015), demonstrate that individuals tend to feel more comfortable revealing their personal or contextual information in their known circle rather than in public spaces where they have privacy concerns. Additionally, people are more reluctant to share private information (e.g. activities and current location) than contextual information (e.g. personal contact and personal messages). Nevertheless, it is important to understand the differences between mobile phone use and VAPA use as the latter integrates verbal communication, which has not been extensively researched in previous studies. Moreover, understanding these two activities is essential to comprehending how social norms in public spaces might lead to personal and ethical considerations when using VAPAs, which in turn may influence how individuals perceive VAPA devices.

2.3.1. Communication Privacy Management

In this study, the concept of CPM is vital to understanding the complex relationship between individuals and their protection of their personal information. CPM theory concerns the transmission of private information and also how this information is regulated (Petronio, 2013). Communication privacy management elaborates on the reasons for people's willingness or unwillingness to share personal information (Petronio & Durham, 2015). The theory describes how individuals treat their personal information and therefore reflects their attitudes towards privacy. The theory suggests that effective ways of managing private individual information are classified based on three elements: privacy ownership (the boundaries of private information), privacy turbulence (breakdowns in privacy regulation), and privacy control (the privacy management engine) (Petronio, 2013). These elements are intended to provide a framework for analyzing individuals' attitudes, behaviors, and decisions as regards controlling their private information.

First, *privacy ownership* focuses on how individuals manage the ownership of their private information and how they acknowledge privacy ownership. In terms of this element, individuals tend to believe that their private information is solely owned by them and that there are certain restrictions regarding the availability of their information (Petronio & Gaff, 2010). In this sense, ownership can be limited to the individual or can be shared with other people. Other people with whom private information is shared are then considered to be "authorized co-owners," who are also responsible for the information provided by the original owners (Petronio & Gaff, 2010, p.178). Previous researchers have discovered that it is possible to have multiple co-owners and that the period of ownership responsibility is either long or short. In the case of groups or multiple owners, members often pair off by connecting one member with what is referred to as a "privacy boundary cell" (Petronio, 2013, p.9). This link can be either temporary or long-term. The privacy boundary cell generates a general understanding of privacy management for the members (Petronio & Durham, 2015). This element identifies the barriers to the use of the information and therefore provides an understanding of what is identified as private information (Petronio, 2013). Therefore, the concept of ownership provides a deep understanding of privacy concerns and consequences of revealing private information.

The second element, *privacy control*, focuses on how individuals control the flow of their private information. Privacy control seeks to identify the situations in which individuals allow or refuse access to their private information (Petronio & Durham, 2015). In terms of

this element, since individuals feel that they have the authority to protect their private information, they tend to feel that they have full control of their privacy (Petronio, 2013). This condition is applicable even they agree to access to their information by "authorized others" (Petronio, 2013). Additionally, controlling access of private information is determined by the integration and use of privacy rules. Privacy rules are determined by different principles such as situational needs, cultural values, and motivations (Petronio, 2013). These principles can be classified into two forms: *catalyst criteria* and *core criteria* (Petronio, 2013). *Core criteria* focus on the indicators individuals use when choosing their privacy rules preferences. For instance, privacy orientations enhance the coherence of how individuals regulate their private information (Petronio, 2013). Nevertheless, although the principal aspect of these criteria concerns predicting behavior based on how individuals disclose or reveal their information, the rules change based on the influence of certain catalysts. In this case, *catalyst criteria* focus on the perceptions of individuals towards risks and benefits and their motivations for the protection of private information.

The last element from CPM theory is *privacy turbulence*. This concept illustrates how individuals' view boundaries when sharing information with others. Privacy turbulence occurs individuals' privacy rules collapse for one or another reason, such as mistakes in privacy rules or purposeful violations of them (Petronio, 2002), resulting in anonymous parties being allowed access to their private information. With regard to the other two criteria, privacy turbulence can serve as a catalyst criterion regulating privacy rules. Management of privacy turbulence can be undertaken by adjusting, updating, or improving privacy rules in order to reconstruct the privacy management system (Smith & Brunnen, 2017). The focus on privacy turbulence has become more important in the digital age (Smith & Brunnen, 2017). Privacy turbulence also acknowledges the context of the boundaries individuals might experience in concealing their private information. For example, "thick" boundaries occur when individuals' are less willing to reveal information, and "thin" boundaries when there is a greater chance of personal information being shared (Petronio & Durham, 2015). These boundaries explain individual vulnerabilities in sharing personal information. In general, privacy turbulence is considered an important element for changes in the privacy management system. Additionally, privacy turbulence specifies its influence in the privacy rules and assumptions for relevant regulation of privacy (Smith & Brunnen, 2017).

In this study, analyzing these three features is central to understanding how individuals comprehend privacy issues as one of personal limitation when using technologies

such as VAPAs. It is important to integrate these three elements when analyzing individuals' attitudes and behaviors towards the use of their personal information. In the case of VAPAs, the role of third parties can create a more complex issue for the use of individuals' private information. The perception of boundaries may then be different since the functionality of VAPAs occurs explicitly in the interaction of people and technology. An understanding of CPM theory is the foundation for identifying vital elements in how individuals protect their personal information. Additionally, it is helpful to understand how this theory can be applied when predicting whether privacy concerns are considered one of the chief limitations of using VAPA devices.

2.3.2 Contextual Integrity

Contextual integrity was first introduced by Nissenbaum (2004) to analyze the implications of privacy in the study of law, public policy, and philosophy. The author first formulated this theory on the basis of the recognition of privacy issues, especially with regard to social issues. This theory identifies three principles as the framework for understanding its approach to privacy protection in the areas of public discussion, law, and policy (Nissenbaum, 2004). These three principles are: *limiting individuals' privacy and the use of their personal information by third parties such as the government, restricting access to personal or private information*, and *curtailing intrusions into places deemed private or personal* (Nissenbaum, 2004). The first principle focuses on individuals questioning the role of the government in intruding in the use of their personal information, which assumes the collection of this information for specific purposes. This principle applies to specific situations in which the role of the government is considered to have powerful control over its citizens' behavior. Additionally, this principle takes into account the protection of personal information from the powerful government that has influences over individuals' right. Public surveillance and data collection are examples of government actions with regard to individuals' private information. The second principle focuses on how personal information is collected and distributed. Personal information is protected when it is classified as a social issue, a matter which focuses on intimacy, sensitivity, or confidentiality (Nissenbaum, 2004). Additionally, this concept emphasizes how each individual has a right to confine their private information. The last principle regards the protection of information based on the individuals' surroundings or what they consider a private space. The act of protecting private information

in a private space can be demonstrated by the fact of having boundaries to personal interaction and of people shielding themselves from the stares of others.

These three principles provide a general understanding of privacy; however, the author considers that these principles do not take into account the outcome or results from the privacy management itself lack tangible results from the arguments of privacy itself (Nissenbaum, 2004). That is, the function of the principles is not always clear, especially when they involve cases relating to new advances in the application of technology. These principles provide a broader scope to individual's authority over the different levels of information shared, that is, sensitive or non-sensitive and government or public information (Nissenbaum, 2004). Therefore, *contextual integrity* extends this emphasis on privacy issues by focusing to a greater degree on the flow of information. It provides a framework for understanding specific behavioral patterns relating to the issue of privacy as these concerns two agents, namely, individuals and other entities (Barth, Datta & Mitchell, 2006). Contextual integrity is constructed on the basis of four variables: appropriateness, informational forms, roles, and principles of transmission (Barth, Datta & Mitchell, 2006). The concept of *appropriateness* focuses on the nature of the information individuals deem appropriate to share or disclose in a certain situational context. In general, the types of information shared are required, expected, or permitted to be shared depending on the source of information. For example, in relation to healthcare, mandatory information such as one's health history or physical condition need to be provided for the sake of individuals' personal health (Barth, Datta & Mitchell, 2006). Secondly, *roles* focus on the two agents considered to be performing particular activities or roles; these are understood to convey different levels of detail in a specific context (Barth, Datta & Mitchell, 2006). Hence, contextual integrity understands that roles are important elements in influencing individuals' decision-making regarding what they consider to be a violation of privacy.

The third element is *informational forms*, which emphasizes the different types of information that are requested to be revealed. This approach not only concerns a simple understanding of information as public or private, or as sensitive or intimate; it also integrates various types of information outside of these aspects that could be implemented as regards individuals' willingness to share information. This can be connected to an understanding of "appropriateness" that classifies the information required as relevant or not. *Principles of transmission* is considered to be the most complex framework of contextual integrity. This principle understands the specific restrictions on the nature of information flow as being based on the informational forms. One important aspect of this principle is confidentiality,

that is, the sharing of personal information is limited to authorized others and it is expected that the information will remain between the original owners and the co-owners or authorized others (Nissenbaum, 2004). Additionally, this principle acknowledges the importance of agreements between them on the basis of strict norms. Norms that are overly taken control by one subject in regards with the flow of information are considered to be violations of privacy rules (Nissenbaum, 2004)

This theory is applicable when one considers the barriers and restraints on how individuals perceive privacy issues and acknowledging the importance of protecting specific types of personal information. Additionally, contextual integrity provides nuance to justifications for the specific degree of restriction regarding data collecting, the idea of the sphere of public spaces, and the nature of the flow of information itself. All these aspects may be determining factors for the use of new technologies such as VAPAs. The consideration of external factors, especially as these influence certain types of behavioral patterns, may be justified by using the framework of this theory. Additionally, contextual integrity includes perspectives from realms such as government or law, which might have implications for individuals' choices when using VAPAs. The role of third parties and companies, in this case, relates to how individuals' might understand confidentiality. Therefore, understanding the role of third parties and companies might also lead to individuals' distrust or hesitancy when considering using a VAPA.

2.4. Theoretical Concepts and Factors of VAPA Acceptance

Focusing on the factors mentioned above, will provide the in-depth understanding required for answering the research question. Actor network theory emphasizes the connectivity between humans and technology, which enforces the adaptation of people to technology in their personal lives. This also enhances the understanding of how technology is becoming more integrated in people's daily life practices. The MOPTAM specifically analyze factors (i.e. perceived ease of use and perceived usefulness) concerning mobile phones application use, which is essential to understanding individuals' use of VAPAs. These factors are also important for privacy concerns since they relate to understanding the advantages and disadvantages of using a VAPA. Communication privacy management is fundamental as it provides a broader perspective on the willingness to share personal information, which is the primary concern in ongoing tensions regarding privacy issues.

Contextual integrity and CPM also provide an understanding of the limitations of using predictive technology, which might impact on the factors from the TAM and the MOPTAM. To conclude, these three factors -social practices of technology, adaptive behavior towards technology usage and privacy tensions in technology usage- are the fundamental basis for further understanding the phenomenon research, focusing on individuals' behavior when using a VAPA.

3. Research Design and Operationalization

Based on the aforementioned theoretical concepts, this research conducts an in-depth analysis to understand users' personal experiences when using VAPA. As the study explores the interaction between people and technology, it is important to analyze the social elements that might influence this use. The most important of these is privacy. The aim of this study is understanding the role of VAPA use as part of diverse millennials' daily activities. Previous research has focused more on homogeneous audiences with similar characteristics; this study focuses on a heterogeneous group that is only homogeneous in one regard: its members are part of a similar age group (i.e. millennials). The participants in this study come from a variety of backgrounds with different cultures and experiences. Currently, most VAPA devices are primarily used in America. This study expands the scope to an international perspective involving millennials from different national backgrounds. Considering the idea that millennials are technology dependent, it is interesting to observe the dynamics of the combination of users and non-users of VAPA devices among these participants.

In order to obtain a more nuanced outcome, the focus group discussions explored the different conceptualizations of research of millennials of diverse backgrounds. This approach enabled the construction of a concept by analyzing data from different international perspectives, which enhances the credibility of the research findings (Lambert & Loiselle, 2008). This research is related to an ongoing supervisor's project (NWO); thus, it is hoped that the outcome of this paper contributes to this project.

3.1. Qualitative Approach and Focus Groups

Since this study focuses on understanding participants' motivations, attitudes, and emotions based on their personal experiences, the research methodology is necessarily qualitative. Qualitative research is suitable for gathering explorative data, and for this particular study, focus groups enabled the dynamic results-based participants' points of views (Lambert & Loiselle, 2008). Focus groups can enhance dynamic interaction among participants by testing and challenging each point of view in a non-threatening social environment and may lead to the discovery interesting new concepts (Osborne & Collins, 2001). Focus group discussions allow the participants to experience a sense of support and security since they are not obliged to answer the questions of the moderator (Strother, 1984).

Within this social context, the participants might offer an original point of view since the focus group discussion does not oblige the participants to come up with a "story" that only benefits the moderator (Dorgathen, 2015). The more open atmosphere of Focus group discussions can also encourage participants to rephrase their responses, restate their opinions, and reflect on the research outcome in order to eventually summarize their responses (Lambert & Loiselle, 2008). There are three important factors that it is vital to consider when conducting a focus group discussion.

First, to protect the personal information of the participants, a consent form was provided in which the purpose of the research was clearly explained. The consent form was signed by them to indicate that their personal information is of value. The consent form ensured that the participants were fully aware of the purpose of the research and understood how their information is to be used. **Second**, it was important to build rapport with the participants by being in contact with them before the research took place. This helped me to obtain a better understanding of the participants and their general knowledge of VAPAs. To build rapport, it was important for the participants to feel comfortable in any situation. Therefore, the researcher needed to inform the participants beforehand regarding the flexibility and changes that occurred in the focus groups. Additionally, I was open to concerns regarding the research that arose during the five focus groups discussion. **Finally**, knowing how to gain access to the participants was crucial to the research. Explaining the purpose of this research beforehand prevented preconceptions or misunderstandings during the focus groups discussion. Moreover, in order to formulate engaging and informational questions, it was also necessary to conduct a basic information check on the participants.

3.1.1. Sampling Procedure and Data Collection

A non-probability sampling procedure was employed for constituting the focus groups as a particular segment of the population was needed. The aim of the study is not to generalize to the population at large, but to focus specifically on millennials (Social Research, 2006). Therefore, the researcher used the snowball effect as a sampling method. Snowball effect sampling method is a form of non-probability sampling that entails chain referral based on the researcher's network (Noy, 2008). Additionally, snowball sampling is acceptable in this study as the research focuses on personal opinions and experiences, which the participants may easily relate to one another. The participants were informed beforehand through email and personal messages of the purpose of the research and the consent form.

The recruitment of the participants was undertaken using the researcher's personal network, and participants were recruited based on their experience and knowledge of the use of VAPAs in general.

3.2. Focus Groups Discussions

Focus group discussions were conducted with five different groups each comprising 4–5 participants, with 22 participants in total. The participants were selected based on their location, the Netherlands, for the accessibility purpose of the research. The purpose of conducting a minimum of five focus groups was to generate sufficient insights to reach a point of saturation, where the adequate amount of data is collected based on the participants' experiences. During the focus group discussions, I was a neutral moderator to avoid biases and presumptions. Additionally, I was aware of my own body language, so that this did not influence the discussion (Brennen, 2013). In the course of the discussion, it was important for the researcher to understand that the conversation could not be steered in a particular direction; therefore, I was actively listened by focusing on being reflective to the participants' responses. Reflecting responses focus on analyzing the participants' feelings towards a brand, product, or situation, rather than on the content of the statements themselves (Brennen, 2013). Additionally, clarifying responses were used to ask probing questions to encourage the participants and to delve further into their statements (Brennen, 2013). It was also important for me to be aware of any non-verbal cues from the participants in order to maintain their dynamic interaction of the participants, which might influence their answers (Brennen, 2013).

As noted, focus groups were selected as an appropriate means of understanding individuals' perceptions, decision-making, and the information-processing influence of the group dynamics (Stewart, Shamdasani & Rook, 2007). This group-dynamic effect triggered participants to share experiences that are valuable to the outcome of the study. Additionally, focus groups stimulate a group effect that enables complementary and argumentative interactions between participants (Osborne & Collins, 2001). An additional benefit of focus group discussions is the observation of complex behavior and motivations that may be important factors in enhancing the credibility of the outcome of the study (Stewart, et al., 2007). One of the important advantages of a focus group is that it stimulates direct conversation between the participants. In this manner, considerable amounts of rich data

could derive from personal interaction between the moderator and the participants (Morgan, 2010).

Based on the topic lists derived from the concepts, predetermined questions were designed for a focus group guide to allow the moderator to control the flow of the discussions. Each focus group lasted between 1 hour and 1 hour 20 minutes; they were conducted in the Media Lab of Erasmus University from April 5th to April 21st, 2018. The age of the participants ranged from 20 to 29 years and they had different occupational backgrounds. Before the start of each focus group discussion, a consent form was provided to the participants. One participant chose not to reveal her real name and used a pseudonym, *Riley*, to protect her personal information. During the focus group discussions, stimulus material was used so that the participants could experience VAPA themselves. Stimulus materials in focus group discussions trigger participants to be more engaging and to provide more information on the discussion topic (Chrzanowska, 2002). Stimulus materials may include photos, videos, and brochures. For the focus groups, a Google Home device and an introductory video were selected as the stimulus materials so as to enhance the experience of the participants regarding the use of VAPAs. During the focus groups, participants were provided with a set lists of tasks they could perform using the device. These activities included playing music on Spotify, finding nearby restaurants, asking a riddle, controlling the lighting, and asking for directions. Use of the Google Home device allowed the participants to have direct experience of it and enhanced their understanding of the overall usability and functionality of a VAPA. The video was also useful for the participants to attain a general understanding of the functionality of the VAPA device. Integrating the stimulus materials into the conversation among the participants produced new ideas and interesting concepts for this study.

To maintain the dynamic setting of the focus groups, the participants were selected from a variety of backgrounds as individual differences enhance group cohesiveness, conformity, and compatibility (Stewart et al., 2007). Individual differences influence the group dynamic in two ways: individual behavior within the group, and the reaction of others to the individual's words or actions; these influence the behavior of the group itself (Stewart et al., 2007). Additionally, an international perspective fostered the intersecting discussions that were based on different cultural orientations, which produced information outside the regular American understanding. Therefore, the selection of the participants for the focus group discussions focused on the following characteristics for the research unit:

1. Individuals aged 18–29 who live in the Netherlands, use smartphones, and are tech savvy.
2. Preferably individuals who have an international background (to bring nuance to the outcome of the research).

3.3. Operationalization

Given the concepts discussed from the theoretical framework, formulating them is essential to further understand the research phenomenon and the schedule for performing the focus group discussions. To define the concepts, a focus group guideline with four principal topic lists was created. On the basis of these topic lists, 12 key predetermined questions and by 16 probing questions were formulated. It was important for the moderator to act as neutrally as possible and to retrieve the information provided without any personal interpretation. The questions were posed in a flexible manner in order to engage the participants in a dynamic interaction. The construction of the predetermined questions was provided to help the participants have a general understanding of the concepts discussed in the focus groups and enabled the posing of the probing questions on more general issues, such as how they accept technologies and what concerns they have regarding privacy. The moderator ensured that all the questions were adequately answered. At the end of the focus group discussions, the participants were allowed to add further comments or remarks by means of the feedback forms provided. Based on the predetermined questions, the four topic lists of the focus groups discussions are:

1. General personal and initial technology questions

Sample questions:

- *Do you consider yourself someone who keeps up with the latest technological gadgets (e.g. newest phone or laptops)?*
- *What do you think are the main reasons for your keeping yourself updated with these latest gadgets?*

2. Attitudes and behavior towards personal assistants

Sample questions:

- *What do you think when you hear about VAPAs?*

- *How often have you used a personal assistant such as Siri or Google Now on your phone? (active and inactive users of VAPA)*

3. Interactions and perceptions of participants with personal assistants in general

Sample questions:

- *When you hear about Google's Home or Amazon's Alexa, and what associations do you have with this technology?*
- *When you experience this technology, what do you think about the fact that it connects to your personal data, such as your calendar, contact lists, and email? Do you have any concerns about this?*

4. The future of technology and the use of personal assistants

Sample questions:

- *How do you feel about technology becoming more integrated in people's everyday activities?*
- *What do you think are the impacts of personal assistants on daily life practices?*

3.4. Transparency and Systematic Consistency

For the availability of the data and the research purposes, transparency is essential, especially when using qualitative approach. By analyzing the data in a more naturalistic setting, the procedures of data collection need to be as explicit as possible and therefore transparency is key (Given, 2008). There are three types of transparency: data transparency, production transparency, and analytic transparency (Moravscik, 2014). All these stages increase the credibility and reliability of the research and add to the understanding of the research phenomenon. The first step in analyzing the data was transcribing the discussions based on the focus group discussions and identifying the results relevant to the research question and sub questions. The data collected from these transcripts were used to continue the coding process. Based on this initial analysis, major issues and topics related to the concepts discussed were identified. The results were color-coded to mark different topics in the transcripts (Steward, et al., 2007). The outcome of the coded material depended on the variety of answers in the focus group discussions. In the course of coding process, it was important to conduct double coding to avoid one's own biases and assumptions. Once the coding process was completed, the material that was coded was separated into particular topics relevant to answering the research question. Initially, there were 18 color-coded topics and more than 250 open codes. These topics were then narrowed down to 13 axial codes. On the basis of these axial codes, five themes were chosen as the selective codes. Other information derived from the transcripts was used as supporting material for interpreting the outcome of the analysis. That is, the data were treated in a comprehensive way, meaning that all the data were included during the analytical process.

In this research, the researcher herself analyzed and summarized the data. While this may increase the potential for subjectivity, I was reflexive about my own perspective in approaching data collection and analysis. Reflexivity is the process whereby researchers position themselves and their role critically during the research process (Brennen, 2013). This enables the research process to be critically examined based on the construction of the participants' opinions and experiences (Charmaz, 2006). As such, the researcher avoided assumptions, beliefs, and values about participants' responses that might have arisen during the focus group discussions (Mann, 2016). This helped to boost the group dynamic among the participants, giving them the freedom to express their opinions.

3.5. Data Analysis

This research focuses on identifying and examining patterns within the data. To understand the data collection process, consideration of several factors is required. As the research is qualitative, it was important to transcribe each focus group discussion. However, in this case, the transcripts exclude verbatim responses. As part of the data collection process, the transcripts were re-read so that the researcher attained more in-depth awareness of the data and gained a general understanding of the outcome of the focus groups. For the transcription process, it was important to present additional material such as notes during the discussion in order to analyze the participants' behavior or responses regarding a specific topic. This might be indicated by either verbal cues or body gestures or both. In this study, constructivist grounded theory was used to analyze the focus group data.

Constructivist grounded theory is an approach that positions the researcher in relation to the participants' experiences in the process of the research, allowing the researcher to be the author of the research (Mills, Bonner & Francis, 2006). The process of the researcher becoming part of the research occurs in the course of making sense of the data, and by searching for the implicit meanings of the beliefs, values, and perceptions derived from the interaction with the participants (Mills et al., 2006). The process of constructing meanings was enhanced by focusing on the language and context that were used during the discussions on the use of VAPAs. The structure of the coding frame was primarily data driven, though some key concepts were important for this research. These concepts were used in developing the main categories for the focus group moderator guide. The data-driven approach was used to develop the key outcomes of the focus groups. The coding process integrated three types of coding: open, axial, and selective. With this approach, the coding process commences with developing the open codes after classified the codes based on the concepts emerged. The next phase is to classify these open codes into different categories and concepts, which are then used to construct the axial codes. This double-coding process allowed the themes to emerge. These created the selective codes and are presented as the main points of the research findings. Four themes were generated from the coding process. Based on the results of the selective codes, the findings were used to analyze the experiences of millennials' regarding the use of VAPAs.

4. Results and Discussions

The findings from the focus group discussions were classified into five themes that emerged during the analysis. These five themes are contextualizing VAPA use, practices that involve VAPAs, choices in using a VAPA, the decision-making implications of VAPA use, and positive personality attraction of VAPA. These five themes were developed by conducting a constructivist grounded theory analysis that involved coding the data. The themes were derived from the open and axial codes. As the research employs a qualitative approach, the results presented below are linked to the theories and concepts noted in the discussion of the theoretical framework, which provides a foundation for explaining the themes in a coherent manner.

4.1 Contextualizing VAPA use

Use of VAPAs is classified based on two aspects, consumers' use contexts and/or their behavior towards technology, and the privacy contexts derived from personal experiences. Both of these aspects enhance understanding of the participants' general perspectives on technology. It is understood that the participants' general behavior towards technology is influenced in a particular way by the limitations and drawbacks of the technology itself, that is, by privacy concerns. From the focus group discussions, it is apparent that there are two views regarding the role of innovative technologies such as VAPA and their impact on millennials' daily activities. Considering these two viewpoints, it becomes clear that technology is not always perceived to be useful; it also results in caution towards personal matters, such as concerns about data sharing. These two aspects are elaborated on by quoting opinions and personal experiences from the focus group discussions.

4.1.1. Consumers' use contexts and behavior towards technology

The aspects of consumers' use contexts and behavior emphasizes the participants' perspectives on the functionality and usability of technology and how this relates to their use of VAPAs. In the course of the focus group discussions, most of the participants viewed the device as something that makes people's life easier; convenience was considered one of the

main benefits of using a VAPA device. Catarina and Verna (Group 1) made this clear with their responses to the question about the role of technology.

> *Catarina: I think the fact that the gadget can choose for you makes your life easier. … we are busy with our lives and we will become busier. The function of technology, the main role, would be to make your life easier and more convenient. But, of course, this comes with a price, but that's the same with everything, it's not only about technology but also about everything in your life.*
> *Verna: I think it's convenient for me, for sure. (Group 1)*

In this context, a VAPA is viewed as a technology that can be useful and beneficial in terms of the impact of the future use of VAPA its future usability. This behavior is associated with the two factors derived from the TAM, perceived usefulness and perceived ease of use (Davis, et al., 1989). It becomes clear that these two factors directly influenced the participants' behavior towards using the VAPA. For example, it was mentioned several times during the discussion that the use of a VAPA is seen as a useful "shortcut" for their daily tasks and practices. Most of the participants associated the use of this technology with their mobile phones, in the form of Siri and Google Now.

To understand these two factors, the MOPTAM—which integrates variables such as the social factors, communication tasks and activities, demographic factors, and intrinsic motivation—is applicable in analyzing the results of the discussion. Considering its focus on mobile use, the MOPTAM recognizes the role of external factors, specifically social influence factors, as having a direct influence on the use of technology. During the focus group discussions, most of the participants articulated their experiences of using a VAPA when their friends or family started discussing or using it. Paulina (Group 1) felt that using a VAPA becomes interesting; this means that it has a greater chance of being used when the device is more accessible. Olly (Group 3) explained that her general knowledge of the technology would increase when it is common for everyone to use it.

> *Boni: I wonder how far the functionality would go; it would also determine how people are using it.*
> *Paulina: If it could do anything, then I think it would be more interesting and common. For now, I think it is really cool that you can give a name of a song and*

it would play that song, but I don't know if anything else would be useful. (Group 1)

Olly: I just feel that I don't know enough to use it and I don't have enough desire to find out about it until everyone starts using it; then I'll get general knowledge of the technology. (Group 3)

The participants from Group 5 acknowledged that technology is something that is continually evolving and, consequently, that innovative technologies will continue to be produced. Technological developments such as VAPAs were perceived as ground-breaking innovations that can make people's life easier. They also bring added value to the basic routine of performing daily activities. Jessica (Group 5) explained that certain technologies such as VAPAs can be very useful for tracking personal agendas and as a shortcut for performing minor tasks such as turning on the TV, playing music, and navigating while driving. Katerina (Group 5) added that she attempted to use Siri as a translation device and that it was very helpful as it allowed her to translate a complicated English sentence into Mandarin. Additionally, Roderick (Group 5) expressed his opinion related to Jessica's statement, emphasizing the perceived ease of use factor. In this sense, he elaborated on the use of VAPA as a substitute when multitasking.

Roderick: I think so too, what she said, that it can do these things for you while you are doing other things and it can save you a lot of time, especially if you are working or doing something important: it allows you to complete many tasks without interruption. So convenient.

For some of the participants, the constant development of technology sparked excitement about future capabilities that may feature in innovative technologies such as VAPAs. On the basis of the results from the focus group discussions, the usefulness of having AI-based devices has become more acknowledgeable. Interestingly, some participants related their perceptions regarding this technology to the role of robots. For example, Riley (Group 2) believed that technology, especially ground-breaking technologies such as VAPAs, will continue to advance. She mentioned that she is interested in seeing how these types of technology will progress. Constant innovation in particular, increased her excitement regarding how intelligent these machines can be. She specifically stated that she was

interested in seeing how ground-breaking technologies, such as robots that are able to perform surgery or chips that are implanted in human bodies, evolve in future. Adinda (Group 2) agreed that she is enthusiastic about how these futuristic technologies will impact on people's daily life practices. However, she still believed that there are certain things that robots would not be able to replace, such as certain jobs. This indicates that she perceived technology as an object with values distinct from those of humans, a matter emphasized by Feenberg (1991) with regard to the technological instrumentalist view.

> *Adinda: What I feel about technology in general is that it is something that people have pros and cons about. It's changing all the time, with similar companies doing the same thing as Apple and Google. There are a lot of companies out there producing innovative technologies. So, for me, I am kind of in between because I feel there is a lot of human capital, a lot of jobs, that cannot be taken by technology. So, I am not quite sure at the moment.*
> *Moderator: So, you have mixed feelings about it?*
> *Adinda: Yes, I am in between, I don't really believe in robotic jobs. A lot of people are talking about it right now, but I think there are still jobs that still need to be done by humans. (Group 2)*

With regard to how technology helps people in their daily activities, Catarina (Group 1) considered the main function technology to be that of saving time and making people's lives more efficient. Vanessa (Group 4) was also of the view that technology is useful for two aspects in life, one's private life and business.

> *Vanessa: I think this is only potential of technology: for it to make everything faster, and more efficient and convenient, so for one's private life and business-wise.*

Based on these findings, it is apparent that there are clear advantages and disadvantages associated with the use of technology in general. The genera technology use and behavior have influenced how the participants understand the usability of VAPAs. It has become clear that there are limitations and drawbacks when it comes to innovative technological advances; this heightened the fear of some of the participants about how technology might control people in the future. Although technology is considered to be

convenient and useful, it is also important to consider the boundaries relating to the extent to which technology will play a significant role for people's daily activities.

4.1.2. Privacy Contexts of Personal Experiences

During the focus group discussions, it was apparent that perspectives on the use of technology in people's lives also come with arguments and limitations that are considered to be among the biggest barriers to technological advances. It might be useful for some people, but for others technology is perceived to be another aspect of the breaching of privacy as it already controls a considerable part of their lives. With the emerging trend of innovative technologies such as VAPAs, privacy is an ongoing issue that requires management, especially for concerns about it to be acceptably resolved in society. The use of personal information for targeted advertising and the selling of data to third parties for profit were considered to be unethical aspects of technology.

> *Olly: I think I was shocked about how much money companies are making selling our data; that is something I didn't know existed. Like, how could anyone think of that? But that's how a lot of companies make profit, selling information about what I purchased over a long period of time—they know my background and stuff. I think they are going to make more money and I can't help it because I have given my life to Google. Everything is on my Google drive, I search with Google, everything I watch is on YouTube, so basically everything is out there. (Group 3)*

> *Jessica: I am not really concerned about privacy because what you share online is really done with your consent, so you have to realize what you share. I mean, with this device, maybe it's a little bit trickier because it's recording almost everything. That's why they created mute button: if you decide you want to talk about something confidentially, then you can use that function.*
> *Moderator: But you're not really concerned about your personal information?*
> *Annisa: I agree, if you don't want your private information to be that accessible, then you just don't have to buy these kinds of technologies. I think you just have to be responsible. (Group 5)*

On the basis of these findings, it becomes clear that there are two contradictory views on this issue. The first relates to some of the participants feeling skeptical about the privacy issue and how their data are being collected or owned, as mentioned by Olly (Group 3). On the other hand, Jessica (Group 5) expressed her thoughts that privacy is not the primary concern when dealing with technology, which in some ways challenges the tensions surrounding the issue. Some of them explained that each individual is responsible for his or her own choices, for revealing personal information when buying specific types of technology, or when using any type of application, such as personal messaging or social media platforms. In this manner, the participants felt that privacy was not the largest mental barrier for them as concerns the use of VAPAs.

The concept of *privacy control* from CPM theory became clearer in the course of the focus group discussions. In this case, it appears that many of the participants who were concerned with privacy tended to feel more reluctant to reveal their personal information due to insecurities about how their data are used and for what purposes. The issue of privacy was very evident in Group 1's discussion. The participants in Group 1 agreed that privacy was their main concern regarding using a VAPA. Verna (Group 1) explained that the uncertainty about how this technology uses her personal information she considered an invasion her privacy. She said that boundaries and limits are required in the future for technology to become more ethical in its functionality. Paulina (Group 1) added that the first word she would associate a VAPA with was privacy. She felt that one would think that the purpose of some companies producing these devices would be to help people; however, she added that they were not doing it for that purpose. Catarina (Group 1) added that the convenience of use of the technology was not worth her jettisoning her concerns about privacy.

Moderator: When you hear about VAPAs, what would be the first thing you associate these with?
Catarina: Privacy.
Paulina: I would go with that one too.
Moderator: So, that would be the first thing you are concerned about?
Verna: For me, yes.
Paulina: For me too.
Verna: Especially with all of this happening, I feel really concerned.
Moderator: So, this is the main reason you're not using the device, privacy?
Catarina: I would say yes.

Paulina: It seems like they created those gadgets, so you would think that it is an easy way to help you, but they are not doing it for that reason, I think.
Catarina: I think for me the convenience isn't worth the lack of privacy.
Verna: Yes, I also feel that I don't necessarily have the need yet and, also, I hear that it's not cheap. (Group 1)

Here it is has become clear that privacy concerns still served as a determining factor when the use of a VAPA was considered. It was understood that the feeling of insecurity regarding how personal information was being used overruled the aspects of convenience and the usefulness of the VAPA itself. Additionally, it was apparent that there are certain preconceptions about the intentions of certain companies that influence the view of VAPA devices.

Nissenbaum (2004) identifies one element of privacy in the area of public discussion as *curtailing intrusion in the public sphere or spaces deemed personal or private.* This emphasizes how people protect their information from the gaze of others when they consider that they are in their private space. This issue was noticeable for some of the participants with regard to the use of a VAPA, as this was perceived to breach their private zones. Tessa (Group 2) stated that this technology seems to hear whenever it wants to hear, despite the fact that there is a mute button. Amy (Group 3) view was in accord with this statement; she stated that she feels that all of her conversations are being recorded.

Tessa: That's what makes me a bit skeptical. I do acknowledge all the convenience, you give the example of washing your hands or driving. But, in the commercial, it says that there's a mute button for privacy and I was, like, why do you need mute button for privacy? Like, if it's in your home it should be kind of private, it should listen to you when necessary or when its name is called. So, I think I feels it's kind of an intrusion. (Group 2).

Amy: I think what you said about being creepy, I kind of understand that because there's kind of this person in your home constantly listening to what you say. It is different with your phone when there's this news article that you read and, say, this device might listen to what you are saying, but this thing is actually there to record what is being said in the room. I don't really see the function of the mute button, like when you mute it, you might as well not have it, and if you have to get up to mute the

device, you might as well just get up and turn on the TV, right? After seeing the video, it is definitely cool, and I would play around if I had it, but it kind of creeps me out a bit. (Group 3).

In this case, it is noticeable that the feeling of uncertainty regarding the recording of private conversations exacerbates privacy concerns. Although, specifically for Google Home, there is an option to mute the device, the fact that it is placed in a private area, in the home, raises more concerns for the participants about how the personal information they provide could be used without them knowing.

According to Crossler and Belanger (2017), with constant technological advances, most of the issues related to privacy concern sharing data with anonymous parties that might use the data for targeted marketing or campaigns. This issue was confirmed straight away in the discussion in relation with the recent Facebook scandal. This scandal has apparently increased some participants' concerns about privacy. The Facebook scandal began on March 20th, 2018, when Facebook harvested 87 million of its users' profiles for Cambridge Analytica. The profiles of the users were later used as a "physiographic profiles," which were then distributed to the pro-Trump group to stirred citizens' choices for presidential election (CNBC, 2018). Verna (Group 1) explained that with everything that is happening now, including the Facebook scandal, she has become more aware of how easy it is for companies to sell private data for manipulative purposes. Roderick (Group 5) added that the recent scandal made him to think of different scenarios and possibilities for how these big companies could use personal information, such as one's location or activities, for targeted advertisements and for campaign purposes such as presidential election. Anna (Group 3) felt overwhelmed by how much of her personal information could be retrieved for various purposes. She stated that she would like to retain the privacy of her information and to not receive unnecessary advertisements based on her previous keyword searches. Vanessa (Group 4) saw that targeted advertisements or campaigns are limiting the general knowledge of people because the information stirred people to certain perspectives and behavior portrayed by the campaigns.

Eline (Group 2) shared her personal experience of using Facebook. She was surprised at how easy it was for her to search for contact numbers and the location of her friends using the social media platform when she needed the information. Moreover, Anastasia (Group 4) was aware of the fact that third-party companies were secretly listening or accessing her data on the cloud. From these responses, it is apparent that a lack of privacy was viewed as an

obstacle for the participants when using technology generally and that it is significant in the case of VAPAs. The recent scandals emanating from big technology companies increased concerns about personal data privacy breaches. Boni and Adrina (Group 1) explained that it is important that big technology companies first deal with social acceptance and then gain trust when managing privacy.

> *Boni: Yeah, I think technology companies have to deal with acceptance first. Because of so many arguments about privacy and how they are going to invade our lives. If they don't deal with the acceptance level in society, they can't really expect to have a better market share.*
> *Adrina: They really need to gain trust first and grow from that. (Group 1)*

Here, it is clear that there is an issue of trust regarding how big technology companies use personal data, and for what purpose, especially in light of the recent Facebook scandal. It is apparent that trust issue influenced participants' perceptions of the utility of VAPA devices. The issue of trust also influenced the opinions of some of the participants regarding the decisions you would make if they were to consider purchasing a VAPA device.

Despite all the comments regarding privacy, some of the participants perceived it differently. They believe that each individual has the freedom to choose what type of personal information they wish to disclose. Therefore, each individual is responsible for his or her own personal information and how it is used. This outcome reflects the understanding of *privacy control* from CPM theory that emphasizes how individuals manage privacy. Jessica (Group 5) stated that all these privacy issues did not concern her because, in the end, people choose whether to use technology or social media accounts such as Facebook. She explained that although she understood that no one reads the consent agreement provided, she believed that it is important to remember that there are certain parts in our lives that should not be shared. Therefore, in relation to the use of VAPAs, she thought that this technology does not disrupt or affect people's privacy. Anastasia (Group 4) was aware that her data were being collected; however, she felt that, at the time, it did not concern her too much since she felt that she had nothing to hide. Neither did Boni (Group 1) think that privacy was a concern as he had not yet experienced any major repercussions in his personal life.

> *Boni: Yes, I think for me it's not too much of a problem because there are no repercussions yet, but then if something happened I might think a little bit deeper.*

One important thing is that we have a huge dependence on technology, on email, for example; they require us to put this data and that data and as long as it does not have a negative effect on me, I couldn't really be bothered.

Regarding the relationship of privacy with country protection, Vanessa (Group 4) felt that the privacy issue also depended on where people live. She stated, with regard to her previous working experience at Microsoft, that the company was transparent about how the data of its employers was being used and, therefore, she felt that privacy was not something that overly concerned her.

Vanessa: I think it depends a little bit on who the third parties are and where the server is located because I know that when I worked for Microsoft, they really focused on telling their customers and clients that they have servers in Germany and they are under German law. This way, I feel a little bit safer and I trust them a little bit more, but in the end, I have no idea who owns my data.

However, Anastasia (Group 4) saw that this might only be an advantage in some countries, such as those in Europe that are protected by a more structured law. She commented that this would be very different when it comes to dictatorships. *Riley* group 2) comes from China and described how the privacy issue is more obvious in her country, which she considers to be directed by a dictatorial government. This links to *principles of transmission* from contextual integrity theory, which focuses on the confidentiality of information transmitted between individuals and authorized others such as governments.

Riley: Well, I think they are already using it for a purpose I don't understand. But, what else can I do if I don't agree (consent agreement)? Then I cannot use anything. For example, Apple in China and iCloud, the government wants the data and normally the company would say no, but they say yes to the Chinese government. So, they just send the data to other companies and they would send a notification to the Chinese people, like: "We have a new policy regarding iCloud, do you agree or disagree?"—and I just chose to disagree, but then I could not proceed with that. Basically, I could not do anything if I didn't accept. (Group 2)

Based on these findings, it is apparent that privacy remains one of the largest concerns when using technology. It is apparent, however, that the act of disclosing or revealing certain personal information also depends on several factors that differ among individuals. It is therefore important to take into consideration the ethical aspects of technology, especially for innovative technologies such as VAPAs. Despite the discussion of privacy concerns, this issue also reflects on individuals' decisions and choices about the types of information they are willing to share or reveal. In this sense, privacy remains an ongoing debate that appears difficult to manage, especially in light of the continual development and progress of technology.

4.2. Choices in Using VAPAs

The choices pertinent to using VAPAs are differentiated into three categories that derive from the focus group discussions. These three factors provide an in-depth understanding of how VAPAs are perceived in the minds of the participants. It was ascertained that the participants acknowledge not only factors that relate to social context, but also those in a broader personal context. Although several contradictory views were present in the different focus groups, it is interesting to observe that these factors connect with one another. It can be seen that attitudes towards and behaviors involving technology in general influence the way in which participants reacted to the use of a VAPA device.

4.2.1. The Fear of Technological Penetration

As technology becomes more integral in people's daily lives, it is apparent that rapid development of innovative technologies such as VAPAs is also occurring. With different types of VAPA being produced, this technology seems to have a big impact on people's life especially when this is considered socially. Based on the two perceptions of social practices in technology, *technological determinism* and *instrumentalism*, the outcome of the focus group discussions shows rather contradictory views of the role and function of technology. One aspect of this is that technology might at some point control people or take over certain jobs, which may impact on human capital in the near future. The other view holds that people will always have the agency to control technology since technology itself is created by humans. Lavinia (Group 4) clearly stated her opinions on the role of technology; she felt that

while it is beneficial or useful up to a certain point, it also requires boundaries and restrictions.

> *Lavinia: But, for example what she said about robots or whatever in the future, would it be a cool thing for you or not? I think technology is good up to a certain point. If you pass that point, like with the robots or whatever, I don't know if I would be fine with that. Imagine if, in the future, your kids went to school and they had a robot teacher or, I don't know, that would be weird right? (Group 4)*

The impact of technology is seen as negative not only in terms of the social context, but also from the economic perspective as they are concerned that the development of automation could redefine or diminish human skills. What is interesting is that some of the participants expressed their fears based on the remarks or opinions of influential academics such as Stephen Hawking, or figures in the technology industry, such as Elon Musk and Mark Zuckerberg. Eline (Group 2) specifically mentioned that the first time she formulated her opinion on AI was when Stephen Hawking reminded people that the evolution of technology might endanger and control them.

> *Eline: I have the same experience, I think because I remember that Stephen Hawking used to remind people about this kind of stuff and that actually for the first time scared me, I'm scared of artificial intelligence. Because I also believe that it would lead in this direction, where it comes dangerous for us as humans and we don't have control anymore. So, mostly that and, I would say, the urgency for me to look up information now, but I don't think that I can control the situation. So, that's maybe even more frustrating. (Group 2)*

Verna (Group 1) agreed when she expressed her thoughts on technology replacing people. Most of the participants from Group 1 perceived that, in the end, people would still have the agency to control technology because people are the ones who create technology. This links to the concept of *materiality* (Baron & Gomez, 2012) within ANT, which emphasizes that both entities have their own agency. However, Catarina (Group 1) stressed the fact that humans need to be aware of the capabilities of technology since, from her point of view, she observed that humans are beginning to be overruled by technology.

Paulina: That's crazy because most of the jobs would probably be replaced and we would have to deal with it.

Catarina: And the scariest thing is, who created robots? Humans. Who created technology? Humans. So, yes, of course I don't believe in a determinist approach because I think technology shouldn't be controlling us—we created it, but we are letting technology control us up to this point. So, yeah, in the future we should be careful and the companies that are creating technology should make sure that people are in control of technology. Maybe this is the most difficult part because machines are becoming more intelligent.

Paulina: We are making it.

Catarina: Yes, that's the point.

Verna: I think they need to be clear about the bottom line: not invading privacy. For example, I read news about the CEO of Tesla, that robots are going to replace humans one day. I was, like, what? It's really scary. Because you don't know, one day they are smarter than humans, now they are saying that they are making progress and developments in machine learning and stuff and they are trying to replicate the human brain. (Group 1)

The functionality of innovative technologies was also perceived to increase fears regarding people's personalities and mental states. In the focus group discussions, some of the participants acknowledged that technology is somehow restricting individuals' choice to be independent. Ilektra (Group 3) stated that, in a way, she was very dependent on technology, to the extent that it decreased her levels of confidence. For example, she described her experience by saying that previously she would be confident travelling to a country she did not know much about. However, now she would not be that confident doing so without her phone and therefore she felt that technology has made her dependent on it, that it was affecting her sense of personal being. Some of the participants stated that, at some point, VAPAs might be a common use of technology and therefore it might be necessary to use this technology in the future. Additionally, Lavinia (Group 4) stated that when technologies such as VAPA become more advanced, she feared that, eventually, people would rely so heavily on the technology that it could make them too lazy to perform their normal daily activities.

Lavinia: Even having food delivered to your house, of course sometimes you are lazy, but if it's every day, then people don't go outside anymore. Then you become so isolated and dependent on technology and nothing else would happen, so you could just stay at home all day, work from your computer, have food delivered and you wouldn't go out and see people. I think that it would be weird, I wouldn't like that. (Group 4)

Some of the participants observed that, in some cases, overcoming a fear of technology relies heavily on the responsibility of the government or big technology companies to deal with this social issue. It can be dealt by regulating strict laws or erecting certain barriers to technological innovation. The consequences of technology itself have continually been debated and analyzed from different points of view.

4.2.2. Basic Information Choices

Privacy concerns have an impact on how willing individuals are to reveal certain types of personal information. The privacy issue tends to be associated with concerns about third parties' data sharing; some of the participants felt that they have boundaries when sharing specific personal information. Some of the participants had had personal experiences that established a distinction between what information they considered themselves comfortable enough to share and what not. The fact that most personal data is shared with third parties increased their hesitancy as some of the participants had also received spam notifications or targeted advertisements. Verna (Group 1) mentioned that these targeted advertisements were becoming manipulative and this concerned her. Paulina (Group 1) said that these advertisements were not useful as they provided repetitive information. Moreover, Annisa (Group 5) chose not to disclose her address or phone number because she sometimes received location notifications of her home address without her having turned on her GPS location. She felt that her data were already exposed, and that she did not have a choice to restrict or protect them anymore. Lavinia (Group 4) also stated that she was not willing to share her address or location, but somehow a Google keyword search, for example, allowed a company to know where she lives.

Lavinia: I don't feel comfortable sharing my location, but I know Google Maps already knows where I live now just because I search how to get to my house to somewhere and it knows, and it still creeps me out....
Just knowing that somebody knows where you are, I don't like that, but I know that nowadays it knows anyway. (Group 4)

Based on these findings, the connection to the CPM theory can clearly be perceived. CPM theory focuses on two boundaries (thick and thin) when relating privacy to how much of their personal information a person would share. The thick boundary category means that individuals feel hesitant about sharing data; while the thin boundary means that individuals feel more comfortable disclosing their personal information. This concern also emphasizes *informational forms*, one of the principles described by Nissenbaum (2004), which focuses on how individuals tend to restrict their answers based on the nature of the question posed to them. The nature of the answers to the questions that individuals felt hesitant about sharing involve societal standards of confidentiality, intimacy, and sensitivity (Nissenbaum, 2004). All the focus groups had similar ideas about what type of data they were willing to share when using a VAPA. Personal information that was not directly linked to their personal behaviors, such as passport details, bank account details, or personal messages were considered more likely to be disclosed.

However, some participants saw that sharing certain types of personal information could be useful for daily activities. Vanessa (Group 4) imagined an example of sharing a personal agenda among family members, which would be convenient as a reminder for busy parents. Ilektra (Group 1) shared the positive experience of finding her current job. She explained that the targeted advertisements that appeared as a result of her keyword searches provided her with a position that matched her skills and interests.

Ilektra: But to be honest, big data can be really helpful in the way it provides really personalized information. For example, I found my internship because of big data. I am doing my thesis on how high-tech companies communicate their products. So, all my searches on Google are for high-technology companies.
Moderator: So, it is tailored for you?
Ilektra: Exactly, you see that now we have sponsored ads on Facebook Messenger? So, the company I work for now posted an advertisement and it appeared on my

Facebook Messenger. In that way it worked really well, it can be really helpful. (Group 3)

Based on the participants' responses, it was apparent that the thickness of boundaries for sharing personal information depended on its usefulness and the convenience of sharing it. Thick boundaries were clearly seen when relating privacy issues to revealing their personal information, such as their address or bank details, which they felt were private since they connected to their daily activities, such as the use of Google Maps. Most of the participants also related their data-sharing behavior based on their personal experiences of using technology. This behavior also illustrated their personal preferences towards the use of VAPAs.

4.2.3. Branded Relations

The emerging trend of VAPAs has resulted in big technology companies producing similar features and functionalities in their devices. With the latest release of Apple's HomePod, it is apparent that big technology companies are developing more advanced features to distinguish themselves from others. These big technology companies have different roles in the minds of their customers. In the course of the focus group discussions, the stimulus material used was Google Home; the participants had the opportunity to ask the device to perform specific tasks. Interestingly, most of the focus group participants related their experiences and opinions of using it based on their perspectives on the company, Google. It was interesting to observe that there were two different views on how Google as a company was identified by the participants. One view was that Google was considered to be the expert in producing innovative technologies. Therefore, they did not have skeptical views of Google as a company, especially as regards the connectivity of Google applications. On the other hand, Google was also perceived to be a company that is invasive when it comes to issues such as privacy. Some of the participants indicated that they already had a general preconception of Google and that that influenced their choice of using a VAPA.

The participants in Group 5 thought that since Google was the main search platform and the use of Google applications was the most common, the convenience and usefulness of having Google Home was one of the biggest advantages when choosing a device. This connects to the TAM when analyzing the relationship between the two factors (usefulness and ease of use) and using a particular system or technology to achieve a goal in this case convenience, which is *predicting behavior intention* (Lee & Rehto, 2013). Jessica (Group 5)

stated that the VAPA device would be more useful if it were produced by Google since it would be connected to the most important applications, such as Gmail and Google Maps. Vanessa (Group 4) also thought that she would trust Google more because she considered Google an expert when it comes to innovative technologies. She added that Google has invested in many interesting projects; that confirmed her thoughts regarding the capabilities of Google as a technology company. With regard to functionality, Boni (Group 1) stated that because Google is connected to most of the accounts he used, he envisaged that this device would be useful to him because he felt that he would have full control of his home when linking it to the VAPA device.

> *Boni: Again, I think it is hands-free and connectivity, because with this one device you can connect everything. Basically, you have full control of your home and what you want to do with your home, so that's one positive side. (Group 1)*

The relation between different technology companies also appeared during the focus group discussions. Interestingly, some of the participants compared Google Home with the most well-known form of VAPA, Apple's Siri. Aditya (Group 4) felts that Google Home had made noticeable progress compared to Siri as its answers was more accurate. Adinda (Group 2) explained that Google as a company had good quality products and she did not have any prejudices against it although she understood that, in some way, Google had much data about her. *Riley* (Group 2) even thought that, when comparing the company's ethics to other companies located where she lived, in China, Google protected more of her data and she felt more secure with the company. Katerina (Group 5) opted to see Google from the positive side by acknowledging the good security system Google has.

> *Riley: But does Google have notorious examples of how they misused or abused information? They have scandals like that?*
> *Eline: Yes, they have this one thing with emails, that emails got hacked, since almost everyone uses Gmail. Also, selling the information to Facebook, so that's what they do with the data, mostly. Also, because it is a conglomerate, they have too much power, which is scary.*
> *Moderator: Do you have also thoughts regarding this?*

Adinda: I'm not really skeptical about the brand itself, because I know Google has a good quality with everything. But in terms of technology, yes, I would choose Apple. Just because of the fact that they are one step ahead of Google.
Riley: Is it?
Adinda: Kind of, I think Google is more for software.
Moderator: Do you also think that the company itself has an influence in how you purchase technology?
Riley: I think Google is a good company. I don't have any prejudice against it because we have even worse. (Group 2)

Despite the fact that Google was seen to be competent as a technology company, when it came to the VAPA device itself, many of the participants felt doubtful of the future use of this device because of their own perspectives on the company. In Group 1, most of the participants felt that with the amount of data Google had and the manner in which it shared them with third parties increased their insecurities about using the device. Catarina (Group 1) stressed the fact that Google is everywhere and that it collected information for different purposes; she considered this one of her largest concerns. She specifically stated that since it was Google, she felt that they were listening or tracking her everywhere she went and therefore the brand name itself had a direct impact on her use of a VAPA.

Catarina: I think in the case of Google, it's even worse because Google is everywhere, so they track you everywhere. I don't have this feeling with Siri, for example. My level of concern really depends on the technology I am using or the brand I am using. For Google, I think, I always feel like they are spying me all the time because they know everything about you and if you have this device at home, it's even worse because they will hear everything, know everything, they will track everything basically. (Group 1)

Boni (Group 1) added that he thought Google was invading people's lives more than other companies such as Apple. On the other hand, he also questioned whether his perspective on this penetration would be the same if the device was from another company. Paulina (Group 1) then answered that, in some ways, Apple was beginning to be "too much in your face" since she had experienced receiving many notifications when she denied changing her Apple identity. She believed that Apple was trying to retrieve her data and to

use it for the company's benefit. On the other hand, Eline (Group 2) stated that she preferred to buy Apple products because of issues such as privacy.

> *Eline: Yeah, I think it matters that it's by Google, actually.*
> *Moderator: Yeah? It matters because of the name?*
> *Eline: That's the most important.*
> *Moderator: What if it comes from Apple, for example? Now they have the same device called HomePod. But in general, knowing that Google connects to your daily activities, the company name matters?*
> *Eline: Yes, I think so. I think I would buy it more quickly if the product was produced by Apple, which sounds weird. I think Google needs to step down a bit with the privacy issue. I don't really agree with the company and their ethics. (Group 2)*

In Group 3, it was intriguing to observe that some of the participants began to question their own perspectives by providing examples of certain situations. Olly, for example, had mixed feelings towards Google as a company. She believed that despite all the company's negative aspects, such as collecting a substantial amount of personal data and information, it was still important that Google is one of the biggest technology companies. She felt that Google was still a good place to work and that people would still like to be employed at Google. In this case, she questioned whether her own behavior or thoughts about Google would then change if she worked there. Would she then start accepting the normality of the device and the company itself? If this were true, then perhaps her mental barriers towards the company would diminish. However, Amy felt that there should be boundaries and restrictions regarding the extent to which VAPA devices could play a considerable role in people's lives. Teodora, however, observed that, in some ways, the connectivity aspect of Google was still useful when using the device.

> *Amy: I mean, this I can see, that you're right that Google already has all the information, but this is kind of like the last step before you completely give yourself to Google and then it's too much in your face and records everything about you. So, if you can prevent that and keep these things out of your house, it feels good to keep some distance from it….*

Olly: But, would it change if it were not Google? The same machine? Because then it might not be as useful because it doesn't know me enough. In America they use a lot of Alexa, right?
Teodora: But, also because Google has a lot of connections with apps like Spotify and Netflix and all these big companies, that's why it is more convenient. (Group 3)

It can be observed that connection with the brand had a strong, direct influence on how the participants perceived the usability of the device. It was interesting to observe that during the discussions, most of the participants reflected on their own opinions and thoughts to reassure themselves regarding the choice they would have made about this specific VAPA device (the stimulus material, Google Home). This outcome brings nuance to the existing research since it enhances understanding of the external factors that may contribute to the decision-making aspect of VAPA use.

4.3. Decision-Making Implications of VAPA use

With regard to innovative technology, there are several limitations and drawbacks about how it is perceived to be beneficial to the society as a whole. Factors such as the generation gap, the influence of culture, and personal barriers were identified in the course of the discussions as considerations for assessing the functionality of VAPAs. Additionally, some of the participants had already experienced the implications of using VAPAs such as Siri.

4.3.1. Cultural Divides Consumption

Anastasia and Aditya in Group 4 were from Asia. Although Anastasia had grew up in different countries, she commented that in Singapore, where she was from, she felt more pressured to have the newest phone or laptop since the environment encouraged her to do so. However, she was surprised that when she moved to the Netherlands, she saw people using old iPhones, which she considered quite unexpected in Western countries. Aditya also added that in Indonesia, for example, people purchase the latest gadgets or technologies. He observed that most Indonesian people use Apple products and it seemed that they wanted to be the first who owned the latest technologies and wanted to keep themselves up to date.

Anastasia: I think I noticed that before moving to the Netherlands, I was really hard pressed, like, I need the new phone or laptop, for example. But then, it's funny because for the first time in the Netherlands after a long period of time, someone is using iPhone 4 and I was like "What? It exists?" It was really weird for me, but now after living here for 3 years, I don't know if I blame it on the environment or whatever, but I never really feel like I need a new one, it would be nice but it's fine without it too. (Group 4)

Here, it was evident that cultural relations and technology were closely correlated to each other. Since culture sets norms and values that reflect on individuals' behavior, technology use and perceptions are also influenced by cultural background. In this technology-driven world, the natural way of communicating and understanding shared interests varies among different cultures. For example, Western countries tend to be more adaptive to new technological advances compared to Eastern or Asian countries. In the discussions, it became clear that cultural factors also play a role in how VAPAs will be used in the future. The mix of nationalities among the focus groups participants provided a deeper understanding of how cultural norms affect some of the implications of VAPAs. It was interesting to observe how participants from Asian countries shared their own experiences of using technology and how these changed once they were living in Western countries.

Additionally, it appeared that the government structure in some countries has impacted on the participants' actual usage of technology. In Group 4, Aditya mentioned that people were becoming more critical in how they behave towards their technology use. He observed that people have different thoughts and opinions about innovative technologies such as VAPAs and that perhaps the governments would listen and begin changing laws. Anastasia then commented that this situation would be beneficial only if it were assumed that citizens were protected by law. She explained that in the Netherlands or most Western countries, although freedom of speech and being critical was allowed, she felt safer and more secure because she knew that the government protected her personal data that was being collected. This perspective seemed to be contradictory in comparison to Asian countries. Olly (Group 3) shared her personal experience of the difference between living Asian and Western countries and how the governments informed the use of their citizens' data. She described that, in Korea, she did not know how important it was to protect her personal information. The same went for Riley from China—she observed that the government played a significant role in controlling its citizens' overall behavior.

Olly: Also, I think there is a difference in how I treat my data, which is different from Europeans. In Asia, at least, we were never really told how important our personal information is. There were so many cases that, with simple websites, we had to give our ID and we felt it was normal. For example, to create an account for Korean online stores, they ask for our identification and we thought, of course, they need it for some reason. I realize with other countries when you make something, it can be fake, you can put your fake name and they won't say anything. So, for us, we treated the data as if it is the government or the country, but only after I grew up and moved to other countries, I saw that this means something. Like, how the Dutch or Germans protect their data so defensively, then I realize what it means. (Group 3)

Based on these results, it has become clear that cultural background plays a significant role in the participants' attitudes towards to the use of technology in general. Participants from Asian countries tended to have different understandings of the value of their personal data or information. This led to a lack of protection concerning what type of personal data or information they were revealing. Most of the participants acknowledged that living in Western countries made them feel more secure about disclosing their personal data since they were well informed regarding the value of their private information. This shows that external factors, such as the role of authorities, played a role in constructing the participants' opinions on the use of their personal data.

4.3.2. Socio-Technical for Resistance of VAPA use

There were several factors that influenced the extent to which the participants felt hesitant about some aspects of VAPA functionality. These factors are based on the socio-technical approach, which analyzes the human, social, and technical aspects of technology. It was apparent from the discussions that there are several limitations and forms of resistance to how VAPA is used because of the complex relationship between social and technical factors. These factors were also seen to have a direct influence on human behavior in general. The implementation of this theory can clearly be seen when considering the participants' previous experiences of using VAPAs. The interesting finding from the discussions is how social

settings and personal connections play an important role in influencing the participants' VAPA-use behavior.

The socio-technical approach considers the material qualities that enable or constrain the use of technology. Based on the discussions, price was considered to be one of the most important factors to decide on when using or purchasing a VAPA device. Most of the participants already had a preconception that VAPA devices are very expensive. Adinda (Group 2), for example, said that, in general, innovative technologies are offered within a very high price range. She also commented that it was not necessary for her to be the first one to buy such as device since in most cases, the price would decrease in a year or two. This preconception was confirmed by Ilektra (Group 3), who thought that the price of this specific Google device might reach €300. Additionally, Jessica (Group 5) was sure that the price would not be affordable; this was also expressed by Verna (Group 1) when she said she knew the exact price.

Catarina: Looks like a piece of furniture. What's the price?
Moderator: They don't really sell it in the Netherlands, but it's about €99.
Verna: Really? That cheap? I thought it's almost €1,000.
Boni: Even affordable speakers are more expensive than this. (Group 1)

Tessa (Group 2), on the other hand, thought that price was not an issue when the object is becoming a trend or mainstream device. She commented that if it reached the point at which it was becoming normal to use, people would not consider price a concern. The import of this statement was also admitted by Eline (Group 2)—that, in the end, people would use it nevertheless as long as it was convenient for them.

Moderator: Coming back to your point about laziness, would this be a limitation?
Eline: No, because I think in the end people would want their lives to be as easy as possible, and I think a lot of people are already lazy and sometimes they are not. Regarding time and money, I think people will use it nevertheless.
Tessa: I think it will be more and more incorporated into people's lives and it will also become more common to use. Maybe in 10 years it will be more common; it could change over time. (Group 2)

With regard to functionality, the influence of the technical aspects on human behavior can clearly be seen when it concerning personal interaction between the participants and a VAPA device. Most of the participants considered the use of a VAPA for their daily activities, and how it could be integrated into their lives. Some of the participants shared their experiences of using a VAPA on their smartphones and observed that it can be complicated in certain situations. Anna (Group 3) commented to the effect that once she had attempted to use Siri on her phone to play music while cycling and she had become quite annoyed because it did not quickly understand what she had said, and, in the end, she had to repeat her sentences three times before she gave up. Olly (Group 3) also commented that her boyfriend regularly used Google Home on his phone and that he experienced the same difficulties. She explained that it was irritating that he had to talk slowly in order for the device to understand. She felt that the natural flow of communication in human interaction was not to be found with the device and therefore more effort was required than for mere typing, for example. Additionally, Jessica (Group 5) observed that, in some cases, language barriers a struggle when using a VAPA. She explained that, for some people, English is not their mother tongue and yet, in some way, they have to speak English. In this manner, it would be more difficult for people who have a certain intonation or accent to talk to a VAPA since it might not properly understand the sentences; as a result, pronunciation might be one of the issues encountered when using a VAPA. What is intriguing from the discussions is most of the participants associated the use of a VAPA with the word "lazy." Despite the fact that Aditya (Group 4) thought that it is very helpful, Anastasia saw it differently.

> *Aditya: I watched a lot of videos about connecting this Google Home to all your devices and say things like, "Turn on the TV," and "Increase room temperature," for example. I think it's really helpful.*
> *Moderator: Anastasia?*
> *Aditya: I don't know, like I know where you are coming from, I think that it could be super useful with all these applications. But, at the same time I am inclined to think that it will only make people lazier. (Group 4)*

In this case, although this device was seen to be useful and to make people's life easier, the participants thought that people would become dependent on it helping them to the extent that they would not make an effort to conduct normal daily activities. With regard to human

interaction, Boni (Group 1) commented that he had not encountered dynamic interaction when it came to the device.

> *Boni: Again, if I have to record myself for a job interview, it is still a bit strange. But I think that's just my personal reasons because, for myself, I really like to interact with someone face to face. It's very different, I think, with this you always expect the answer from the machine, but then that's it. There's a sequence—a, b, c, d—but then there's no dynamic part to it.*
> *Adrina: Yes, so no emotional interaction.*
> *Boni: Yes, that's the dynamic part of it. (Group 1)*

According to Morthy and Vu (2015), there are two factors that influence privacy concerns, and one of them is *physical interaction*. This factor emphasizes how people tend to lower their voices in public spaces as an act of protecting their personal information. Additionally, Nissenbaum (2004) also theorized one of the concepts relating to privacy protection in public discussion—*curtailing intrusions into places deemed private or personal.* This concept focuses on individuals' acts to protect information in what they consider private space. In this case, social aspects from socio-technical theory can be related to the both concepts, specifically that concerning social settings. During the discussion, some of the participants expressed their opinions about how they felt hesitant about talking in public, especially when using a VAPA on their smartphones. Jessica (Group 5) commented that in it is only useful to activate VAPA in certain situations, for example, when driving. Other than that, she felt that its use is unnecessary as it is not common to see people using it in public. Amy (Group 3) thought that, in general, she was resistant talking in public spaces because she felt that was not normal for her. Moreover, she stated that she did not want everyone to know about the things that she is searching for or who is she talking to.

> *Amy: I think the whole talking in general is what makes me a bit hesitant to do it because 90% of the time when you want to look up something or listen to music, you are outside in public. I think I am extremely hesitant to talk. Like, "Hey Google." I want to know whatever it is that I am searching for, but the people around me do not have to know. So, even if the technology would come that far and work fine technically, personally I would still prefer typing it in without people knowing what I am looking for.*

Mod: So, because the public setting?
Amy: Yes, I think, at this point of time; for example, in the train you want to quickly Google something, but the person next to you does not need to know what you are looking for. (Group 3)

The insecurity associated with disclosing personal information is perceived as the biggest limitation in using a VAPA. This can also be observed from the conversation in Group 2 when participants were asked about social settings.

Adinda: I don't know, I think I'm just a bit ignorant, I kind of forget about it, not that I don't want to use it.
Moderator: So, you just don't feel like using it?
Riley: But why do you use Siri in public?
Adinda: Because you do it like speaking out loud.
Riley: I think if it's for functional use, then it is appropriate, but if you like ask stupid questions in public then, yeah.
Tessa: I think in public it's already stupid that you are asking your phone to call someone, that's what I think. Why can't you do it yourself? (Group 2)

The role of social context becomes more evident when relating it to the use of VAPA devices. Factors such as public settings, language issues, and communication flow were identified as important when considering the drawbacks and implications of VAPA use. These social elements also enhance understanding of the role of VAPA as it is becoming more common to use. It is important to understand that some of the participants observed that VAPA use has a significant influence on people's physical state by decreasing the when they perform daily activities.

4.4. Positive Personality Influence of VAPA Use

The outcome of the discussions also generates robust perspectives in relation to emotional and intangible aspects, such as the influence of voice. It was discovered that emotions play a vital role in the participants' attitude or behavior as regards the use of VAPAs. It has become clear that the AI aspect of VAPA appears to be recognized by the participants as they tended to perceive the device as human. Although some of participants remained hesitant to acknowledge that the device has human instincts, some of them thought that it might be possible that this device could potentially replicate humans' behavior. This human perspective also resonates with the understanding of how the personality of the voice influences the participants' perspective of VAPAs in certain ways. It is therefore interesting to observe that the gender dimension in the influence of voice plays an important role in attracting participants to use VAPAs.

4.4.1. Emotional Bonds

Based on the discussions, the factor of AI in VAPA use is closely related by the participants. The emerging trend of AI devices specifically on how it is linking to human's thoughts, emotions and life events such as VAPAs has influenced the way people interact with such devices in particular. AI devices have developed substantially, to the point they can be integrated or adapted for human to perform activities such as daily tasks. As regards the functionality of the technology, the emotional aspect of how users' feel or experience the system tends to be neglected as usability is seen as the most important aspect. The perspective of the interaction between human and technology emphasizes how the emotional aspect is also an important determinant when it comes to the use of VAPA devices. The latter is closely related to the two factors from the TAM, perceived ease of use and perceived usefulness.

The focus groups also showed the importance of emotional responses to system behavior in relation to the aspect of human and non-human interaction of VAPA use. This interaction is also observable in the connection with ANT. This theory concerns treating people and technology as intertwined rather than distinct. This element of interaction was perceivable when Roderick (Group 5) mentioned that using the device feels like talking to an invisible or unseen human being. Jessica replied to this statement by relating it to her experience of doing online shopping with AI-based chatbots. She found that the human-like aspects noticeable in a machine can be very useful for certain situations, in her case when she

was tracking her packages based on the help of automated chatbots. Although in some cases she needed to reassure herself that she was talking to a machine, once she found that it was useful, it became a normal experience for her. This shows that people and technology can create a relationship of mediation relationship between one another; this is theoretical derivable from one of the principles of ANT defined by Baron and Gomez (2012). *Mediation* involves the agency of non-human elements, which reinforces the mediation between humans and in this case, a VAPA. What is interesting was when the participants attempted performing tasks with the Google Home device, most of them said "thank you" afterwards. When asked why she answered this to the device, Katerina (Group 5) thought that it felt somehow "weird," but it was her emotional response and her human instinct that triggered what she said. On the other hand, in Group 2, Eline and Adinda did not feel weird when interacting with the device. Adinda related this interaction to the film *Her* (also see Chapter 1) in which the actor falls in love with the VAPA device.

> *Moderator: How do you feel interacting with the device? Does it make you feel weird in a sense? Interacting with something you don't know?*
> *Adinda: No, I don't think it's weird. You know this movie called* Her *with this guy falling in love with this device? For me, in general I don't feel it is something weird. I watched that movie and it could happen to someone who is very lonely, taking this device as a companion, that's weird. But, if I used it* in *daily life, I don't think it's weird.*
> *Moderator: Eline?*
> *Eline: No, not really. I kind of think in the back of my head that I know it's not a person, but it feels like talking to a person. So, it's kind of ambiguous. (Group 2).*

In Group 1, some of the participants emphasized the emotional responses at a more conversational level. Catarina stated that she found it silly to say "thank you" to the device as if there were a person on the other side to help her. Additionally, she emphasized how the device could rationally follow her thinking, which made it feel very human. This idea is also found in Sismondo (2010) with regard to ANT. He states that technology fosters a new type of relationship, an extension of what is thought about the social world. Paulina understood this in the same way, presenting her perspective from an economic point of view.

> *Catarina: The thing is, I always find it silly that you always say "thank you" to a gadget.*

Paulina: I was about to say the same.
Catarina: I think it is really silly, you always say "thank you" because you think, yeah, there's another person on the other side helping you.
[…]
Catarina: The fact that they follow you rationally, so you're having a conversation like, "Hey, do something for me," and it would reply, "Hey, sorry, this does not work." I think this is the weirdest thing with this gadget, because if you ask for something and that's the end, then it's fine. But the thing is that it follows you rationally, it makes conversation with you and I think this is very human.
Paulina: Probably that's the point, that you feel like you have a real interaction, and then maybe people actually like it and they will purchase it and tell their friends. I think that's what they are trying to do. (Group 1)

Though emotional aspects influence the participants' attitude to using the VAPA, improvements in this device are still required before it could be fully considered to have human-like responses. Lavinia (Group 4) commented that human interactions are different from those with this device. Although it feels as though it is human, development is needed before it has the natural-language capability of humans. Vanessa believed that eventually it would be possible for such devices to show emotions.

Lavinia: I still think that humans are different from machines, like, human are subjective and have feelings. If this technology wants to completely take over, a lot of things would be different, the emotional part.
Vanessa: But I think it can also learn from us because there is an AI person, I think it's a social media account based on artificial intelligence and it learned everything from people around it. So, it's not that the system is stupid or evil, but it's the people who use it. But, I can imagine the system can be sensitive to you like it says, "Ah, you're right," or "I understand your opinion." I mean it's not good, but I think it is possible for them to show some kind of emotion. (Group 4)

Based on these outcomes, it is apparent that emotional interaction plays an important role in using a VAPA. The fact that this device was experienced as engaging the participants in a human-like conversation demonstrates that non-instrumental elements can influence the usability of the technology. Additionally, it has become clearer that emotional aspects affect

attitudes and behaviors to technology in general. It will not be surprising if, in the future, VAPA devices integrated emotions in their functionality, and thereby replicate human interaction.

4.4.2. Influence of Positive Voice

In most cases, VAPA devices are set to have a specific default voice personality, usually female (Wong, 2017). With some types of VAPAs, the default voice can be changed to male. It is important to understand that the voice personality on these devices is gender neutral. Interestingly, for the participants, this in some sense appeared to have an influence on the device's usability factor. Some of them related the voice personality to the emotional factor in terms of, for example, the intonation and flow of the voice. Moreover, some of the participants also associated the voice personality with their own personal emotions. In Group 5, the influence of the voice personality was noticeable when the participants asked about human interaction. Katerina, for example, commented that she felt the need to say "thank you" to the device because it spoke politely to her. The soothing female voice made her comfortable to talking to the device. Eline (Group 2) noted that the nature of the voice personality was something that quickly made her familiar and easy to get used to. Tessa agreed, saying the female voice made the experience more personal for her.

> *Tessa: Now that we are using it, I feel more comfortable talking to it. I don't see it as human, but what is more personal that it is a female, and it's talking really nicely to you. Why wouldn't you be nice to her as well? (Group 2)*

Here it is clear that gender plays an important role, especially it is related to the emotional interaction of the participants. The female voice had certain characteristics that appealed to some of the participants' personal experiences. Eline (Group 2) added that, for her, the significance of the voice personality was something she related to how she used her TomTom GPS device in her car. Nevertheless, the manner in which the person is talking, and the intonation also matter.

> *Eline: I think voices do matter, as Tessa said. Now, I have different TomTom voices and I am already familiar with the old TomTom voice. The guy who did the voice-*

over died a couple of years ago. But his voice is already so familiar for Dutch people particularly. I like it when the voice is calm, warm, and welcoming and I totally got that vibe with this one.
Moderator: Do you think that was because it is a female?
Eline: I also have a female voice for my TomTom, which I kind of hate because it sounds more aggressive. I do like female voices, but it depends on how they talk and their intonation.

Some of the participants were not aware of the default female voice setting. For example, Catarina (Group 1) asked whether the voice could be changed, as it can in most VAPA devices, which feature different types of voices. Additionally, with the Google Home device in particular, the way the device speaks is very clear and it speaks its sentences in a structured manner that makes it sound friendlier. Amy (Group 3) thought that although the voice scared her a bit, she was surprised how it could talk just like a human. This statement also relates to Anastasia's to the effect that she felt as if she were talking to a "friend".

Anastasia: From the video, especially like the second video, it kind of felt like a friend, like this machine should be your friend that helps you out. For example, you ask, "Hey what song is this? I kind of like it," you know, that kind of thing. So, that's how it's kind of portrayed for me. (Group 4)

Voice personality was considered to be one of the factors that can influence the willingness of the participants to use a VAPA. The voice personality increases the significance of the emotional and non-instrumental aspects of human interaction with technology. This result also acknowledges gender representation in the society, which shapes use of technology. These findings provide a new angle on how gender plays a role in the development of innovative technologies such as VAPAs. The "human-like" feeling mentioned by some of the participants strengthens the contention that VAPA devices can dissolve the distinction between humans and technology in interactions with them.

5. Conclusion

The emerging trend of using AI-enabled VAPA devices becomes increasingly apparent when considering recent changes in the development of Google's Assistant. As of its May 2018 update, it includes six new voice implementations, the ability to have dynamic, continuous dialogue, and—perhaps its most controversial feature—the ability to book appointments on behalf of the user by means of a telephone call (Carman, 2018). Google refers to this last feature as Google Duplex, and its aim is to engage in natural conversations with human users to nurture an increasingly natural relationship between humans and technology. It performs small, simple tasks autonomously, without the involvement of people (Google AI Blog, 2018). These statements further indicate how the complex relationship between humans and technology is becoming more intertwined. These recently added features in Google Assistant reinforce the potential for VAPA devices to become more integral in people's daily activities. This recent development also provides added value to the scope of this study, which has researched the potential benefits of VAPAs performing the basic routines of daily life practices. It is evident that VAPA devices can and do make a meaningful contribution to how people perform their daily life practices; however, this also raises ethical questions that are particularly important in this research. These ethical considerations relate to one of the important factors of VAPA use, which is the emotional interaction.

First, based on the focus group discussions, this research highlights how the emotional aspect appears to be one of the determining factors in understanding how millennials perceive the usability of VAPA devices. The findings strengthen the ANT contention that technology should not necessarily be treated differently from interactions with humans. Based on the focus groups discussion it was mentioned that if this device were to become more sophisticated, it would definitely feel as if there were an "unseen" human at home. This indicates that the technology is becoming more integrated in that it enhances the ideal image of what is normal in the social world. Additionally, some participants felt that the natural flow of the conversation reassured them that there was some kind of human connection in their interaction with the device. Of interest is that the device's voice seems to generate additional value for how the participants relate their emotional behavior to their interaction with the device. The fact that the voice is female soothed them or allowed them to easily become used to it; this adds a nuance to views on how gender affects use of VAPAs. Moreover, considering future practices of using VAPAs, it was understood that most of the

participants saw it as beneficial based on three aspects: informational retrieval, multimedia control, and environment control. The salience of these activities is also derivable from existing theory that emphasize behavioral patterns pertaining to VAPA use. From the ANT perspective, VAPA becomes a *mediator* element by enhancing in a variety of ways people's performance of their daily activities. Most of the participants apprehend the device functions as a "shortcuts" for performing their daily activities, which correlates with the *perceived ease of use* aspect of the TAM and MOPTAM. This implies that acknowledgment of the potential benefits of VAPA devices for their daily live activities increases the likelihood of the participants' trusting their capabilities.

Second, this research indicates that there are several concerns strongly related to decision-making when using a VAPA. Privacy is the most important issue when considering the device's data-sharing process. Most of the participants related the tension they felt in sharing their personal information in light of the recent scandals involving big technology companies such as Facebook and Google. These scandals have influenced their attitudes to use of their personal information. Knowing that their personal information may be used for companies' own benefits or for manipulative purposes increases their hesitancy to reveal their personal information. As concerns *CPM theory* and *contextual integrity,* boundaries and restrictions, especially those pertaining to *privacy control and turbulence*, were identified as important when sharing different types of personal information. Personal information, such as one's address or personal messages, was considered more private and therefore the participants were more reluctant to disclose it. This confirms the understanding of CPM theory regarding *appropriateness*. *Appropriateness* in this case is when individuals classified their personal information and chose what they deemed appropriate to reveal or disclose.

Nevertheless, there is other information that they felt more comfortable revealing, especially those that do not link directly to their behavioral patterns. What is important is that the boundaries for revealing personal information are influenced by the participants' cultural backgrounds. The mix of nationalities of the participants provided a new understanding about differences in how they value their personal information and in their use of technology. It was noteworthy that most of participants from Asian countries felt that, compared to their experiences in Western countries, they were not well informed by their governments about the importance of securing their personal data. As a result, they did not understand the value of their personal data and allowed the governments to control certain ways it should be used. This correlates with the concept of *principles of transmission* from contextual integrity

theory. On the other hand, it is also important to acknowledge the role of individuals' own decisions and responsibilities in that they choose how they their personal data is treated.

The image and perception of particular brands have an important influence on a participant deciding what type of VAPA they would use. The stimulus material present in the discussions was Google Home and most of the participants expressed their concerns about privacy when the image of Google was considered. Some of the participants felt that, as a brand, Google conjured up several negative correlations with regard to how it treats its users' personal information. Moreover, they perceive Google are invading their private lives to a greater degree than other companies. However, positive associations were also made with Google, especially in terms of its broad congruence with platforms such as Netflix or ChromeCast. This matter indicates that the relationship between people and technology involves more than just complexity or privacy issues. The association of the company's image provides a new angle for understanding the usability aspect of VAPA, relative to previous studies.

Third, when considering concerns with the use of VAPAs, certain issues were identified that relate to how the participants perceived the role of AI in general. Some of the participants expressed their fear of technological penetration, relating it to *technological determinism*. They observed that, with constant improvements in technologies such as VAPA, it might one day be possible for technology to control humans, especially considering that such devices are coming to be more commonly used. Additionally, the participants feared that dependence on this technology could affect the physical performance of daily activities, such as if people were to become lazy or rely excessively on the device. An important point derived from these outcomes is the fear that technology would take over certain jobs, which would have an impact on human capital. Most of the participants mentioned that certain jobs are already performed by robots or innovative AI-based technology, such as AI-based chatbots that track the delivery process of packages. Influential figures in the world of technology have a vital role in constructing opinions about the future of technology. For example, Stephen Hawking or Elon Musk were repeatedly mentioned as regards their statements on the role of AI-based technology and its impact on human capabilities. The opinions of these figures had a direct influence on the decisions participants made about using VAPA technology. Concerning functionality, certain issues were identified that relate to the socio-technical approach; these are significant for understanding the use of VAPAs for society as a whole. Public settings and language problems are some of the issues that influence use of VAPAs; this correlates with one of the principles from contextual

integrity, which is the importance what is considered to be individuals' private environment. Language issues have focused on the flow of natural conversation that was considered lacking in the interaction between the participants and the device, which contributes to previous research focuses solely on individuals' private environment. However, as noted in relation to the recently added Google Assistant feature, Duplex, the problem of this natural conversation may have been solved and it is no longer perceived as a practical concern.

Reviewing these findings, it has become clear that the integration of VAPA devices in people's daily life has many advantages that could potentially allow this device to be commonly used in the future paths of VAPAs. One important aspect to understand is that the potential benefits of VAPA could add value to the basic routine of performing daily activities, which is an expansion of what is considered to be the normal social world. In light of all the recent advances in VAPA technology, it would not be surprising if these smart machines were to become as intelligent as humans. Although this could potentially increase the fears and tensions of humans towards this device, it could also provide an insightful view into how people and technology may in the end, have essential value for one another.

5.1. Limitations and Further Research

The number of the participants involved in this study (22) can be considered limited (22 participants); recruiting a greater number of participants for similar future studies will provide a greater range of valuable opinion to inform the outcome of such research. One of the most important limitations in this study was the lack of a gender balance among the participants. Most were female; only four were male. Better gender representation may have provided more distinct opinions on the use of VAPAs and the recounting of a greater number of different experiences of understanding the functionality of the device. In addition, most of the participants were students. The inclusion of different social groups or occupations may have enriched the data as people with certain backgrounds might have more knowledge of the use of VAPAs than others. The number of focus groups conducted could have been increased to generate more nuanced results, especially those relating to privacy concerns. Additionally, the use of Google Home as stimulus material is considered to be a limitation since it restricted the participants' general perceptions of the use of VAPA devices, and hence their understandings of issues of functionality and privacy.

Recent developments with Google Assistant have engendered interesting viewpoints, which may have brought added value to this research. It is important to note that the new features discussed above only appeared at the end of the data analysis process of this study.

Further understanding the emotional bonds between people and technology could possibly be a new field of research in its own right, one that delves deeper into the matter of human interaction with VAPA devices. Therefore, further research specifically analyzing this emotional interaction would enhance understanding of the complex relationship of human and technology. Additionally, it is likely that there are a greater number of more determinant factors pertaining to the use of VAPAs than gender, social context, and cultural consumption. If that were the case, identifying further influences that may uncover different aspects of the implications of decision-making in VAPA use would be useful, especially in light of recent developments in VAPA technology. Moreover, it is possible that comparing the results obtained here with those of younger generation (Generation Z) would generate a greater variety of input regarding how VAPA is becoming more integral to daily life practices. The use of stimulus material could also be enhanced by including a variety of VAPA devices, such as Amazon's Alexa or Apple's HomePod. This will be interesting to analyze further since it would allow a greater range of perspectives on the functionality of these devices.

5.2. Social Implications

The relationship of human beings and technology derived from using VAPA can have many potential advantages for human beings, however it can also cause confusion regarding the its impacts on people's behavioral patterns. The topic of Artificial Intelligence often causes fear about the future of technology and the potential that this might control human actions and potentials in the future. Through this research, a view about how innovative technologies are becoming more intertwined with human beings suggests that understanding both roles seems to be more complex than typical fears and concerns. With the recent advancements of VAPA devices such as Google Duplex, there are certain aspects that shaped people's behaviors, which are impossible to avoid. Although VAPA devices are pictured as an achievement in technology developments, it also raises issues, specifically on social impacts. One of the examples are related to the factors derived from this research, which is the importance of emotional interactions. When VAPAs are becoming more integrated in people's daily lives, there are two questions that could be asked to us, will the emotional interaction and human-like aspect of certain technologies like those of VAPAs nurture human being's relationship in a more positive direction? Or will it create more distance connection since technology is so similar with us that the social elements from human's natural communication starting to diminished?

In cases where VAPAs are becoming more integrated, these might also generate impacts that could be difficult to regulate such as the value of social interaction. This device allows people to perform verbal commands without having a presence of another human being and therefore one question that could be asked is: Will this device become another aspect that becomes a barrier for social interaction? These questions are vital for us to understand how we want to navigate ourselves especially with the recent development of VAPAs. It is also important to reflect on how these advancements might shape the society in general. Therefore, these questions need to be answered in a collective level as well. The fear and anxiety will always be there, but it is also possible that it might diminish when it reaches the point of acceptance from individuals themselves. It is also apparent that privacy is still an ongoing issue especially when considering the ethical aspects of VAPAs. Therefore, it is the responsibility of VAPA platforms to solve this issue for the level of concerns and fears of individuals to decrease. There are no right answers to the questions above, but it is certainly important for us to inform ourselves of the impacts and possibilities from innovative technologies such as VAPAs.

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Appendix A

Consent Form

CONSENT REQUEST FOR PARTICIPATING IN RESEARCH

FOR QUESTIONS ABOUT THE STUDY, CONTACT:

The person responsible for the analysis and main research work is Tamara Anissa, Jonker Fransstraat 130B, 450652at@eur.nl, +31627013225. This also includes any questions related to the research purpose and involvement in this project.

DESCRIPTION

You are invited to participate in a research about the use of VAPA (Voice Activated Personal Assistant) technology. The purpose of the study is to understand the influence of this technology in millennials' daily activities.

Your acceptance to participate in this study means that you accept to be part of a focus group. In general terms,

- the questions of the focus group will be related to your perception of VAPA in general, your attitude towards VAPA.

	I am 18 years and older
	I agree to be audio recorded

RISK AND BENEFIT

As far as I can tell, there are no risks associated with participating in this research. For this study, I will be using a pseudonym for all participants rather than your actual name.

	I agree to be quoted directly using a pseudonym
	I agree that the researcher may publish data with my quotations

I will use the material from the focus group discussion for my own academic work, such as further research, academic meetings and publications.

TIME INVOLVEMENT

Your participation in this study will take approximately 60 minutes. You may feel free to end your participation at any time.

PAYMENTS

There will be no monetary compensation for your participation.

PARTICIPANTS' RIGHTS

If you have decided to accept to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. You have the right to refuse to answer particular questions. Your individual privacy will be maintained in all published and written data resulting from the study.

CONTACTS AND QUESTIONS

If you have questions about your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact – anonymously, if you wish, to Jason Pridmore, PhD (pridmore@eshcc.eur.nl)

SIGNING THE CONSENT FORM

If you wish not to sign this consent form, you may speak to me privately.

I give consent to be audio recorded during this study:

Name Signature Date

I agree to participate in this study and for my contributions to be used pseudonymously in all written materials resulting from this study

Name	Signature	Date

Appendix B

Focus Groups Guide

Focus Group Discussion Guide

Consent Process

Consent forms for focus group participants will be sent in advance by all those seeking to participate. Participants will be asked prior to the focus groups discussion if there are any questions regarding their participation and about the aim of the research. A consent form sheet will be provided, to be sure that the information from today will be protected and used only for the outcome of this research.

Introduction:

1. **Welcome**

   Welcome and thank you for participating in this focus group discussion. My name is Tamara and I will be your focus group moderator. The aim of today's discussion is to explore the different opinions of how VAPA (Voice Activated Personal Assistant) is perceive as a part of your daily life activities. VAPA technologies are such as Siri on IPhone, Amazon's Echo or Google's home.

   Is there anyone here who has never experienced being in a focus group discussion before? I will briefly explain the process of how the discussion will be done. I will ask several open questions and you are able to answer them freely without any restrictions. As a moderator, my role is simply to stimulate the conversation and to engage your participation in this discussion.

   Before starting the discussion, I would like to remind you that the discussion will be recorded for the research purposes and all conversation will be shared only in this room. The discussion will last for approximately one hour. Does anyone have any questions before the session starts?
   (Open for any questions)

   Great, if everything is clear, I will start the session and the recording.

2. General personal and initial technology questions

- Okay, can everyone introduce yourself by answering the following questions:
    - What is your name, where are you from, and do you see yourself as someone that keeps up with the latest technology gadgets? (e.g. newest phones or laptop?)
    - *Prompt question:* What do you think are the main reasons of keeping yourself updated with these latest gadgets
- ***Attitude and behaviour towards personal assistants***
- Now that I know most of your backgrounds, I would like to start with asking questions regarding our topic of today's discussion. What do you think when you hear about VAPA?
    - *Prompt question:* Can you name examples of technologies you mainly associate this word with?
    - *Note – if respondents mention Alexa or Google home, these are not available in the Netherlands yet, ask:* Have you experienced using these home devices?
- How often have you used a personal assistant, for example on your phone, such as Siri or Google Now? (active and non-active users)
    - *Prompt question (active users):* For what kind of activities are you using this technology for? What are your main reasons of using this?
    - *Follow up question:* Do you think using this technology is helpful for your daily activities?
    - *Prompt question (non-active users):* What are your reasons for not using this technology?
- In this focus group, we have an example of one of these technologies, Google Home – we will be using this more later, but for now:
    - *We have about X minutes left in our focus group now. OK Google, please set the timer for <X minutes>.*

3. Interaction and perception of participants' regarding personal assistants in general

- When you hear about Google's home or Amazon's Alexa, what associations do you have with this technology?

- *Follow up question:* Are you familiar with what this technology is capable of? I will show you a video to make yourself familiar with its function and usage.

(Showing video) (Discussion)

- After seeing this video, what do you think about it? What do you see as positive and what are you concerned about?

(Open for questions)

- (Presenting stimulus material: Google's Home). Does anyone want to try out the device? I have set list of questions here that you can ask. Start with "Ok Google" or "Hey Google"

(Activity begins)

- **Set list of questions:**
  1. Sing me a song
  2. Play a Hiphop song
  3. Ask for a recipe
  4. Please find me the nearest Italian restaurant
  5. Ask me a riddle
  6. Turn on the lamp
  7. Send an email to someone
- *Prompt questions:* How do you feel when you experience the interaction with this technology? What strikes you the most from the use of this technology?
- *Prompt question*: Do you have any concern or opinions regarding the brand of the device itself?

- When you experience this technology, what do you think about the fact that it connects to your personal data such as calendar, contact lists and email? Do you have any concerns about this?
  - *Prompt question:* How do you feel about sharing your personal data? What type of personal data do you feel more willing to share? What are you less willing to share?
  - *Prompt question:* Are you concerned about your personal data being used by third parties or companies that are connected to these devices?

(Discussion)

4. The future of technology

- Lastly, after using and performing tasks with this personal assistant, I am interested to know your opinions regarding its future use. How do you feel about the constant innovation of this type of technology that it is becoming more integral in people's daily activities?
    - *Prompt question:* What do you feel are the potential benefits of you in using VAPA?
    - *Prompt question:* If you would use it in the future, for what types of activities you would use it for? (at the office, household jobs, transportation)
    - *Prompt question*: What do you think are limitations or drawbacks of this technology?
- How do you feel about the use of personal assistant in the future?
    - *Prompt question:* Taking into account the human and non-human interaction, do you think the use of personal assistant would change how people interact in the future?
- What do you think are the impact of personal assistant in daily life practices?
    - *Prompt question:* Do you think that this technology would have a big impact in the society?
    - *Prompt question:* Do you have any concerns or fear if this technology would be more commonly used in the future?

(Discussion)

Moderator: That concludes our focus group discussion. Are there any last comments or remarks regarding the topic discussed that you might want to share?

Thank you so much for coming and sharing your thoughts and opinions. If you have additional information that you did not get to say in the focus group, please feel free to write it on this evaluation form. I will share the outcome of the discussion to anyone who is interested.

Materials and supplies for focus groups

- Sign-in sheet
- Consent forms (one copy for participants, one copy for the researcher)
- Evaluation sheets, one for each participant
- Focus Group Discussion Guide for Facilitator
- 1 recording device
- Notebook for note-taking

Appendix C

Coding Frame

Selective Coding	Axial Coding		Open code 1
Contextualizing VAPA	**Consumer use contexts and behavior of technology**	**The optimistic perspective of technology**	added value, changing the world, big impact, inevitable, evolving, functionality, acceptance, innovative technologies, demands, excited of future capability, ground-breaking technologies, makes life easier,beneficial, transparent, convenient
	Privacy contexts in personal experience	**Potential personal privacy impacts**	distrust, digital device, network connectivity, consent agreement, invasive, data owningprivacy button, government regulation, listening all the time, scared, hesitant, exposed, intrusion, skeptical, afraid, voice recording, dangerous, Facebook, Cambridge analytic, concerned, pervasive
		Reassuring self about own privacy choices	good data security system, personal choice, consent agreement, functionality, confidentiality, be responsible, not affecting, not disrupting, practical tool, not centralize, not sharing certain information, nothing to hide, server dependency location, European law, being transparent,
Practices with VAPA	**Informational retrieval use of VAPA**		autonomous driving, transportation subsitution, school digital assistant, taxi drivers, older people, disabled people, lonely people, setting an alarm, turning on TV, vacuum machine, groceries shopping, check weather, check news, Fitbit, smartwatch
	Multimedia Control use of VAPA		autonomous driving, transportation subsitution, text messaging, sending email, taxi drivers, older people, disabled people, lonely people, setting an alarm, turning on TV, play music, turn on Netflix

	Environmental control use of VAPA		households, smart fridge, cleaning house, food delivery, package delivery, autonomous driving, transportation substitution, smart light, thermostat, home temperature, school digital assistant, cooking, vacuum machine, groceries shopping
Choices in using VAPA	**The fear of technology penetration**		addiction, controlling human, industrial revolution, human capital, no control, dangerous, government regulation, big data, hesitant, complicated, decreases confidence, human failure, overwhelmed of information, isolated, limiting freedom, control state, robotic jobs
	Basic Information choices		address, contact number, personal messaging apps, geo tag location, passport details, Google maps, personal stuffs, data for future jobs, geo-tagging, selling to third parties
	Branded Relations	**Strengths of Google as a brand**	Google biggest tech company, all accounts connected, has so much data, main searching platform, real technology company, more advance, interesting projects, expert, convenient, connections, good quality, normality of usage

		Trust Barriers against Google	mental barrier, has so much data, hesitant to buy, the company knows everything, too much in your face, not align company's ethics, conglomerate, too much power, skeptical, track everywhere, spying, hear everything, third parties selling data, penetrating lives, devoted to Google
Decision-making Implications of VAPA use	**Cultural divides in consumption**		Asian vs Western, dictatorship, strict regulation, Indonesia, standardized product use, technology differentiation, mainstream usage, freedom of speech, protected by law, language barrier, sentence formatting
	Socio-Technical for resistance	**Technical rejection factors**	price issue, privacy issue, exposing personal information, accuracy, time control, data leaked, human failure, not accountable, inconsistent functionality, not accurate, third parties data sharing
		Limited personal connection	laziness, dependency, too much reliability, language difficulties, pronunciation issue, talk slow, too much effort, last shred of control, no dynamic interaction, awkward, not natural
		Social settings limitations of using VAPA	weird, sometimes inappropriate, not comfortable, privacy issue, loud speaking, stupid, not practical, not useful, not common, private information, exposed, public settings

Personality Attraction of VAPA	**Emotional Bonds**		instinct, unseen human, invisible assistant, real person, robots, artificial intelligence, emotional feeling, VAPA as a friend, human natural language, companion, film HER, continuous conversation, cool feeling, follows rationally
	Influence of Positive Voice		female voice, more soothing, calm, talking nicely, more comfortable, like a friend, easy to get used to, more friendly, clear pronunciation, follows you rationally, easy to understand, instinct reply