“HEY SPEAKER - WHY SHOULD I USE YOU?”

Exploring the user acceptance of smart speakers

by

Jonas Hoffmann and Kasper Thuesen

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Kasper Thuesen, 107905, kath16af@student.cbs.dk
Jonas Hoffmann, 107594, joho16ag@student.cbs.dk

Abstract

Voice-assistant powered smart speakers are entering private homes by storm, with the purpose of facilitating everyday tasks and simplifying their users' lives. At the same time, they bring along an array of new challenges due to their purely voice-based interface and their fixed location inside the heart of consumer homes. Motivated by the soaring success of the technology and backed by literature about technology acceptance and user experience, this research investigates what motivates users to continuously use smart speakers in their daily lives and what makes them stop using them. In addition, it explores the gap between expectation and experience for this technology and analyses its influence on smart speaker usage. The research is carried out in two steps. First, 10 selected users are provided with a smart speaker with the task of using the product over the course of four weeks. Consequently, a focus group and several in-depth interviews are conducted with the participants about their experience. The analysis reveals that *Usability*, *Usefulness* and *Sociality* – each consisting of several sub-components – are the main factors that affect smart speaker usage. This research depicts one of the first user-centered analyses of smart speaker usage and opens a door for future research in the area of smart speakers.

Keywords:

Smart Speakers; Voice Assistants; Technology Acceptance; User Experience; Gulf of Expectation and Evaluation

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Table of contents

List of Tables

List of Figures

1 Introduction

Ever since the invention of the mechanical computer, mankind has witnessed an unprecedented speed of technological development. Whilst computing power has come from solving simple tasks with enormous efforts to computing complex matters in split seconds, consumers have also seen a constant change of interfaces that make human-machine interaction possible. After the very early popularity of batch and command line interfaces, which made use of punch cards or paper tape, the graphical user interface has dominated ever since while presenting ever-evolving designs, applications, and interaction styles over time. Lately – fueled by jumping developments in the fields of machine learning and natural language processing – voice has emerged as a serious contestor for becoming the main means by which human beings interact with computers in the future. Due to its direct, effortless, intuitive, flexible and sophisticated nature, voice makes it possible to trigger and control complex tasks, and it is thus likely that "*spoken dialogue interfaces will become the future gateway to many key services*" (Luger & Sellen, 2016: 5286). Recently, voice interfaces have emerged in the market in a variety of forms with intelligent personal voice assistants being one of the most popular. The first voice assistant that had a very prominent appearance was Siri – built into the Apple iPhone in 2011. Several other players, such as Google and Samsung, followed the lead and created similar assistants for their respective smartphones. The purpose of it was to assist users with simple tasks during everyday situations where the users could not use their hands, e.g. while driving or cooking. Such tasks included asking for the weather, calling a friend from the users contact list, or setting a timer. Initially built for smartphones, almost all big players in the industry have quickly turned their attention to other media devices such as notebooks and smart watches and are further looking into integrating voice assistants into home devices and appliances. At the very forefront of popularity of voice assistant powered devices are *smart speakers*, which some claim will take a central place in future homes where everything is interconnected.

1.1 Motivation and Problem Statement

The smart speaker market is booming, and sales forecasts of smart speakers are showing extraordinary figures. According to a report from Global Market Insights (2017), the smart speaker market is expected to grow by an exponential growth rate of 20% from 2018 to 2024 with a predicted end-user spending of 2,1 billion USD worldwide in 2020 (Ann Forni & Van der Meulen, 2016). According to Gautier (2016), companies will exploit this new form of interface by selling compatible products and positive externalities such as voice commerce, media services, advertisements, and sales of new levels of user data will thrive. Looking at Gartner's Hype Cycle for Emerging Technologies from 2017, *virtual assistants* (voice assistants) have just reached the peak of the hype and are said to reach the plateau of

productivity within five to 10 years from now. At the same time, connected homes are also said to be at their peak of hype while reaching the plateau of productivity within the same time frame. This indicates that these two trends go hand in hand or at least correlate in some way (Gartner, 2017). With smart speakers at the forefront of voice assistant technology, the hype cycle suggests that companies as well as end users really see the potential of smart speakers as a new interface for human computer interaction.

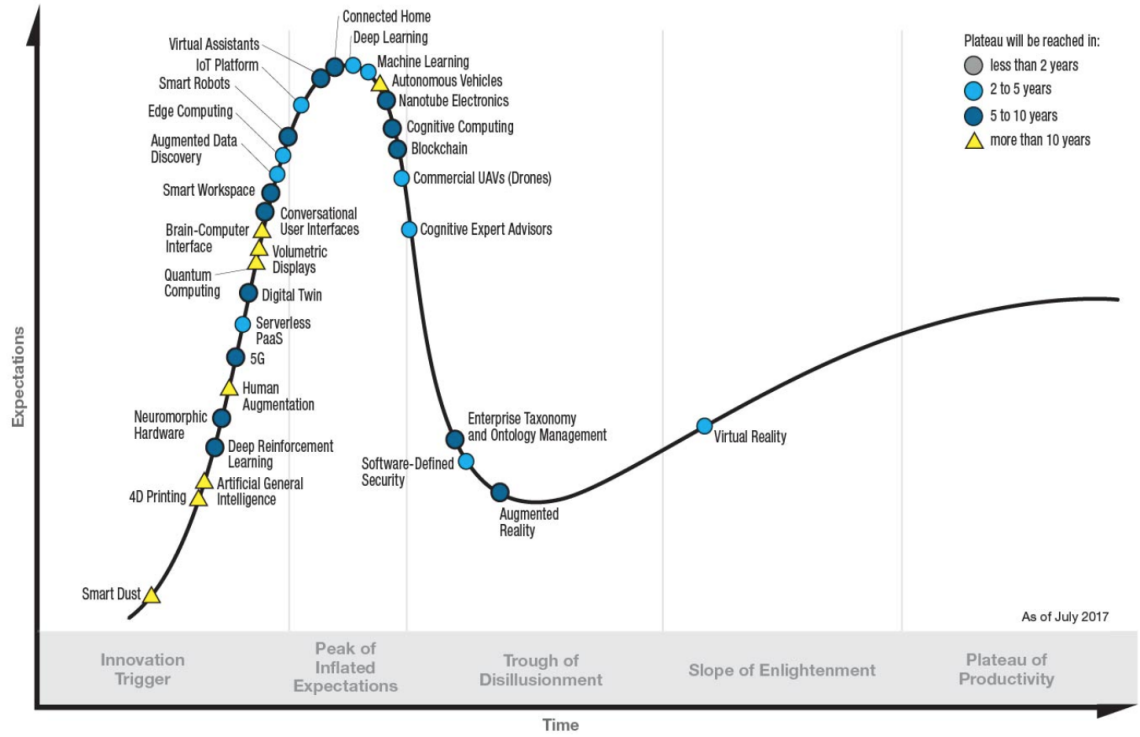

***Figure 1**:* Gartner's 2017 Hype Cycle (source: gartner.com, 2017)

Considering the limited amount of papers revolving around the acceptance of voice assistants (Luger & Sellen, 2016; Coskun-Setirek & Mardikyan, 2017; Mallat, Tuunainen, Wittkowski, 2017), and understanding that none of these studies are committed to smart speakers, we argue that such study will hit two birds with one stone, especially considering the fact that smart speakers are arguably different from other technologies that research has addressed previously. As Purington et al. (2017) argue, smart speakers "*take on a range of different roles and functions in multi-user interactions, especially in personal spaces such as the home* [which] *makes this device particularly relevant for study*" (p. 2854). We share the same belief; that smart speakers deserve separate attention as they – unlike voice assistants in smartphones – are a more or less static part of the home, similar to a piece of furniture. Thereby smart speakers represent a technological phenomenon that falls in between previous research. Furthermore, while consumers and developers apparently both see the potential of voice assistant technology,

research shows that there is a mismatch between the expectations and the actual experience users have with them, as Luger & Sellen found in 2016. Considering the fast developments in technology, we believe it is interesting to see how the match between expectation and experience holds for smart speakers.

1.2 Research Objective and Question

On the basis of the foreseen popularity of voice controlled appliances as well as the found mismatch between user expectancy and user experience, this research will seek to answer the following question:

What influences consumers to continuously use or stop using smart speakers?

The objective of this thesis is to determine the factors that motivate and demotivate continuous use of smart speakers and to explore whether consumer expectations are met by their actual experience. The concluding insights will be used to suggest a conceptual framework for explaining and understanding consumers' adoption and acceptance of smart speakers. The ultimate goal is to find out what drives consumers to continuously use smart speakers and which factors make people stop using the devices. In addition, we want to explore how the connection between consumers' initial expectancies and their experiences influence this decision.

2 Limitations

Our research is limited by several factors. Firstly, due to the very nature of our research strategy, in which we asked several users to test a smart speaker, we were bound by financial constraints. With a budget of maximum 500 EUR (approx. 3700 DKK) we were able to acquire 10 smart speakers – five Google Home Mini and five Amazon Echo Dot. Our sample size was thus naturally limited to 10 participants, which had an influence on the sample method. According to Saunders, Lewis & Thornhill (2008), in order to understand commonalities within a heterogeneous groups, a larger sample size must be drawn. On the other hand, in order to draw conclusions from a homogenous sample, a sample size of 10-12 during a qualitative research can be sufficient. We thus sampled participants from a homogenous group. Any assumptions made in this paper can therefore not be generalized to the whole population, and studies with different samples might generate slightly different outcomes. In relation to this, and as will be addressed in section 6.3.2, the sampling method of this research is based on non-probability sampling, meaning that not everyone in our defined population had an equal chance of being picked out for this research (Greener, 2008: 48; Saunders et al. 2008: 213). Consequently, any results cannot be fully generalized for the whole of the population. Furthermore, the participants only used two different types of smart speakers, namely Google Home Mini and Amazon Echo Dot. Even though Google and Amazon own most of the smart speaker market as of today, other manufacturers and models might offer a slightly different feeling and experience to the user, which could have an impact on the factors that users experience when using a smart speaker. Also, it is acknowledged that only five of our participants were able to use their smart speaker in their native language, while the other five had to use English language as their mother tongue was not supported by the system. Even though we ensured to select participants with a sufficient level of fluency in English, conversing in one's native language might provide a higher level of comfort and improve the overall experience. Another limiting factor of this research is time. In order to provide ourselves with sufficient time for analyzing, interpreting and discussing the results, participants are asked to use the speaker for a 4-week period of time only. As a result, we are not able to make any conclusions on the possible fact that the found factors might change or stay the same over a longer period of time. The last of the limitations of study is the fact that as a result of this being conducted as a qualitative research wherein we follow an interpretivist and subjectivist research paradigm, as will also be addressed in section 4.2 and 4.3, we are not able to prove any causal linkages quantitatively. While we will allow ourselves to make assumptions about these based on the empirical evidence collected, we acknowledge that these assumptions will have to be tested in numbers in order to make definite and objective ‘laws’.

3 Research philosophy

Embarking on a mission to provide a fulfilling answer to such research question that this paper seek to answer, one must thoroughly think of the philosophy that will be adopted beforehand. The importance is outlined by Saunders et al. (2008) who state that the "*development of knowledge and the nature of that knowledge*" with even the slightest ambition of enlightening a specific problem must be led by a research philosophy (p. 107). The importance is enhanced by the argument that the chosen research philosophy will evidently influence not only the overall perspective on the apparent world, but hereby also the strategy the researcher will follow and the methods that he will use to reach an answer (ibid). The process of adopting and following a specific philosophy is thus not profound, or even as "mysterious" as Mackenzie & Knipe (2006) claim that it can appear as such, even though it could be assumed at first. Instead, the choice is of actual practical importance (Saunders et al. 2008, 107-108). Saunders et al. (2008) recognizes that while abiding to a research philosophy might provide the researcher with a better understanding of the "*taken-for-granted-assumptions*" about how the world is construed, the strategy and methods that ends up actually being used will rarely follow perfectly in sync with one philosophy (ibid: 109). Nonetheless, the adoption of a philosophy in this case acts as a guiding star and will inevitably influence the choices that we make underway. Thus, we find it of great importance to reflect on the choice of philosophies.

In the following sections, the thoughts and choices in regards to our overall research paradigm, as well as our research ontology and epistemology of this research paper, will be addressed and explained thoroughly. While these choices, as explained above, has a clear and direct impact on the methodological choices of the research, they will only be addressed in section 6.0.

3.1 Research Paradigm

As Saunders et al. (2008) argue, the thought and decision process in regards to the research philosophy is not profound. Mackenzie & Knipe (2006) argue the same when they state that if the researchers do not nominate a research paradigm as the first thing, "*there is no basis for subsequent choices regarding methodology, methods, literature or research design*." (p. 2). Saunders et al. (2008) defines the understanding of a paradigm as a way of researching "*social phenomena from which particular understandings of these phenomena can be gained and explanations attempted*." (p. 118). Subsequently, a research paradigm is here understood as an overall approach to researching a particular phenomenon and from that deriving particular understandings and explanations. While literature suggest a range of different definitions of what paradigms actually exist and what the importance of them are, Mackenzie

& Knipe (2006) too argue that "first time or early career" researchers might easily be confused. Thus, they present a list of the more common paradigms; *postpositivst* and *positivist*, *interpretivist*/*constructivist*, *transformative*, and *pragmatic* (p. 3-5). Saunders et al. (2008) adds to the list the *realist* paradigm. However, regardless of how well one argues for the decision of a preference in paradigms, there is no such thing as a definite "correct" choice, because it ultimately relies on faith (Guba & Lincoln, 1994: 107). With that said, one can argue that in each specific research, an advantageous choice of paradigm exists, benefiting the researchers more than others.

For the type of research conducted within this paper, we committed to the interpretivist paradigm. Interpretivists seek to understand the differences between human beings and their actions. The researchers must thus be empathetic in their approach and try to view the situation being studied from the viewpoint of their research subjects (Saunders et al., 2008: 116). Interpretivists will usually be lenient towards using qualitative methods (Mackenzie & Knipe, 2006: 4). This allows the researcher to achieve a deep understanding of how the research subjects view the phenomenon in question, ultimately creating the best environment for the researchers to understand and differentiate between the research subjects. In the case of this research and its goal, the interpretivist approach is found to be the most appropriate in order to achieve a fruitful answer to the research question.

3.3 Ontology

When conducting a research and deciding on one's research philosophy, it is important to be clear in defining what is thought to constitute as being "real". That is, what is the ontology of the study? Generally, ontology is defined as either objective or subjective. Objectivism, in this regard, is understood as the belief that reality is construed by social entities, which exist only externally to other social actors, thus seeing social constructs as significantly structured and rigid. Saunders et al. (2008) exemplifies this with the argument that the objectivist would view management in an organization as a clearly defined position with exact duties, operating procedures, formal structures etc. Management is in that sense seen as pretty much the same in any organization you choose to look at, thus somewhat creating 'laws' of what management is and is not. Subjectivism, on the other hand, posits that reality is made from the being of each social entity and the co-existence and co-influence between him or her and other social actors (Saunders et al. 2008: 110). Using the prior example, the subjectivist would then claim that while managers from different organization might share some of the same duties, procedures, and structures, they still interact with employees in contexts that are inevitably different from both the former and the next organization. Thus, what constitutes as a managers' "real" is subjective and must be defined in each case.

Following the interpretivist paradigm, naturally the ontology in this research is tackled with a subjectivist approach. By this, we as researchers take upon a responsibility to understand the "*subjective reality of* the [research subjects] *in order to be able to make sense of and understand their motives, actions and intentions in a way that is meaningful*" (ibid: 111). The job for us as researchers here is thus to construe a research design that will facilitate a social interaction amongst our research subjects and the phenomenon in question. This means that whatever choices we make must be supportive of the belief that the "real" emerges from the interplay between social entities and social actors. From such construction, data, or knowledge, must be derived and analyzed while keeping in mind that truth is found in what the research subjects says.

3.4 Epistemology

The main question within epistemology here is what constitutes acceptable 'truth' - in other words, what do we accept as valid knowledge in the understanding of our reality? (Saunders et al. 2008: 112).

The true interpretivist would claim that any attempt at generalizing across different research subjects, or creating 'laws', in order to simplify or generalize complex matters will inevitably leave out rich knowledge, and thus not be truly 'true' (ibid: 115). While it can be argued that such radical stance is not necessarily appropriate in any instance, we in this research still are influenced by that stream of thought when we argue that in our case, valid truth emerges from the interplay between the research subjects and their interaction with the phenomenon in question. The 'real' is thus a mixture of subjectively and locally construed beliefs, and none of them are thus seen as more or less real, or 'true', than the other, "*some are simply more or less informed and/or sophisticated*" (Guba & Lincoln, 1994: 111). In exemplifying this, Saunders et al. (2008) mentions a theatre in which each person plays a part or a role that they themselves interpret and act in accordance with the given meaning and also in accordance with the others in the play (p. 116). The 'real' here is thus the overall play – the combination of interpretations and plays of the different actors. In the case of this research, what is 'real' in is thus the interpretation of whatever knowledge, or data, that emerges from the empirical evidence. Whatever findings that comes from this research must then not be seen as an attempt to define definite laws, but instead must be seen as a reflection of what is 'real' based on the interpretation of the underlying meanings that is found in the context of this specific study.

4 Literature Review

In the following section, we will present a theoretical framework to our research objective. It will entail the introduction of the core concepts used throughout this paper - voice assistants and smart speakers. In addition, the guiding theories about the different *Technology Acceptance Models* and the *Unified Theory of Acceptance and Use of Technology* will be discussed. In order to make this theoretical framework as comprehensive and exhaustive as possible we will review existing literature that has been selected based on several parameters. In order to review the literature about voice assistants the *Libsearch* search engine has been used. Based on recommendations of CBS library, the following IT related databases have been searched: ACM Digital Library, AIS Library and SpringerLink. Because of the fact that the voice assistant technology has not received a unanimous term in scientific research, several keywords have been used during the search. These included "voice assistant", "virtual assistant", "intelligent personal assistant" ,"voice activated assistant" and "conversational agent". These keywords have been combined with terms like "user acceptance", "technology acceptance" and "technology adoption" to yield specific results for outlining the background. In order to review timely relevant papers we filtered for publication dates within the last 5 years and selected journal articles, theses and conference proceedings. Other papers outside of our search strings have been used where found appropriately in order to improve the validity and credibility of this paper.

4.1 Voice Assistants

Voice based interfaces and devices are said to be the "*next natural form of Human Computer Interaction*" (Luger & Sellen, 2016: 1). Literature uses a variety of different terms for these technologies, such as "(Intelligent) Virtual Assistant" (Coskun-Setirek & Mardikyan, 2017; O'Brien 2017), "(Intelligent) Personal Assistant" (Gautier, 2016; Cohen et al., 2016), "Conversational agents" (Luger & Sellen, 2016; Purington et al., 2017) and "Speech-Based Natural User Interfaces" (Gustavo et al., 2018). While often being used interchangeably, some of these terms are ambivalent or lack clear distinction to similar technologies. Luger & Sellen (2016) for example cite the work of Glass (1999) who argues that *Conversational agents* ought to possess at least *"an automatic speech recognizer to perform speech to text conversion, some form of dialogue manager (controller) to control the interaction with the user, and a mechanism for conveying information to the user (e.g. text and/or speech generation)"* (p. 1). We argue that this does not incorporate important aspects such as artificial intelligence, learning capabilities, personality development and relationship building and is thus an insufficient starting point for a research like this. Equally, "*Speech-Based Natural User Interfaces*", which according to Gustavo et al. (2018) "*operate through intuitive actions related to natural human*

behavior via voice instructions" (p. 1) are coined too broad and could incorporate simple voice command enabled devices without further processing capabilities. Similarly, we believe that the term *Intelligent Personal Assistant* (Gautier, 2016; Cohen et al. 2016) is missing the link to the voice based nature of the technology, and *Voice-Activated Personal Assistant (VAPA)* (Mallat, Tuunainen & Wittkowski, 2017) is an impractically long term. Lastly, the term *virtual assistants* (O'Brien, 2017) is also frequently being used to describe a human self-employed professional whose services can be hired by a company for a period of time.

Thus, for the sake of avoiding confusion we will use the simple term *voice assistants* throughout this paper, which will refer to "*an intelligent software, which can perform tasks for the user through interaction with natural language, or a combination of natural language and touch-based interface*" (Kääriä, 2017: 11). A key characteristic of voice assistants is hereby their ability to react on user input, engage in human conversations, adopt human-like behavior and to absorb information and learn (Mallat et al., 2017). Voice assistants can be incorporated into a related medium such as a mobile phone, a smart speaker, a multimedia car system and so forth, all the while the software is the same independent of its medium (Mallat, Tuunainen & Wittkowski, 2017; Gautier, 2016).

Belonging to the field of human computer interaction, voice assistants are based on artificial intelligence, which is applied through Natural Language Processing (NLP). NLP allows the spoken user input - consisting of sentences, phrases and words - to be computerized and then responded to by the corresponding device (Goksel-Canbek & Mutlu, 2016). In more detail, NLP can "*verify the sentences used in natural language, provide semantic relation, form a syntactic structure of the sentences, correct the spelling errors and combine syntactic structure of the sentences and semantic relation for appropriate responding*" (Goksel-Canbek & Mutlu, 2016: 594). Voice assistants are thus able to master all five fields of speech processing determined by Drygajlo (2003): "*speech recognition, speech synthesis, spoken dialogue, speaker recognition, and speech compression*" (Coskun-Setirek, 2017: 3). NLP is an evolving field and is continuously becoming more sophisticated and dynamic making it possible for a computer to understand everyday language, making sense of questions within a certain context and giving it the power to answer them (O'Brien, 2017). In contrast, lower-form conversational agents such as chatbots use simple pattern-matching rules to react to user input by detecting certain rules and keywords (Vassallo et al., 2010). Throughout the conversation, a chatbot then searches for a lexical match between the user input and a fixed set of question-answer modules. Eventually, it selects the predefined answer that is associated with the processed keyword (ibid). While the history of conversational interfaces reaches back to as early as 1964, when former MIT scholar Joseph Weizenbaum created the first rudimentary chatterbot named Eliza, it was not until 2011 that the first

fully functional modern voice assistant was released to the public: Siri - the iPhone bound digital helper created by Apple (Luger & Sellen, 2016; Coskun-Setirek & Mardikyan, 2017). Ever since then, almost all big players in the electronics market followed up with a phone assistant of their own, such as Microsoft's *Cortana,* Google's *Now* (later Google *Assistant*), Samsung's *S Voice* (Coskun-Setirek & Mardikyan, 2017). Nowadays, voice assistants can be found in a variety of devices and can be used for a large variety of tasks and situations. Research has shown that they are used preferably by users with disabilities, in situations where hands are eyes are used otherwise, by users who do not have access to a keyboard and a visual interface, and by users who do not possess any computer skills (Easwara & Vu, 2014; Portet et al., 2015; Coskun-Setirek & Mardikyan, 2017). Some of the main tasks carried out by voice assistants include "*checking the weather, setting reminders, setting alarms, getting directions, making lists, adding notes, adding items to [their] calendar, searching the Internet, searching* [their] *address book, activating music playlists, or activating FaceTime"* (Luger & Sellen, 2016: 5291).

4.2 Smart Speakers

According to Gaultier (2016) the competition around voice assistants has now moved "into the homes of consumers" in the form of smart speakers (p. 3). Smart speakers are Bluetooth and WIFI enabled devices that include the same voice assistant technology as in smart phones. These speakers are equipped with several microphones through which the user can activate and give instructions to the voice assistant (ibid). Smart speakers are on listening mode at all times however are only activated to listen for commands once a pre-selected call word is used (e.g. "OK Google"). After the device has been activated, it uses beamforming to improve its audio sensitivity in the direction of the person speaking (Alanwar, 2017). The conceived voice input is sent to the cloud where the natural language processing takes place. The processed information and respective reply is delivered back to the user as an audio response (ibid). Due to their always-listening nature, smart speakers are able to monitor their environment and gather information about users throughout their day. According to Nasirian et al. (2017), this leads to a higher quality of service and more implicit and transparent forms of interactions. With 9,7m units sold in the final quarter of 2017 (51,8% market share), Amazon is dominating the global smart speaker market. Following as the second big player, Google managed to sell 6,7m units in the same time period (35,7% market share). Other players on the market are Harmon Kardon with their Windows Cortana featured *Invoke* speakers (Harmon Kardon, 2018), Sonos with Alexa powered *One* (Sonos, 2018), Apple with their Siri powered *HomePod* (Apple, 2018), French company Invoxia with its Apple Homekit supported *Triby* (Invoxia, 2018), and South Korean Naver Corporation with their speakers *Wave* and *Friend* who use the voice assistant Clova (Clova, 2018). Furthermore, Samsung is said to soon release a smart speaker of their own which will feature their VA Bixby (Welch, 2018).

4.2.1 Alexa & Echo Dot

As one of the pioneers in smart home systems, Amazon introduced the Amazon *Echo* as the first ever smart speaker in November 2014. Starting with once device, the Echo series has thus far extended significantly and as of today includes the variations *Echo Dot*, *Echo Show*, *Echo Spot*, *Echo Look* and *Echo Plus* (Amazon, 2018). The Amazon *Echo Dot* model that has been used for this research is the cheapest device in the range. Amazons smart speakers are driven by Amazon's own voice assistant called *Alexa.* Alexa can be used for a variety of tasks such as playing music, retrieving information from the internet, reading news, managing smart home devices, setting alarms, managing to-do lists and providing traffic, weather and real time information (Lopez et al., 2018). In addition, Alexa powered products can be paired with multiple other devices in a smart home such as lights, thermostats, smart plugs, locks, cameras or cloud based services like Spotify or Prime Music (Purington et al., 2017). Alexa can also be extended by several thousand external functions, the so called *Skills*. Through an open source platform introduced by Amazon, any enthusiastic developer or company can create their own *Skill* which Alexa can resort to, thereby multiplying its functionality (Gautier, 2016). Amazon states that Alexa gets smarter as it is being used, adapting to your voice, search patterns and personal preferences (Amazon, 2018). Some of the prominent commands include "Alexa, play music", "Alexa, set timer to 20 minutes", "Alexa, send a message to Michael", "Alexa, dim the lights in the living room", "Alexa, turn off the TV" (Amazon, 2018).

Figure 2: Amazon's Echo Dot (source: amazon.com)

4.2.2 Assistant & Home Mini

In 2016, Google released their own smart speaker called Google Home, which was supported by a more powerful version in 2017, the Google Home Max. In the same year, the Google Home Mini was released as a counterpart to the Amazon Echo Dot. The incorporated voice assistant technology is the Google

Assistant, which was released in May 2016. It is an extension to its predecessors Voice Search and Now, which possessed limited conversational capabilities and were bound to Android phones, Google Apps and Google Chrome Browsers. The Google Assistant is integrated into many more devices, such as Android powered smart watches, TVs, cars and the Google Home smart speaker series (Google, 2018). Based on NLP, Google Assistant is able to perform a variety of tasks ranging from answering questions, playing games, planning your day, controlling other smart home devices and much more (Lopez et al., 2018; Google, 2018). Furthermore, the Assistant is able to predict users' requirements (Lopez et al., 2018). The Google assistant can be triggered remotely by saying "OK Google" or "Hey Google". Common commands include "OK Google, remind me to pick up a birthday card", "Hey Google, book me a table for 6 at Quartino for 8:30", "OK Google, who invented sushi?" (Google, 2018).

***Figure 3*:** Google Home Mini (bestbuy.com)

4.2.3 Recent Smart Speaker Developments

Considering voice interface as one of the main pillars of future undertakings, both Google and Amazon are working intensively on improving their smart speakers (Full Transcript: Sundai Pichai at Google, 2018; Perez, 2018). While these developments are taking place continuously, the public is rather unfrequently fed with news about these developments. Shortly after the conduction of our fieldwork for this research, and during the process of writing and presenting the results, Amazon and Google held keynotes in respectively late April and early May in 2018, where both revealed the developments - or releases - of multiple features and functionalities. In order to make this paper as relevant as possible we will provide a quick overview of the main new issues and features that the big players in the industry are working on. We will pick up these developments at a later stage when discussing our findings in order to give a holistic picture of the current state of smart speakers and where it is headed.

At the I/O keynote in May 2018, the CEO of Google, Sundai Pichai, claimed that their main goal is to make the Google Assistant *naturally conversational (*Full Transcript: Sundai Pichai at Google). Google is therefore working on *Multiple Actions*, which allows the user to ask more than one question at a time (e.g. "*What is the population of Denmark, and what is the biggest city and what is the population of that city?*"), as well as the introduction of *Continued conversations* – a feature that is ought to enhanced the flow of the conversation. In addition, Google claimed to release six more voices with improved natural sound, pace, pitch and pauses (Prater, 2018). In addition, the assistant will be equipped with positive reinforcement replies to a politely asked question or a command in order to improve the manners of potential child users. Furthermore, Google introduced the new calling feature *Duplex*, which lets the Google Assistant make phone calls to companies in order to book certain services for its user. However, it remains unclear whether this service will be available on the Google Home series or whether it will be rolled out for Google Assistant powered smartphones only (Prater, 2018). Amazon too is working on *context carryover*, which allows for the user to ask more than one question in a single sentence, as well as asking follow up questions without having to say "Alexa" before each one. In relation to this, Amazon revealed that they are "*focused on improving Alexa's ability to track context and memory within and across dialog sessions*", meaning that Alexa will be able to remember earlier interactions and put this into context when having a conversation with the user (Perez, 2018). In addition, Google revealed during their keynote that AI technology will be utilized in order to "*analyze all the content published to the web at any moment, and organize all of those articles, videos, and more into storylines*," and that it will pinpoint "*the ones you might be interested in and puts them in your briefing*" (Welch, 2018). Furthermore, Amazon will attempt to further embed third party functions – so called skills – and trigger them automatically where they can be of use (Kinsella, 2018). All of this development done within the smart speaker area implies that both Google and Amazon are pushing hard for a general acceptance of these products to be brought into the homes of people.

4.3 Technology Acceptance

End user's acceptance and usage of computer systems has been studied in depth for decades with different researchers working together and building upon each other's work in order to achieve the right formula for explaining and forecasting system adoption. Recognized as the first to formulate such model tailored for computer usage in organizational settings, Fred D. Davis published "A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and results" in 1986; the Technology Acceptance Model, broadly recognized as the TAM. The TAM was originally and largely based on the central concepts from the TRA-model – a model developed by Fishbein (1967) and later conceptualized by Fishbein & Ajzen (1975). The TRA, also known as the Fishbein-model, takes a rather social-psychological stance when it theorizes that one's behavior (one's action) is directly

dictated by one's intention with that action, which is ultimately factored by respectively one's (positive or negative) attitude towards performing that action, and the subjective (organizational or social) norms (Davis et al., 1989: 984). While the Fishbein-model came almost 20 years before the release of the TAM, and before the release and wide spreading of personal computers, Davis (1896) in his initial research acknowledges that the TRA "*provides a well-founded theory of the motivational linkages between external stimuli, of which system characteristics are an instance, and resulting behavior*" and the TRA thus creates the "*theoretical basis for specifying the causal linkages between two key beliefs: perceived usefulness and perceived ease of use, and users attitudes, intentions and actual computer adoption behavior*." The TRA is thus used by Davis as a theoretical foundation for the TAM (Davis, 1986: 22; Davis et al., 1989: 983).

In Davis, Bagozzi & Warshaw (1989), Davis' rework of the TRA is directly compared to the TRA. The theoretical framework of the TAM is here outlined, conceptualized, and eventually visualized as the 'final' model (see Figure 4).

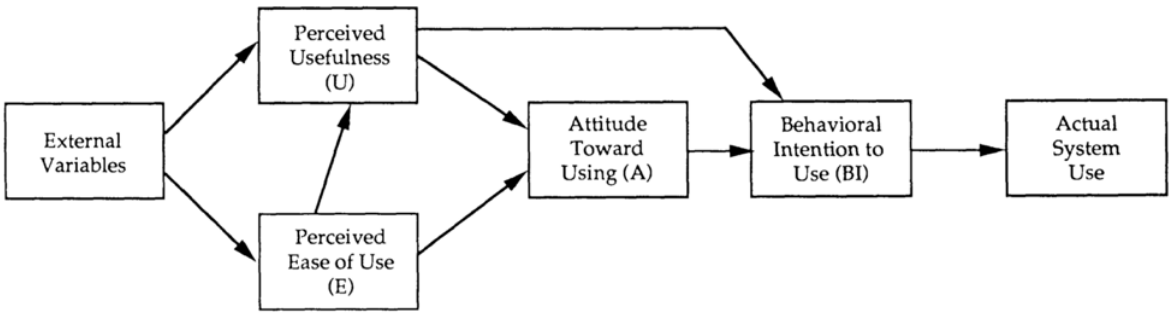

Figure 4: Technology Acceptance Model, in this paper 'TAM1' (source: Davis, Bagozzi & Warsham, 1989)

In their 1989-text, the *Perceived Ease Of Use* (E/EOU) refers to the expectancy that the user has towards the system being free of effort, i.e. how easy the user expects that the system is to use (ibid: 985). In the initial 1986 text, it is also argued that this effort relates to both the physical and mental, here clearly drawing inspiration from the more psychological TRA-model from almost 20 years before (Davis, 1986: 26). *Usefulness* (U) is in Davis (1986) explained as the "*degree to which an individual believes that using a particular system would enhance his or her job performance.*" (p. 26), and usefulness is claimed to not only be affected by the external factors, but also by the ease of use. The argument in Davis (1986) is that a system "*which is easier to use will result in increased job performance (i.e., greater usefulness) for the user*." (ibid). This is also argued in Davis et al. (1989) in which they state

that the higher the ease of use is, the more can be accomplished with the same effort, increasing the efficiency and ultimately the perceived usefulness (p. 987).

It is argued that ease of use and usefulness both directly form the user's *Attitude Toward Using* (A) a specific computer system. Davis et al. (1989) states that this claim is another point retrieved from the TRA-model, in which it is argued that the user's attitude towards using the system will arguably be formed by his or her relevant beliefs about the system, e.g. will the system be useful and/or easy to use. The theory states that this joint attitude toward using the system will transform directly into the *Behavioral Intention to Use* (BI), which is argued to be influenced by the perceived usefulness too. Davis et al. (1989) here claim that no matter if a person has a positive or negative attitude towards a system, in an organizational setting, he or she will intend to use a system if they believe it will enhance their job performance (p. 986). So, while the user's behavioral intent is directly formed by his or her general attitude towards the system, usefulness of the system too can influence the intent, no matter the attitude towards it. Ultimately, both the TRA and the TAM agrees that the behavioral intention will dictate the actual act/usage (Davis et al., 1989).

As recognized already in his work from 1986, external variables are argued as having a direct influence on both perceived usefulness as well as ease of use of the system. External variables in the TAM are amongst other things defined as the systems output quality or the user's learning based on the system's feedback, and while these things clearly separate TAM from TAR – being computer oriented – Davis (1986) argues that characteristics of a computer system will cause a like degree of influence on behavior based on the stimuli that they give (Davis, 1986: 22; Davis et al. 1989: 987). In a later reworked take on the TAM (from now on referenced as TAM2), the external variables are split up in numerous different ones as opposed to the original TAM (from now on referenced as TAM1) wherein they are seen as one, indicating an increase in focus on external variables from TAM1 in 1986 to TAM2 in 2000. These external variables are theorized as *subjective norms*; how the user thinks important acquaintances will think of the action, *image;* the degree to which the user thinks the action will enhance his social status, *job relevant*; the degree to which the user thinks the action will be relevant to his job, *output quality*; how well the user thinks the system performs, and *result demonstrability;* how well the users can attribute work related achievements to the use of that specific system (Venkatesh & Davis, 2000). Separating it from the TAM1, Davis & Venkatesh (2000) argue that these external variables influence solely the perceived usefulness and not the perceived ease of use. Instead, ease of use is - similar to the external variables - sidelined as an influence on the usefulness. Venkatesh & Davis (2000) use the same arguments as in Davis (1986) and Davis et al. (1989); that the less effort a system requires to perform a task, the more tasks can be done (p. 192).

Further evolving on the TAM1, Venkatesh & Davis (2000) introduces two moderators to the TAM2: *Experience* and *Voluntariness.* They argue that the former will influence the subjective norm in the sense that while the user does not have any former experience with a system, his or her intention on using the system must be based on the subjective norms, i.e. how the user believes others think of it. After experience with using the system, the user will form his own beliefs about its strengths and weaknesses, over time thus subsiding the influence of subjective norms (p. 190). Voluntariness is too argued to be a moderator influencing the subjective norm, but only in relation to the intention to use the system. The argument here is that in a context where usage of the particular system is mandatory, subjective norms will influence the intentions to use, and likewise; where usage of a system is voluntary, subjective norms will not influence the intentions to use (ibid: 188). Most significant in this regard, though, is that Venkatesh & Davis (2000) find that the subjective norms influence the intentions to use over and above the perceived usefulness. Generally and interestingly, the shift from TAM1 to TAM2 reflects an increased focus on the social factors that indirectly and directly influence the behavior of the user, at least so when the users own experience with it is scarce. This leads to the other significant takeaway from the TAM2; that the effect of social influences is argued to decrease as experience increases. Whereas the framing of TAM1 can be seen as more isolated in its nature, TAM2 takes in more accounts, most significantly social influences and experience.

In an attempt at developing an integrated technology acceptance model, the TAM3, Venkatesh & Bala (2008) propose the addition of six variables: *Computer Self-Efficacy*; the degree to which the user thinks that he or she can perform a job with the computer, *Perception of External Control*; if the user believes that an organizational and technical underlying supporting resources exists, *Computer Anxiety*; the degree of fear when user is faced with potentially using the system, *Computer Playfulness*; a degree of cognitive spontaneity in interacting with the computer, *Perceived Enjoyment;* the enjoyment of using the system, and *Objective Usability*; the objective comparison of the effort completing a task using the system versus using something else (p. 279). While intentions of further extending the TAM are inevitably light hearted, the continuous work is also being met with criticism. Benbasat & Barki (2007) states that while researchers are continuously working on evolving and building upon the TAMs, all of this work has "*not been based on solid and commonly accepted foundations, resulting in a state of theoretical confusion and chaos*." (p. 212). They hope that researchers will seek to leave the conformity of the TAM, and take into account the constantly evolving contexts of IT system usage (ibid: 2016).

While a range of different TAMs (1986, 1989, 2000, and 2008) exists, an effort in research has also been put towards unifying not only the TAMs, but also other lesser used models. Most notably is the

Unified Theory of Acceptance and Use of Technology (from now on referenced to as UTAUT), which seeks to combine 8 different user acceptance theories, hereunder the TRA, the TAM1, and the TAM2 (Venkatesh, Morris, Davis & Davis, 2003: 425). Venkatesh et al. (2003) argue that because of the extensive range of different models, researchers are forced to pick and choose elements from the different models, or favor one over the other, ignoring whatever findings other researchers might have provided (p. 426). In order to solve that issue, Venkatesh et al. (2003) undertook a research where data from four different organizations was used to enable a unification of 8 central models into a single one. The unified model was then tested against the same data set and was found to outperform the others. Further data from two organizations were used to test and confirm the UTAUT model (p. 425). Ultimately, the UTAUT presents a theoretical framework with four variables directly influencing behavioral intent: *Performance Expectancy*; the degree to which the user believes the system will enhance his or her job performance, *Effort Expectancy*; how easy the user perceives the system is to use, *Social Influence*; the degree to which the user thinks important acquaintances believes he or she should use the system, and *Facilitation Conditions*; if the user believes there are organizational and technical infrastructures to support the use of the system (ibid: 453). A significant rearrangement here is the removal of Perceived Ease of Use and Perceived Usefulness, though these can be argued to be similar, if not identical, to respectively Effort Expectancy and Performance Expectancy. Another significant addition is the moderating factors *Gender* and *Age.* This addition, though, is based in theory which amongst other things suggests that women tend to be more affected by social norms, just as increased age is theorized to result in increased influence from social norms as well (ibid: 453). The UTAUT argues that *Experience* is a moderating factor as well, influencing the determinant variables that are effort expectancy, social influence, and facilitating conditions. Venkatesh et al. (2003) further argues that *Voluntariness* can be a moderating factor on social influence, a clear nod towards the TAM2 where Venkatesh & Davis (2000) proposed that in a context where usage of a system or technology is mandatory, subjective (in this case social) norms will arguably influence the intentions to use, and on the other hand, where usage of a system or technology then is voluntary, subjective or social norms will not influence the users intentions to use (p. 188).

Even though both the TAM2 and the UTAUT are found to have larger 'webs' than the TAM1, based on the fact that they account for more specified variables and moderators, they all share the same limitation which is the fact that their aims are to explain technology acceptance in organizational contexts. This gap in research was acknowledged by Venkatesh, Thong & Xu in 2012, who sought to extend the context from organizational to consumer use (p. 157, 171). The model they present is an extension of the *Unified Theory of Acceptance and Use of Technology* (from now on referenced to as UTAUT1) and was named the UTAUT2 (Venkatesh et al., 2012: 158). Venkatesh et al. (2012) argue

the critical need to extend the UTAUT1 to other contexts and thus choose to provide to research some "*key additional constructs and relationships to be integrated into UTAUT, thus tailoring it to a* consumer use context." (p. 158). The added value stems from three main arguments for extending the UTAUT. Firstly, Venkatesh et al. (2012) states that research has found clear links between hedonic motivation and technology usage. Secondly, they argue that in a consumer context, users themselves are responsible for any costs related to adopting a new technology, thus creating another variable in the decision process. Thirdly, they argue that (at the time) recent work challenges the argument that behavioral intention is the main indicator of technology use, and also that it, on the other hand, introduces habits as another strong variable (ibid: 158). By seeking to integrate hedonic motivation, price, and habits as variables influencing of system usage, the UTAUT2 thus separates itself from prior models by moving itself away from an organizational work context, where indicating factors to a larger extent might be influenced by things out of the users' own control, to a more personal and private context, where the user is more in control of the factors.

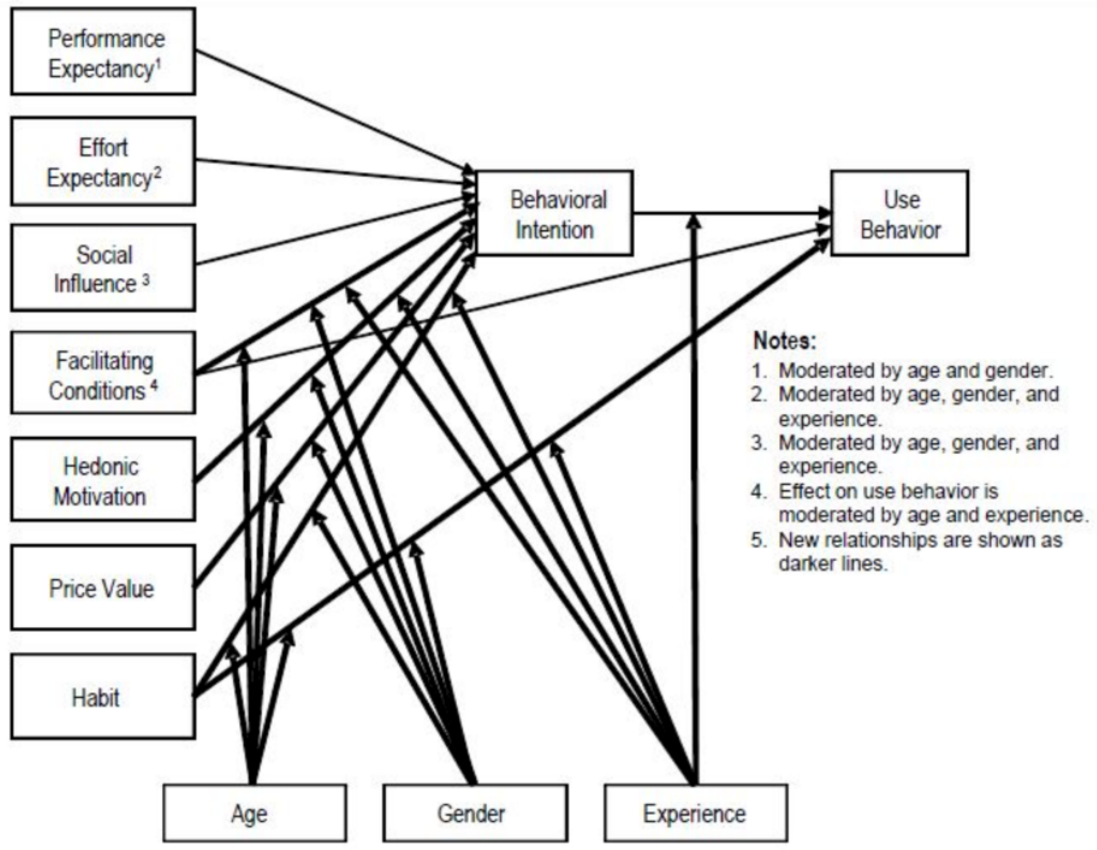

***Figure 5**:* The Unified Theory of Acceptance and Use of Technology, in this paper the 'UTAUT2' (source: Venkatesh, Thong & Xu, 2012)

While the UTAUT2 provides a technology acceptance model applicable in a consumer use context, its structure is very like the UTAUT1. All four variables from the UTAUT1 is argued to be relevant in a consumer context too. Three out of four moderators – gender, age, and experience – are too argued to be relevant. In this regard, voluntariness as a moderator is removed. Venkatesh et al. (2012) argue that while the continuum of voluntariness stretches from completely mandatory to completely voluntary, "*consumers have no organizational mandate and thus, most consumer behaviors are completely voluntary, resulting in no variance in the voluntariness construct*." (p. 159). The point here is that that the consumers usage of the system in most cases will be voluntary. In return of the removal of this moderator, and as addressed earlier, three variables are introduced in the UTAUT2; *hedonic motivation*, *price value*, and *habit*. Hedonic motivation is argued to be a variable directly influencing the behavioral intention based on the theory that "*fun or pleasure derived from using a technology* […] *has been shown to play an important role in determining technology acceptance and use*" (ibid: 161). Another important role is price value. Venkatesh et al. (2012) points out the addition of this variable is one that differentiates the UTAUT2 from other earlier models. The argument here, as addresses briefly earlier, is that in an organizational setting, the actual user of the technology will rarely bear the costs of acquiring and using it himself, thus diminishing the importance of price. On the other hand, though, it is argued that in a consumer case, "*price value is positive when the benefits of using a technology are perceived to be greater than the monetary cost and such price value has a positive impact on intention*." (ibid: p. 161). In other words, if the user finds that the technology provides a performance or service that outweighs the actual cost of using the technology, then this will result in a positive impact on the users' intention to use the technology, and ultimately thus also impact the actual acceptance and adoption. The last addition of influencing variables is habit. Venkatesh et al. (2012) reflects on a range of different theories about habit when they seek to not only define habit, but also differentiate it from experience. While they do not neglect the fact that experience can directly form habits, they do work with the variable as a "*perceptual construct that reflects the results of prior experiences*." (p. 161).

Building on an already unified model embodying different models and concepts of technology acceptance, the proposed UTAUT2 model inevitably provides a well-theorized concept of technology acceptance in a consumer context. However, while the model positions itself strongly in the field of technology acceptance and provide well-argued variables and moderators for technology acceptance, the authors do point out the gaps that their work indirectly create. The main gap addressed is the fact that their study is tested against one technology only, mobile internet (Venkatesh et al., 2012: 173). Other research papers have addressed the acceptance of other technologies in different contexts, like the personal computer in a home environment (Brown & Venkatesh, 2005), or voice assistants in the public space (Moorthy & Vu, 2014), though it is evident from these that test results will arguably be

influenced by the technology and the environment it has been tested within. While this in itself is not necessarily an issue per se, it does create gaps for other researches to fill, like research of the acceptance and adoption of voice assistants embodied in smart speakers. Exploring the area of technology acceptance it becomes apparent that its primary goal is to predict the adoption of technologies based heavily on expectation and attitude. While this is of great importance to manufacturers and designers in terms of understanding what triggers the acceptance of technology, it lacks to assess if and why consumers will or will not use the product over a longer period of time. We argue that while TAM can predict and explain why people purchase a technology in the first place, it does not comprehensively explain what factors motivate people to keep using the product or which factors are responsible for abandonment and return of those products. For this reason, we will additionally look at the topic of *User Experience* in order to build a basis for our data acquisition and analysis.

4.4 User Experience

As briefly mentioned, *User Experience* is expected to play an important role when exploring the reasons that motivate consumers to use smart speakers. Hornbæk & Hertzum (2017) state that UX models describe "*the experience of using interactive products, the consequences of those experiences, and the ways experiences and consequences are connected*" (p. 2). Due to the abundance of User Experience literature and the ambiguity of the concept throughout its academic and business use, we do not aim to give an exhaustive literature review, but rather want to define the concept of User Experience on the basis of prior literature and explain the most important notions and concepts that make up the term. The concepts will be picked during our discussion and compared to the findings and existing theory.

Coined by Donald Norman in 1994, the term User Experience is nowadays used abundantly in both academics and the business world (Buley & Leah, 2013). In fact, its original meaning has been watered down and altered various times leading to different definitions and thereby inflating the amount of research under its name (Law et al., 2008). At the same time, the job title of User Experience designer has been trending in recent years, while often being used as a substitute for Web or App designers (Norman, 2013). This is because UX (short for User Experience) and design are closely related. Hornbæk & Hertzum (2017) state that in contrast to technology acceptance theory, user experience theory informs design (Hornbæk & Hertzum, 2017). Initially, however, Donald Norman defined User Experience very generally as "*all aspects of the end-user's interaction with the company, its services, and its products*" (Norman & Nielsen, 2018). So in its original meaning, User Experience was meant to address any possible touch point of an end-user with an organization. In order to make the term more directly applicable however, an abundance of researchers has tried to build on this definition and set a certain focus. Lauralee Alben (1996), for example, put the product into the focus of UX by defining it

as "*All the aspects of how people use an interactive product: the way it feels in their hands, how well they understand how it works, how they feel about it while they're using it, how well it serves their purposes, and how well it fits into the entire context in which they are using it."* (Alben, 1996: 12). Other researchers have added more complexity by incorporating more factors into their definitions or narrowing down on certain other parts. Worth to mention are Hassenzahl & Tractinsky (2006), who define *User Experience* as "*a consequence of a user's internal state (predispositions, expectations, needs, motivation, mood, etc.), the characteristics of the designed system (e.g. complexity, purpose, usability, functionality, etc.) and the context (or the environment) within which the interaction occurs (e.g. organisational/social setting, meaningfulness of the activity, voluntariness of use, etc.)*" (p. 95). They hint that User Experience does not happen on a single layer but its definition is to be found in the center of three research streams, namely "beyond the instrumental", "emotions & affect" and "the experimental". One could go on and on and address all definitions of UX that literature has brought up – however that would hardly add much value to this research. Furthermore – in an effort to arrive at a practical definition across industries, the *International Organization of Standardization (ISO)* has already developed an international standard, which defines User Experience as a "*person's perceptions and responses resulting from the use and/or anticipated use of a product, system or service*" (ISO, 2010). Furthermore, they add three important notes in order to describe and add detail to the definition:

> *"Note 1 to entry: User experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours and accomplishments that occur before, during and after use.*
> *Note 2 to entry: User experience is a consequence of brand image, presentation, functionality, system performance, interactive behaviour and assistive capabilities of the interactive system, the user's internal and physical state resulting from prior experiences, attitudes, skills and personality, and the context of use.*
> *Note 3 to entry: Usability, when interpreted from the perspective of the users' personal goals, can include the kind of perceptual and emotional aspects typically associated with user experience. Usability criteria can be used to assess aspects of user experience."* (ISO, 2010)

Next to the abundance of academic definitions and the comprehensive ISO standard, a series of UX models have been proposed. Hornbaek & Hertzum (2017) identified four common characteristics among those models. Firstly, they found that most of the models distinguish between pragmatic and hedonic attributes, whereas the former depict the attributes of a product that ultimately guide the user toward a goal and make the product appear "simple, predictable and practical" while the latter refer to the attributes that provide identification and stimulation. At the same time, most studies show a stronger influence of practical attributes than hedonic attributes on the overall user experience (ibid: 5).

Secondly, Hornbaek & Hertzum (2017) found that users perception of the beauty and overall aesthetics of a product is vital, meaning that beautiful products generally benefit usability (Tractinsky, Katz & Ikar, 2000). Thirdly, they found that perceptions of products change as time passes time. UX research has shown that while some perceptions remain fairly stable over time - e.g. beauty - other perceptions such as pragmatic quality are subject to change. Fourth and lastly, Hornbaek & Hertzum (2017) extracted that emotions are central in most UX models.

Two examples of UX models

In order to provide a deeper insight into UX, two renown UX models are here introduced. The first model is Hassenzahl's (2005) model of user experience, which Hornbaek and Hertzum (2017) also use it in their review of papers where TAM and UX crossover. Hassenzahl (2005) states that a product possesses certain features (content, presentation, functionality, interaction) which a designer assembles to create an *intended product character* (a). A product character consists of hedonic and pragmatic attributes. Once a user comes in contact with a product he or she first observes the product features and from that derives an individual version of the product character. Hassenzahl (2005) calls this the *apparent product character*. The apparent product character leads to certain *consequences* (b): Firstly, the user judges the product's appeal ("It is good/bad"), secondly he or she experiences emotional consequences, such as satisfaction or pleasure and thirdly behavioral consequences show in form of for example an increased time spent with the device. These three consequences are moderated by a specific usage situation.

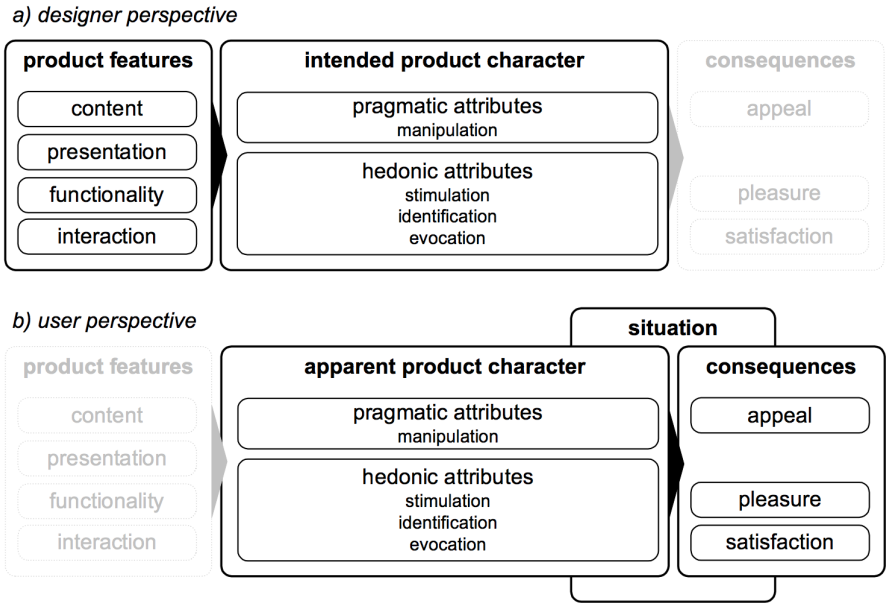

***Figure 6*:** The User Perspective on Interaction model (source: Hassenzahl, 2005)

Another interesting viewpoint on User Experience was defined by UX pioneer Peter Morville in his *UX Honeycomb* (2004). He claims that a product needs to be *useful*, *usable*, *findable*, *valuable*, *desirable*, *accessible* and *credible* in order to provide a positive user experience. Morville (2004) says that the honeycomb is a "*great tool for advancing the conversation beyond usability and for helping people understand the need to define priorities. Is it more important for your website to be desirable or accessible? How about usable or credible?*" (p. 1). We argue that this prioritization and weighting of the *UX* factors is transferable to any other technology as well and is thus be a good starting point for a research like this.

***Figure 7*:** Peter Morville's User Experience Honeycomb (source: semanticstudios.com)

Another UX concept interesting in this regards, and which will be picked up at a later stage in this paper, is Don Norman's (2013) *Gulf of Execution and Evaluation* as used in the paper by Luger & Sellen (2016). Norman (2013) states that whenever people use something they face the *Gulf of Execution* – where they are figuring out how they can use the product – and the *Gulf of Evaluation* – where they are trying to figure out what happened. Norman says that the role of a designer must be to assist the user in bridging those gulfs. In reality, the Gulf of Execution can be bridged by signifiers, constraints, mappings, and a conceptual model. The Gulf of Evaluation on the other hand can be bridged through sufficient feedback and a good conceptual model of the product. Luger and Sellen (2016) apply the *Gulf of Execution and Evaluation* on their research of smartphone voice assistants. As a result of their research, they found a deep gulf of execution. Their participants were said to have "*poor mental models of how their* [voice assistant] *worked and that these were reinforced through a lack of meaningful feedback regarding system capability and intelligence*" (p. 5295). The researchers also found that playful and engaging features of the voice assistant created unrealistic expectations about the system capabilities, which framed the consequent user experience. Furthermore, there appeared to be a deep

gulf of evaluation meaning that users were not able to assess the intelligence of the system, needed to visually confirm the vast majority of tasks and avoided using their voice assistant for complex operations. Considering the 2.5-year time gap between Luger & Sellen's (2016) paper and this very research, as well as the different focal product of research, we deem it highly interesting to discuss our findings on the gap between expectation and experience for smart speakers.

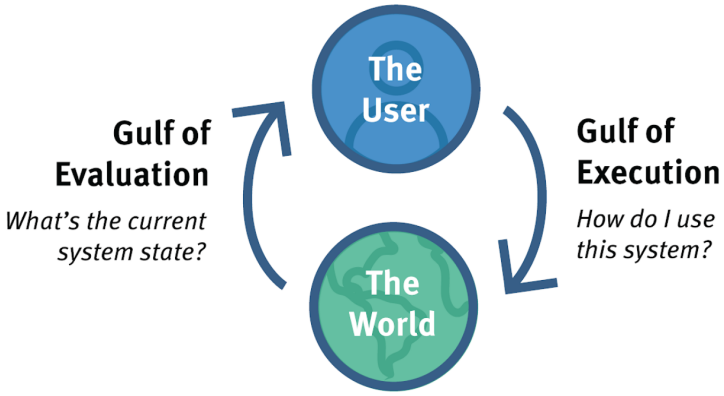

***Figure 8*:** Don Norman's Gulf of Execution and Evaluation (source: nngroup.com)

4.5 Acceptance of Voice Assistants

A few papers have connected the research area of technology acceptance with voice assistant technology. Coskun-Setirek & Mardikyan (2017) conducted a quantitative study on "*the factors that affect the usage of voice-activated personal assistants*" (p. 1). They developed a conceptual model based on prior literature about voice assistants and readings about the field of technology acceptance. Eventually, the model was tested based on 183 survey participants. Their model incorporates the moderated influence of *subjective norms*, *job relevance*, *output quality* (all from TAM2) and *perceived usefulness* on *perceived ease* of use and *behavioral intention* (TAM), finding that job relevance, output quality and perceived ease of use have a positive direct effect on *perceived usefulness*. Similarly, Nasirian et al. (2017) developed a new system quality model with the goal to better describe the adoption of voice assistants. Thereby, they investigate the effect of information quality, system quality and interaction quality on trust, which in turn is thought to affect the intention to use voice assistants. Kääriä (2017) extends the technology acceptance model by the factors of anthropomorphism, which is then tested on voice assistants. The results show no significant effects of anthropomorphism on the acceptance of voice assistants. Coskun-Setirek (2017) test factors from the TAM2 model, which has been deemed outdated and has been improved by several newer models. Nasirian et al. (2017) seem to take a rather narrow stand while evaluating the system capabilities and the user experience of voice

assistants, and Kääriä (2017) explores the effects of anthropomorphism of voice assistants on the level of adoption.

While all of these papers help in understanding the adoption of technology, we believe they only contribute to and address very specific topics within technology acceptance, while there is no such paper that includes a complete and data supported number of factors in their conceptual model. This is due to the fact that a data-based conceptual model about the technology acceptance of voice assistants does not exist as of now, which we seek to change with this very thesis. In the following, we look at similar research that do exist and revolve around voice assistant usage. While the goal of these papers was not to research the acceptance of voice assistants, we believe that the emerging topics do play a role in a consumer's decision whether or not to continue using voice assistants.

Several papers have addressed security, privacy and ethical issues of voice assistants. Wueest (2017) addresses the privacy concern some users have about the always-listening function of the devices. Saffarizadeh et al. (2017) discusses the effects of these concerns towards self-disclosure of users. He states that users with less concern for privacy are more likely to disclose more personal information, which in turn gives them a better service by the voice assistant. On the other hand, Saffarizadeh et al. (2017) find that once a voice assistant is able to appear trustworthy through seemingly disclosing private emotional information about itself, they might be able to coax users into disclosing more information than they would do under other circumstances. Cohen et al. (2016) addresses privacy issues especially for families with children. Based on the fact that family-based interactions tend to be full of nuance and emotion, the authors raise the question whether there should be a 'codified ethics' that serves as guidance to the assistant in regards to what it should or should not do. In addition, they discuss whether voice assistants should - in the future - be able to act as an agent for their users, meaning acting on the users' behalf. Cohen et al. (2016) argue that in order to do so, voice assistants will need to understand users' intentions, goals and plans and be able to act accordingly, which in turn demands almost full transparency of the users. We take it that privacy concerns are likely to play a role in the adoption of voice assistants. Wueest (2017) discusses several security risks related to voice assistants and in particular smart speakers. Firstly, anybody within the listening radius of an always-listening voice assistant can engage with it and its settings. The voice input does not necessarily need to come from the user or one of his friends or family, but could also be triggered by a neighbor, somebody outside who yells loud enough or even televisions, radios and other sources of sound. Wueest (2017) describes several cases of TV ads and shows that triggered a smart speaker (p. 14). By default, one can get access to private information such as calendar entries and private messages through Alexa and the Google Assistant. Moreover, somebody with physical access to a smart speaker could modify it and turn it into

a listening device (p. 12). Wueest (2017) describes several cases of children ordering toys through Amazon Alexa by using their voice. Whenever a purchase has been triggered, Alexa will ask for a 4-digit voice code. Wueest (2017) claims that this is no hurdle for attentive children who are in the room when their parents use the voice code on another purchase. In addition to the voice code, the purchase can be secured by voice recognition, so that Alexa only triggers a purchase once the voice of the eligible person is detected. However, doubt remains whether this is secure enough since voice is "*prone to replay attacks* [...] *and easy to impersonate*" (Feng et al. 2017: 343). In September 2017, even a parrot in London managed to trick Alexa into buying something online (Wueest, 2017). Literature shows that there are several privacy issues and security risks concerned with voice assistants. We assume that these are even more apparent for smart speakers that are always on listening mode within the very heart of a personal living space. It is interesting to see whether these concerns constitute factors for the acceptance of the technology.

Easwara & Vu (2014) conducted a study about the influence of social acceptability of using voice assistants in the public space. They found out that participants were generally more likely to use their voice assistant to enter non-private instead of private information. The degree of willingness to disclose private information to the voice assistant was found to be dependent on the location and on the social context. Easwara & Vu (2014) state that participants found it socially unacceptable to transmit private information to their voice assistant in public and in front of strangers. We believe this phenomenon to partly hold for smart speakers as well. While smart speakers are mostly used in private homes rather than in public spaces, we believe that the general interaction volume increases. On the other hand, we think that users are still hesitant to use their smart speaker in the presence of other people, especially in front of strangers. Purington et al. (2017) studied social roles and the personification of the technology. They found that users who personified voice assistants and referring to e.g. 'her' and 'Alexa' instead of using neutral pronouns showed higher rates of user satisfaction. However, the authors are not certain about the direction of the relationship. They explain it could also be that people who are satisfied with the product are more inclined to then personify it when talking about it. The latter assumption is further supported by Kääriä (2017) who studied the effects of anthropomorphism (personification of technology) on intention to use and user satisfaction. The results show no significant correlation between the variables.

As described earlier, the adoption of technology is heavily dependent on the *perceived ease of use, perceived usefulness* (both TAM) or *performance* and *effort expectancy* (UTAUT2). These variables constitute what can be referred to as user experience. There is however one big difference; while the variables from technology acceptance models seek to predict whether or not a technology will be

adopted, user experience takes part in explaining why people like or dislike a technology. For the purpose of our paper, the experience users have with smart speakers is of great importance. Several studies have explored the usability and user experience part of voice assistant technology. Luger & Sellen (2016) sought to determine the interactional factors that affect everyday use of voice assistants. They report that their participants had no clear mental model of how the voice assistant worked nor did they get sufficient feedback on the systems intelligence and capability. In addition, the many Easter eggs and humorous responses of the voice assistants lead users to attribute "*elevated levels of episodic social intelligence to the system such as sarcasm or humour*" (ibid: 5294). This continuously created unrealistic expectations that could not be met by the system capabilities of the voice assistant. The misalignment between user expectation and the actual user experience created a large "gulf of execution and evaluation", and thus demotivated any further use of the technology (Norman, 1994). They found that quality of both factors have an impact on user experience with voice assistants.

Similarly, Nasirian et al. (2017) explored the impacts of system quality, information quality and interaction quality on the adoption of voice assistants. By system quality, they refer to the "*usability, availability, reliability, adaptability, and response time*" of the voice assistants, whereas information quality corresponds to the perceived quality of the information provided by the voice assistant as a response to user input (DeLone et al., 2004: 34). Both system quality and information quality has an effect on the adoption of voice assistants. This is supported by Jiang et al. (2015) who find that speech recognition (reliability) and intent classification have an effect on user experience. Other research however found that especially elderly people did not value sophisticated system quality and speech recognition as much. Portet et al. (2013) tested an early form of voice assistance as a part of a smart home for the elderly. Their study revealed great reception of voice assistants, which were strongly preferred over touch screen solutions. However, elderly people seemed to like 'keyword commands' better than the 'whole sentence' command. Portet et al. (2013) note that this would help to avoid "*many of the current bottlenecks in speech recognition*" (p. 139). This is an interesting insight that could or should be tested amongst younger users of voice assistants as well. If the majority of users of voice assistants preferred talking to their device using short keyword command, developers could conclude that improving the understanding of (complex) whole sentences, informal language, slang and accents is not the most important factor of voice assistants. Portet et al. (2013) also describe that many elderly fear that a voice assistant based system would "drive them to a lazy lifestyle" (p. 139) where they would lose control. Dale (2015) states that the limited system quality of voice assistants prevents great user experience in the long term. He claims that voice assistants are merely an "*interface to a collection of discrete and effectively independent underlying functionalities*" (p. 327). Anything that lies outside of these functionalities will be met with a search engine query or a referral to a third party application or

service. While Dale (2015) acknowledges that there is certainly some value behind this model, he argues that voice assistants will not be able to constitute real artificial intelligence and therefore their value will remain limited. He proposes two ways this will play out in the future. Firstly, the sheer number of distinct third party functionalities will exceed the capabilities of the interface and thus frequently leading the user to the wrong features. Secondly, the user will be able to manage and navigate despite an increasing number of features and functionalities, which will lead to the user having to manage and delete applications like we do on our smartphones. In any way, the limitations of their intelligence will affect intuitiveness of the voice assistant and hamper the user experience. Eventually, Nasirian et al. (2017) argue that interaction quality with a voice assistant has an even greater influence on the consequent user experience than system quality. This suggests that users value a smooth and natural conversation with the technology more than the actual outcome of the service – e.g. how the voice assistant talks to the user is more important than how fast it responds or how accurate the given answer is. Concluding the literature review on user experience of voice assistants, it seems as if it has not yet reached a very satisfying and mature level. Our research will provide insights into the user experience of smart speakers. We assume user experience to be a crucial point for the acceptance of smart speakers.

5 Methodology

Until this point, we have dug into existing literature in order to assess and understand the theoretical foundation that lays the ground for exploring user acceptance of smart speakers. In the coming section, we will address the methodological tools that we used in order to best provide new empirical knowledge to this specific field of research.

5.1 Research Approach

When looking at the objective of the research, the researcher must acknowledge what the purpose of his or her research is. Mainly three research purposes exist: *descriptive, explanatory,* and *exploratory.* The first, the descriptive study, seeks to paint an accurate image of a particular phenomenon, individual, group, or situation in question. While the end goal of a descriptive study can potentially be unclear, it is most commonly used as an extension or a build-up to an either exploratory or explanatory research (Kohtari, 2004: 2; Saunders et al., 2008: 138-140). An explanatory study, on the other hand, will seek to explain linkages between cause and effect in a specific context. Saunders et al. (2008) explains it as "*studying a situation or a problem in order to explain the relationships between variables*" (p. 140). While it can be argued that the explanatory approach could seem fitting in our research of finding out what motivates and also keeps users from using smart speakers, we believe that we must first find out what these variables actually are before the causal linkages can be addressed. Thus, our research approach will be of exploratory nature, which is defined by the fact that the researchers seek to gain "*familiarity with a phenomenon or to achieve new insights into it*" (Kohtari, 2004: 2). It is exactly familiarity and insight that is the purpose of this research, and while the purpose of a research can change over time, the exploratory study is mainly what provides us with the insight needed for answering our research question (Saunders et al. 2008: 139).

5.2 Research Strategy

Having our exploratory research approach in mind, we are further looking towards the best suiting research strategy in order to answer our research question. Saunders et al. (2008) deals with seven different research strategies but acknowledges that the use of one does not rule out another, and that none is superior over the other. The important part here is to understand which strategy will provide the best possibilities to answer the research question. Therefore, the choice of strategy will be guided by the research question (ibid: 141). In the case of our research, wherein we want to explore which factors influence the continuous use of smart speakers, we follow the strategy of grounded theory. According to Saunders et al. (2008), the idea is here to start with a series of observations from which the data will

be used to develop a theory. The theory is then used to make predictions about behavior. Testing of the predictions is then done to possibly confirm the theory (ibid: 149). Glaser and Strauss originally proposed the strategy in 1967 with the intention of providing researchers with a tool for analyzing in an interpretivist manner, this being by the method focusing strongly on the meanings and concepts that emerge from the actual social constructs in question (Suddaby, 2006: 633-634). Grounded theory can thus not only be seen as the natural choice in extension of our interpretivist research paradigm, but also our subjectivist ontology and epistemology.

While Saunders et al. (2008) argue that grounded theory involves the testing of one's findings, we in this research do not follow the data all the way to the end by testing it. The main reason for that is that this is solely an exploratory research. As addressed in section 6.1, the objective here is to find the variables that motivate or keep people from using smart speakers. The objective is not to build the causal linkages and relationships between the variables, which would take an explanatory research. Suddaby (2006) points out six misconceptions of grounded theory, one being exactly what Saunders et al. (2008) points out about the testing of the data. Suddaby (2006) argues that while the mix of qualitative (in our case finding the variables) and quantitative (the possible testing of causal linkages between the variables) methods should always be encouraged where it makes sense, there must in all cases be a strong connection between the research question and/or objective, and the method(s) used (p. 636). In other words, if it, in terms of one's research question and objective, does not make sense to test the data quantitatively, then it is not encouraged. Suddaby (2006) also refers to the fact that an interpretivist research, like this, will seek to enlighten the reality that is both internally and socially construed within the research subjects, hence why a quantitative (or realist) attempt at creating objective and measurable 'laws' of linkages does not make sense in that regard: "*the purpose of grounded theory is not to make truth statements about reality, but, rather, to elicit fresh understandings about patterned relationships between social actors and how these relationships and interactions actively construct reality*" (p. 636). Summarizing, it is in any case where it makes sense encouraged to mix the quantitative method with the qualitative. Where it, in regards to the research question and/or objective, does not make sense, it should not be done. Our research falls in the latter of those two scenarios.

In his 2006-text about the misconceptions that he has experienced of grounded theory, Suddaby reveals that one of them is that many seem to simply not address their methodology used – or even not use any at all – and that "*it becomes clear that the term 'grounded theory' was interpreted to mean 'anything goes'*" (p. 640). While we adopt grounded theory as a research strategy, we surely do not discredit or leave out the addressing of methodology. We acknowledge that the choice of methods is of great

importance, because these methods will ultimately provide us with the empirical evidence needed to achieve a fulfilling and valid answer to our research question.

While we use two different methods within the qualitative research spectrum, our research thus takes the form of a multi-method qualitative study. The use of multi-methods can be advantageous if the combination places the researcher in a better position for him or her to answer the research question fulfilling (Saunders et al., 2008). We argue that our choice of not only conducting semi-structured one-to-one interviews, but also a focus group, first and foremost provides us with a substantial amount of data, that potentially triangulates itself, ultimately placing us in a better position to answer our research question in the most fruitful way. In section 6.6.2, we will address the choice of the interviews in detail.

5.3 Population and Sampling

In the following section, we will address the thoughts and process of defining an adequate population and a respective sample and sampling method.

5.3.1 Population

In defining what population is fitting for this specific research, we look at what is the core of the research phenomenon in question; voice assistants embodied in smart speakers. We here look specifically at what was also pointed out in the motivation for this research; the fact that voice assistants are said to close in on reaching their peak of hype, and that we will see a full reach of productivity within 5-10 years (Gartner, 2017). With the nature of the technology and its current state in mind, we thus note that the technology is still emerging, and that the population must then be of persons that live in an area where emerging technologies are even present and available to purchase, and an area where such technology will possibly integrate thorough when the technology is mature. Denmark is here seen as a suitable country. Furthermore, we note that the population must be in an economic situation where the purchase of such technology would even be a possibility. We here note that Danish students with the common governmental support and young professionals generally find themselves in such a position. Lastly, we note that the population must cover people who are in an age where this technology is still being adopted and found interesting. Lastly, we considered an age group in which people are also likely to obtain and equip their own home in the near future, where the purchase of smart furniture and home devices may play a role. Based on these arguments, we ultimately define our overall population as students and young professionals located in Denmark and between the age of 20-30.

5.3.2 Sample

While it would not only be a practically unbearable task, but also too time and money consuming, to include the whole of the defined population in our research paper, we instead sample from it. Sampling is a way of achieving insight into a whole population without actually having to include it in the research, and whether the study makes use of interviews, questionnaires' or something else, the importance of picking the right sample is equal (Saunders et al. 2008: 212). In picking a sample from our defined population, we made use of *purposive sampling*, which enabled us to select informants based on our own judgement of how able they would be to give us the insight needed to thoroughly answer our research question (ibid: 237). By picking out our own desired informants, we acknowledge that the generalizability will be flawed at best. On the other hand, we argue that the method allows for us to reach maximum diversity in a rather homogenous population. This ultimately allows us to at least speculate on generalizability based on empirical evidence, rather than not being able to generalize at all, which had been the case if we sought to collect statistical evidence. Thus, we have sought to sample from both ends of the age spectrum of our defined population, as well as from both students and young professionals.

While purposive sampling is a non-probability sampling method, meaning that some possible research subjects have had a higher chance of being picked than others, we, as said, acknowledge that we cannot generalize statistically on our populations based on our findings within the sample. In order for us to do that, we instead would have to make use of probability sampling method, where everyone in the defined population would have an equal chance of being picked (Greener, 2008: 48; Saunders et al. 2008: 213). We argue that for an exploratory research like this, wherein we seek to identify the factors that motivate and keep people from using smart speakers, non-probability sampling is suitable. This is mainly based on the fact that this is a qualitative study where focus is on the phenomenon in question, the voice assistants in smart speakers, not the users themselves per se. Greener (2008) argue that in a qualitative study, "*the focus will not be on trying to estimate things about a population, but in trying to understand or relate the data to theory or ideas.*" (p. 53). This is indeed true in our case. This also means that our sample is of a size that most likely could not be used to generalize for any population, unless that population is very small, which is not the case in our research. In other words, doing a qualitative study makes it hard to generalize for the population, even if a non-probability sampling method was used. Saunders et al. (2008) argue that, based on that, probability sampling is often associated with mostly quantitative studies, e.g. survey or experimental studies (p. 213). While the findings of this research do not allow for itself to be applied to the whole of the population, we still believe that our sample selection will be able to give us a true and fruitful picture of at least a decent proportion of the population because the defined population is to some extent homogenous.

5.3.4 Participants

Saunders et al. (2008) argue that the size of one's sample depends on the research question(s) and the objective of it. In terms of numbers, they argue that for a research with a fairly homogenous population, as in the case with ours, 12 will be a sufficient size (p. 234). In deciding on the final size of the sample, we, though, also had a monetary limit since every informant would have to be equipped with a smart speaker on our expense. Thus, we chose to pick out 10 informants in our sample. In order to address the claimed diversity within the sample, all 10 informants are presented here:

No.	Name	Age	Occupation	Nationality	Device
1	John	24	Student	Norwegian	Echo
2	Kasper	26	Unemployed	Danish	Echo
3	Stefan	25	Full-time employment	German	Home
4	Miriam	24	Student	Danish	Home
5	Mathias	25	Full-time employment	Danish	Home
6	Michael	30	Student	German	Echo
7	Mikkel	30	Student	Danish	Home
8	Rebecca	23	Student	German	Home
9	Andrea	21	Full-time employment	Danish	Echo
10	Michele	23	Student	Italian	Echo

Table 1: Research participants

5.4 User Tests

As part of our research, each participant was handed a smart speaker with a voice assistant built in. For this, we acquired five Amazon Echo Dot's and five Google Home Mini's. The main intention of

providing the participants with devices was to enable them to have first-hand experience with the research phenomenon, ultimately providing us with very rich and valid empirical evidence in the goal of achieving an answer for our research question. Devices were handed out at random after each pre-test interview. The participant was asked to use the speaker for anything that he or she found it both natural and useful for, and to use it as much as he or she liked. The participant was thus not forced or required to use it for specific tasks. Had we made specific tasks and guidelines for our participants, the study would naturally have moved towards being an *experiment* study. While experiments seek to study the causal links between independent and dependent variables, this was, as explained earlier, not the intention of this research (Saunders et al. 2008: 142). The intention here was find out what the actual variables are, and in doing that, actual hands-on use of the devices was found to be a natural choice.

Participants were asked to use the devices for four weeks. While some might argue that four weeks is not enough time to thoroughly introduce a smart speaker into one's home and every day, a study from 2010 concludes that user's overall experience with an interactive product is only marginally different after six months of usage compared to four weeks of usage (Karapanos, Zimmerman, Forlizzi & Martens: 2010). In conjunction with the fact that the time frame for this research only allowed for so much user experience, we found four weeks sufficient in this regard.

5.6 Data Collecting

In obtaining the empirical evidence needed for us to create a well-grounded basis for our analysis, we used two different methods; semi-structured one-to-one interviews before testing of the devices was initiated, and a focus group interview as well as semi-structured one-to-one interviews the four week testing had ended. In the following section, we will explain and reason the choice of these methods.

5.6.1 Pre-use Interviews

Before handing out the device to the user, we conducted a short one-to-one semi-structured interview. In a semi-structured interview, the researcher will have a range of predefined questions and overall themes that are to be covered during the interview though the interview will not be limited to or by these questions and themes. This means that some questions might be rephrased, rearranged or even omitted during the specific interview depending on how it evolves (Saunders et al. 2008: 320). A semi-structured interview is also called a non-standardised qualitative interview, and these are well used in exploratory studies where they allow for the researchers to make the users elaborate on certain things, or 'probe' specific answers, where further explanation is needed. This correlates perfectly with our

interpretivist epistemology, by which it is important for us to understand our users and their answers (ibid: 324).

The reason for conducting these short semi-structured interviews before the actual testing was mainly to get an understanding of who the user was, what his or her experiences with voice assistants were, and also to get an insight into his or her expectations towards them. The questions asked were thus framed around three themes: the user, his or her experience, and his or her expectations. This information enabled us to address the relationship between the users' expectation and their experience on actual empirical grounds. The alternative would be to try to address the expectations in the focus groups after the testing, which we argue would provide us with a flawed intel, since this would arguably be influenced by the actual usage of the device.

5.6.2 Post-use Interviews

After having our 10 participants use their respective devices for four weeks, each participant was called in for a post-use interview. In order to fully exploit the fact that we had 10 participants available to us, and thereby the possibility of obtaining diverse empirical evidence, we decided to conduct one post-use focus group interview and five individual post-use interviews. Triangulating the data in this way gives the researcher security in that the data set is reflecting what you also think it is reflecting (Saunders et al. 2008: 146). In other words, we wanted to be sure that what came from either of the methods of interviewing was true and understood by us in the correct way. Using the same structure and type of questions in both the focus group and the individual interviews gave us this security. How they were conducted will be explained in the following sections.

Size of focus group

Saunders (2008) argue that there are three principal ways of conducting an exploratory study. One is via a search of literature; another is by interviewing experts in the field. The last is by conducting focus groups (p. 140). A focus group is defined as a group interview where the subject topic is precisely defined and where focus is on initiating an interactive discussion between the participants (ibid: 343). By conducting interviews in groups, this method is thus a quick and effective way of gathering valuable data that is not only to some extent structured, but also detailed and stimulated by the participants themselves (Bader & Rossi, 2002: 2-3). While this research paper follows the interpretivist paradigm and thus takes upon a subjectivist ontology and epistemology, we believe that the use of focus groups facilitates the best insight into the thoughts and opinions that are created both subjectively and socially in the interaction between our research participants. How exactly our focus group was conducted will be explained in the following section.

Before conducting a focus group one must first consider what the size of it should be in order to fully exploit its potential. The question of group size is widely discussed within literature, and it is hard to find one right or wrong answer to it. Saunders et al. (2008) suggest that focus groups typically includes four to eight participants, whereas Bader & Rossi (2002) suggest between 10-12 (p. 15). The pool of participants available to us was the size of our sample size, 10 people, narrowing the potential group size to between four and 10.

We decided on conducting one focus group with five persons in it. The idea here was that having a somewhat low number of five person in the group would allow for more speech time for each participant.

Structure of interviews

Halkier (2012) argues that conducting a focus group in an organizational or institutional setting might not be socially recognizable for the participants and can thus influence the interaction because participants are then less relaxed (p. 36). In order to achieve the maximum level of interaction between our participants, we conducted the focus group as well as the individual interviews at our private homes. Participants for the focus group were invited to meet up 15 minutes before the start of the interview with the hopes of them using the 15 minutes to meet and greet each other.

For both the focus group as well as the individual interviews, the structure was the same: Participants and the facilitator were sat at the table, and the recorder began the recording on a cellphone as well as a computer so that a backup was secured, should one of the recordings fail. Following the agenda proposed by Bader & Rossi (2002), the interview started with an introduction of the facilitator and recorder. The general goal of the session as well as the research was explained, and participants were then informed that the interview was being recorded. Participants for the focus group were asked to introduce themselves briefly.

It is often valuable to have participants write down their thoughts and feelings on the topic before asking questions. This probes the participant into focusing on the topic and expressing his or her feelings (Bader & Rossi: 2002: 24). With this is mind, we made the participants in the focus group do a combination of what Colucci (2007) labels as *ranking* and *pile sorting*. With ranking, participants are either provided with a predetermined list of items or produce them themselves. The items are then ranked by each participant, which creates a great basis for discussion. Ranking is a powerful tool for generating data, and they provide the facilitator with great inputs for discussion. In our case, participants

were asked to each write down their top three motivating and top three demotivating factors in their use of the smart speakers. The first person was then asked to place the cards on the table and explain why he or she had written that specific factor down and why it was ranked as it was. The next person was then asked to also place his or her cards, not according to the ranking, but according to already placed similar cards. This task was based on pile sorting, in which items are placed according to their similarity or differences. By getting our participants to explain not only why one factor was more or less important than the other, but also why it was similar to already placed cards, we probed the participants into thoroughly discussing and sharing their opinions.

Having all the cards placed on the table based on their similarities and differences, the rest of the agenda was initiated. Where our pre-written questions had not been answered by the discussion during the placement of the cards, these would be brought up by the facilitator. Ultimately, our interview guide was fully answered as a result of discussion initiated by participants themselves and by us asking the leftover questions. The transcriptions of the focus group as well as the individual interviews can be found in Appendix 11-16.

Type of questions

In his addressing of typical misconceptions about grounded theory, Suddaby (2006) points out that researchers often think that using grounded theory is equivalent to totally neglecting existing theory. He argues that it is first and foremost not realistic to totally disregard what you already know. He states that while the reason for forgoing existing literature might be that the researchers want to discover something completely new, it was never the intention that grounded theory meant ignoring existing literature completely. The danger is that "*unstructured research produces totally unstructured manuscripts that are unlikely to make it past the desk editor at any credible journal of social science*" (ibid: 634). The goal is thus to find the practical grounds between using existing theory and obtaining new raw data (ibid: 635). While our goal was to obtain our participants' honest and true opinions and meanings about the factors that motivate and demotivate them from using a smart speaker, we sought to keep the agenda for data collecting structured and based on correct grounds. We thus chose to frame our research guide around our review of existing literature in the fields of voice assistants, technology acceptance models and UX. By framing our questions around the basis of this, we believe the obtained data is richer, because it stems from literature, but is not a direct copy of it.

The interview guide used for conducting the focus group as well as the individual interviews consisted of three main questions that we saw as initiators of discussion. Bader & Rossi (2002) argue that three to four main question with two to three follow-up questions each is an adequate number of questions,

and the three questions were thus only the main questions (p. 24). The hope was that the participants would automatically cover all the remaining questions and themes we had in mind. In case that would not happen, an extensive list with probing questions were at our hands. Before asking questions, we as facilitator and recorder introduced ourselves and our research. The agenda and ground rules were then addressed. With an intention of creating a relaxed environment for the focus group, the participants for that were asked to briefly introduce themselves too. While people often have valuable afterthoughts, the interviews were ended by asking the participants if they had anything on their mind which had not been addressed (Bader & Rossi, 2002: 24). The interview guide can be found in Appendix 18.

5.6 Processing the data

In processing the data retrieved from the interviews, Attride-Stirling's (2001) method of *Thematic Networks* analysis was used. Attride-Stirling (2001) argues that while there has been a rise in the popularity of qualitative research, not a lot of tools for analyzing the qualitative data has been made available (p. 385-386). The presentation of the thematic network was thus an attempt at closing this gap, and Attride-Stirling (2001) argues that a thematic analysis can advantageously be made via, and presented as, a "*web-like illustrations (networks) that summarize the main themes constituting a piece of text*." (p. 386). In her presentation, she provides a 6-step guide which for this research was followed from start to finish. The guide requires for all of the field work as well as transcribing to be done prior to the analysis, and as such, this was done. For this, we used VLC Media Player[1] as a tool for playing the audio recordings at a slower speed while the transcribing was being done manually. In the following section, we explain how we came from raw text to analyzable networks of data.

5.6.1 Thematic Network analysis

Attride-Stirling's (2001) guide for creating the *web-like* networks of the data is construed by six steps, and each step was followed as suggested. The first step was coding the material. This meant first establishing a coding framework, which can be done either via theory or by the recurring themes within the data. While this research is based on grounded theory, we read through the data and established codes based on what had been discussed in the interviews. All text was then dissected using these codes. Step two included extracting the themes and then refining them. This was done by looking at the text segments in the different codes and then extracting general themes. The themes were defined so that they would be non-repetitive and still broad enough to be covering a notable segment of thoughts expressed in the interviews. This step allowed for us to take out some of the data that was redundant in terms of our research. The third and next step was creating the networks. This included arranging the

[1] http://videolan.org/

themes defined in step two, and making them *Basic Themes.* The basic themes were then rearranged into *Organizing Themes*. The organizing themes were then connected to one *Global Theme*. In the case of this research, we end up with two global themes; one for the pre-test interviews and one for the post-test interviews. These networks can be found in section 7.1 and 7.2 respectively.

Having constructed the networks, the 'true' analysis part of the thematic networks method began. Attride-Stirling (2001) explains this stage as one where the researcher goes "*deeper into the meaning of the texts*" and where "*the themes that emerged now have to be explored, identifying the patterns that underlie them*." (p. 393). This step was the first part of our analysis, where the two different global themes as well as their organizing and basic themes were all explained, painting a picture of all the data from the interviews. The fifth and second-last step was summarizing the different networks and patterns, which ultimately laid the grounds for the last step in which the researchers return to the "*original research questions and the theoretical interests underpinning them, and address these with arguments grounded on the patterns that emerged in the exploration of the texts*" (ibid: 394). With our research question in mind, the patterns and main takeaways from the data was then wrapped up as a final step of our analysis. The full analysis will be presented in the following section.

6 Analysis

Throughout this section, we will present the outcomes of the *Thematic Networks* analysis (TNA) that we conducted with the data. The data is made up of the transcriptions of 10 short interviews with the participants before they started using the smart speakers, five interviews with participants after the 4-weeks trial period, and one focus group with five participants also after the 4-weeks trial period. The analysis section seeks to explore the main themes that have emerged from our data. Following Attride-Stirling's (2011) approach, as addressed in section 6.6.1, we will present several *Organizing Themes* and explain and analyze their thematic components, the so called *Basic Themes*. In order to maintain high clarity throughout the TNA, we conducted two separate analyses for respectively the pre-testing data and post-testing data, and as such, they will be presented separately.

It is acknowledged that the data from the pre-testing interviews is inevitably based solely on our participants' thoughts and beliefs about the product before actually using the smart speakers. While the overall objective of this research necessitates actual hands-on use of the speaker, it is thus furthermore acknowledged that the data from prior usage can not directly and on its own move the research towards an answer to the problem statement. Still, we argue that the data holds information that is at least to some extent valuable for the process of establishing a full and well-rounded answer to the objective of this research paper, and to what initiated the thought of conducting this research in the first place; to find which factors motivate or demotivate the use of smart speakers, hereunder how the actual use of the speaker holds up against the participants expectations for it. We therefore allow ourselves to analyze on the data, but to treat it somewhat differently. Concretely, this means that we will analyze on and present all of the themes that were being discussed during the pre-test interviews, but only actively use and dig into what is important in reaching our research objective, this being the data revolving around the participants' actual expectations for the smart speakers. By giving this part more attention and focusing less on topics like data privacy and price, we argue that we will ultimately be able to give a richer answer to what factors motivate and demotivate the continuous use of the smart speakers, while still acknowledging that other themes were discussed in the interviews.

Equally or not, it is argued that both parts are important in determining the factors that motivate and demotivate the use of smart speakers. Both parts will thus be presented in the following section. In the discussion section, the themes are compared and opposed, and underlying connections and patterns will be discussed in order to concludingly present the condensed factors.

6.1 Pre-test Network Analysis

In the assessment of the data retrieved from the pre-test phase, we identified one major organizing theme, this being *Expectation.* For this part, we further identified four different basic themes. The theme of *Expectation* makes up the most fruitful one of the pre-test-interview themes. Besides, we identified five basic themes, which were also themes discussed within the interviews, but strike us to be of lesser importance. The five basic themes are *Privacy and Security, Prior Experience, Price, Brand*, and *Tech Knowledge.* As we acknowledge above, these are of lesser importance according to our research objective and will thus receive less attention. The five themes are all grouped within the organizing theme *Influencing Variables.* In the following section, the two organizing and their related basic themes will be explained in order to explore and understand any underlying themes in the data from the pre-test interviews.

6.1.1 Expectation

The theme of *Expectation* is made up of all the data revolving around the expectations that our participants had before getting their hands on the smart speakers and is thus completely independent of the actual use of these. The theme encompasses four basic themes, respectively *Impact, Usefulness*, *Ease of use*, and *Use cases*, and the data that make up each of these basic themes will be explained and analyzed in the following sections.

Impact

First of the basic themes is *Impact*. This theme covers the user's expectations to the amount of impact that the use of smart speakers will have on their everyday lives. The overall take away from this was that most of the participants did not expect the smart speaker to have some groundbreaking impact, but that they did expect for it to at least make some things easier. Andrea specifies an example of things as "*putting on music without using your phone*" (App. 5). Also, Rebecca, Kasper and Michele see the smart speakers' potential in easing some things in their everyday lives from the get-go, whereas John, Miriam, Mathias, Stefan, Michael and Mikkel all see the clear potential, but are unsure whether or not this potential will be redeemed at this time rather than some time in the near future where the technology is more mature. Notable in this regard is the expectations of the impact of smart speakers in the future, which near all participants agree will be significant. Rebecca states that she only sees the full potential being fully exploited "*in the future and especially in regards to smart homes, when you can connect the device to your heating and your lights and maybe even your cameras in the house.*" (App. 8). This notion of smart homes is also pinpointed by Andrea, John, Mathias, Michele, Miriam, Michael and Stefan, who all express how they are certain that the technology of voice assistants will inevitably have

an impact in the near future. It is thus noted that the general opinion is that voice assistants, whether in a smart speaker or not, will undoubtedly have a remarkable impact on our lives in the future, but only a smaller part of participants expect that to happen with the smart speaker models used in this research.

Usefulness

Closely related to expected *Impact* is the expected *Usefulness* of the device. Usefulness in this regard refers to the extent the participants expect the device to be useful in their daily lives. That is, will the functionalities of the device make it actually useful in completing tasks that the participant normally does in his or her life. A majority of the participants expected the device to be at least to some degree useful. The general expectation was that for everyday tasks, the device would definitely be useful. When asked about what he thought he would be using it for specifically, Kasper said that "*something like weather forecasts, and maybe if it could check up on dates*", just as Michael said that he "*will definitely try to get the weather forecast* [and] *try to connect it to* my *music account*" (App. 2, 9). The general expectation was that the smart speaker could be useful for simple and daily tasks as aforementioned, and none of the participants expected to use it for larger and more complex tasks. Mathias specifically addresses this: "*You shouldn't have too high expectations, because it probably doesn't do all these complicated things. It should be quite simple stuff you tell it if it should be useful*" (App. 1). It is thus noted that seven out of 10 participants expected the smart speakers to be useful to some extent for daily simple tasks, while the last three participants - John, Miriam, and Andrea - did not really expect the smart speaker to provide much usefulness even for these simple tasks. Nevertheless, all ten participants were generally excited to start using the device.

Ease of use

Moving forward to another recurring theme in the pre-test interviews we determined *Ease of use*, which in this context refers to expectation of how easy the smart speakers will be for the participants to use. There was a clear consensus that the participants expected both Google Home Mini and Amazon Echo Dot to be easy to set up and to operate. Rebecca notes that she believes it is "*designed so that the setup is super easy and quick and that you will understand everything super easily*", just as Kasper expects for it to be "*rather quickly* [to] *get started with"* (App. 8, 2). John also believes it will be easy to use, or "*at least setting it up"* and goes to make the statement that he does not "*think there will be a problem at all"* (App. 10). All participants expressed that very opinion. Miriam explained that her expectation of the ease of use was because "*it's Google*", whereas Andrea noted that while the devices do not have screens, naturally they would be made so that they were intuitive and easy to use (App. 3). Kasper explains that because he does not have to take his phone out of the pocket to complete tasks, the smart speaker will be easier to use than the phone, and Stefan too says that he expects for it to be

straightforward to start using. Thus, it is noted that all of the participants expect the devices to be easy to set up and operate.

Use Cases

Another significant theme within the pre-test interviews were the expected *Use Cases,* meaning the users' beliefs about what they would actually use the smart speakers for. As already addressed within the theme of Usefulness, an overall expectation was that smart speakers could be used for basic and simple daily tasks. A majority of the participants mentioned checking weather forecasts, controlling music, and also setting alarms. These rather simple and daily tasks made up a noteworthy part of the expectancy towards the use cases, but another significant theme in this context was the use of the smart speaker in connection with other smart devices. As addressed under Impact, a majority of the participants expected that the full potential of smart speakers could only be realized when one's home would be equipped with a range of smart devices which the speakers could connect to and interact with. Some participants already had some other smart devices at the time of the interview, and they expected to be able to use the smart speaker to connect them. Miriam mentions that she may be using it to control Netflix via her Google Chromecast, which is also mentioned by Andrea. Rebecca also states that she expects to connect it to her "*Spotify account and* [her] *TV*" (App. 8). Connecting the TV and thus controlling streaming services is also mentioned by Mikkel. It is noted that the participants who already own smart devices have a strong belief that they will be able to connect it to the smart speaker. At the same time users expect to use the device for daily and non-complex tasks such as checking the weather forecast, controlling music, and so forth.

Looking at the organizing theme of *Expectation* as a whole, it becomes apparent that the participants' expectations for the smart speakers is considerable moderate. There is a general consensus on the expectation about an easy set up and simple operating, but when it comes to the of the actual number of use cases of the devices, it is clear that the participants do not expect to use the smart speakers for not much more than weather forecasting, controlling music, setting alarms, and some also for controlling televisions. Seeing as the users are limited in their expectancy of what they are going to use the smart speakers for, inevitably the view of the devices' overall usefulness is limited as well, even though seven out of 10 participants did expect for it to be useful in one way or another. Looking at what type of general impact the participants then expect for the smart speakers to have on their lives, it makes sense why only a portion of them believes that this impact will be significant at the time of this research, whereas the rest of them believes that impact will only be truly felt when the technology of smart devices is more matured and integrated into the other devices they are using at the time.

6.1.2 Influencing Variables

The organizing theme of *Influencing Variables* covers all of the discussed themes that were not directly pin pointers of the participants' expectation, but more so influencing variables. While we have argued that these variables are not necessarily equally as important as the actual expectations, we at the same time cannot neglect the existence of these themes and believe that the fact that our participants discussed them must be a sign of them having an influence on their expectations. We will therefore analyze and present these themes, but not dig too much into them with the fear of allocating resources on something that does not assist us in reaching the research objective.

Price

First of the basic themes is *Price*, which refers to the actual market price of the product and the participants' thought of that. Although none of our participants actually paid in order to use their smart speakers – as they were provided by us – we believe that price is still an important factor for any end user of a technological product. None of our participants was aware of the actual cost of the devices, thus all of them believed the two smart speaker models to be (far) more expensive than they actually were - e.g. "*I'd say around 1.000 DKK would be my first guess. I haven't looked it up, but that's my guess*", Mathias said (App. 1); "*Around 750 to 1000 Kroner for the cheap model I'd think*", was Kaspers guess (App. 2); "*200 dollars",* said John (App. 10). Being confronted with the actual price, most paticipants stated that they had higher expectations for the product if it was more expensive. "*Definitely. If it's 1.500 DKK I would definitely expect it to work really well, and if it's just a couple of hundred Kroner, then I wouldn't think much of it, I think*", said Andrea, which was backed by Rebecca who said that "*it's just logic that if it costs more it will be better"* (App. 5, 8). However, most participants also claimed that in the face of a lower price, they would expect the hardware of the product to be worse rather than the voice assistant technology: "*I think the value proposition is the same. It's just better speakers*" (App. 6). It thus seems that price is influencing the level of expectation that people have towards smart speakers and its performance.

Brand

The brand name and awareness seem to also somewhat influence the expectation of the participants. If the brand is known to produce high quality products then this consequently raises the expectations of users in regards to smart speakers. Answering the question about the basis for his expectations, Mikkel said "*Google. I have faith in Google. I think their products usually work really well"* (App. 4). Respectively, Michael also mentioned his positive expectation towards Amazon's Echo Dot: "*especially because it's a big name behind. You are used to that they are delivering"* (App. 9). Rebecca added that her expectations stem from "*good marketing*" (App. 8). Furthermore, Mikkel and Stefan

mentioned that the manufacturers would not gamble with their reputation by releasing a product that users would not like. "*So I have quite a big faith in that Google would not put something on market that could ruin their brand"* said Mikkel, with Stefan expressing the same point: "*As far as I know Google, it will work very, very well because if they would publish a device with such a big media attention that would not work they would* [shoot themselves in the foot]. *So, I think it's working quite well*" (App. 6). We conclude from this that the more prominent a brand is and the more positive associations' users have with it, the higher are the expectations about a new product, which thus makes brand name an influencing factor.

Tech Knowledge

The next identified theme is *Tech Knowledge*. This theme encompasses the data revolving around the tech savviness of the participant and how this influences their perspective on smart speakers. It derived from our interviews that the understanding of technology in general – and knowledge about voice assistant technology in particular – plays a role when people build their expectations about smart speakers. All of our participants had at least a fairly good understanding of technology, with Mikkel, Michael and Stefan being very interested, and Michele being "*an absolute prosumer*" (App. 7). It appeared that most of our participants did not believe that the voice assistant technology in smart speakers would greatly outperform already existing voice assistants, with Rebecca stating the following: "*I think it's not different to Siri*" (App. 8). However, participants seemed aware of the different application fields: *"I wouldn't say that Alexa is better than Siri, but Alexa is made by Amazon and its purpose lies in the smart home and Siri is made for your phone. So I would say different: Yes"* (App. 7). With regards to the performance of smart speakers, the general notion was that it "*isn't a new technology anymore, it's been around for years and is being developed all the time by many companies"* (App. 1). Being asked about the main differences smart speakers would pose to regular smartphone voice assistants, Michael said that he thinks "*the mobility is the biggest difference",* while Kasper highlighted the easy accessibility "*because I don't have to take my phone out of my pocket*" with Mathias adding that the "*microphone will be much better*" (Appendix 7, 2, 1). It appears that knowledge about technology has an effect on what users think about new technology and takes part in shaping their expectations.

Prior Experience

Closely related to *Tech Knowledge* is the theme of *Prior Experience*. Within this theme, we pooled all user data regarding prior use of voice assistants and smart speakers. Nine out of 10 users had made prior experience with Siri on their phones or other devices, while one had used the Google Assistant on his phone before. Only three participants said they had predominantly positive experiences, with only

Michele stating that he is "*using it a lot on my MacBook*" (App. 7). On the other hand, only two out of ten participants had made actual hands on experience with smart speakers before, while six participants had at least heard or read about it. It seems that a good or bad prior experience influenced peoples' attitude and expectation towards smart speakers. John, who had used both Siri and Google Assistant, stated that "*I have prejudices against these kind of* [smart speakers] *because they don't always work and when that's the case it becomes more of a hassle than really a utility I think."* (App. 10). On the other hand, Michele reported that because he is happy with the range of functionality that Siri offers, he does not feel the need for a smart speaker. Similarly to *Tech Knowledge*, the user's prior experience with the technology influences his or her thought process about smart speakers.

Privacy and Security

Considering the 'always listening'-function of smart speakers, the fact that data privacy as well as security was discussed throughout the interviews came as no surprise. All of our participants were well aware of the 'always listening'-function and the fact that they would place the speaker into their homes for four weeks. Interestingly, only two participants exerted some concerns about their data privacy and security. John said it is scary *"that everything is recorded and is sent to respective companies"*, and Rebecca that "*the technology is quite new so it can be hacked*" (App. 10, 8). The other participants believed that a smart speaker would not pose a risk that a smartphone or a laptop would not already do. "*I already have a smartphone and I have some sort of idea that if Google or Apple wants to listen, they already do"*, Mathias said *(*App. 1*).* This was the general consensus; that participants did not think that the smart speakers would result in more of their data being recorded than already is.

Concluding on the thematic network of the pre-test interviews, we noticed several interconnections and overlappings among the organizing themes. First of all, *Price* and *Brand* seem to be somewhat interconnected. While it became clear that users associate a lower price with lower quality of the smart speakers, some users argued that a lower price does not necessarily mean that the product will be worse based on the fact that "*it's a huge company* [Google] *that makes it, so they have economies of scale that makes them able to offer it for a lower price, compared to a smaller company who would have to set a higher price"* says Mathias and goes: "*So, I still have high expectations even though it's half the price of what I thought"* (App. 1). Thus, the brand name and reputation obviously justify lower prices at the same level of expectation. "*If you look at some of Google's other products that are also relatively cheap, e.g. the Chromecast, they work perfectly"*, says Mikkel, further establishing this point (App. 4). In addition, it seems that users are more willing to accept a lower price (than expected) if they have the impression that the brand will offer more products, features, and services that go with the smart speaker. Stefan said: "*I think actually Google tried to offer us to the product to a little price as possible because*

in the end this is an upselling opportunity to get the speakers into as many like homes as possible. And in the end they can actually build up some business models based on having these things installed" (App. 6). In our case, the two sample brands – Google and Amazon – are widely recognized for both being very reliable manufacturers of technology related products and services, as well as offering a wide range of these same products and services. At the same time, both Amazon and Google are known for their economies of scale and the resulting cheap prices for their products. Arguably, customers of these companies are thus likely to be less influenced by product pricing than customers of new tech companies. Moreover, the notions *Tech Knowledge* and *Prior Experience* are interrelated. A user who is knowledgeable in the area of voice assistants and smart speakers most definitely has had prior experiences with either technology. On the other hand, not everybody who has tried out those technologies necessarily has to have a great understanding of technology. In addition, *Tech Knowledge*, *Prior Experience* and *Brand* also seem to be somewhat connected to the organizing theme of *Expectation*. Many of the participants expect the smart speakers to be easy and intuitive to set up and use because "*it's Google*" (Miriam, App. 3) or Amazon. Mikkel also says that he expects the Google Home Mini to be set up via the Google Home app, which he has used before in relation to his Chromecast device. Participants' prior experience and their degree of brand awareness thus seems to be an influencing factor on at least some parts of the expectation towards the smart speakers. Interestingly, even though participants think the price for smart speakers is cheap and they respect and trust the manufacturers, they still do not expect smart speakers to have a very big impact on their lives. This seems to be a result of *Prior Experience*, in which it became clear that a majority of participants only had experience with the Apple assistant Siri, and that these experiences had not made a positive impact on them. Thus, the expectations were only moderate for these smart speakers, which was made clear in their expectancy towards the actual *Use cases*, where participants expressed that they only expected to use it for non-complex tasks such as setting alarms, weather forecasting, and controlling music. For the participants who had either prior knowledge or experience with smart devices, they also expected to use the smart speaker for connecting to those, but this did not affect the overall moderate expectancy towards the smart speakers.

6.2 Post-test Network Analysis

Having assessed the empirical evidence collected from the pre-test interviews, focus is then turned towards the post-test interviews. In relation to these, six organizing themes were identified, these being *Sociality, Usability, Data privacy, Price, Hedonics,* and *Usefulness*. For the organizing theme of *Sociality*, *Private* and *Public* were two basic themes that emerged within. For *Usability*, the identified basic themes were *Functionality*, *Personalization*, and *Malfunctions*. For *Usefulness*, the basic themes

of *Functions*, *Ecosystem*, *Locality*, and *Accessibility* were identified. *Fun* and *Personality* were basic themes identified for the organizing theme of *Hedonics*. The complete identified network can be seen in Figure 9. In the following section, each organizing theme and its basic themes will be analyzed with the intention of enlightening all potentially motivating or demotivating factors discussed in the interviews. The ultimate goal of this it to identify the factors that actually motivate or demotivate the use of smart speakers. In addressing this, any underlying patterns and structures will be brought to surface as well. The order of the themes shown in Figure 9 and as listed above is completely random, and the themes will be addressed in a clockwise order starting with *Sociality*.

***Figure 9**:* Thematic Network of possible variables identified in the interview

6.2.1 Sociality

One of the topics that was discussed during the interviews and focus group was the experience our users had when using their smart speaker in the presence of other human beings. We labelled this organizing theme *Sociality*, which is comprised of the basic themes *Private* and *Public.*

Private

Under this theme, we collected all experiences that our users reported when they used the smart speaker in a private setting – which we defined as smart speaker conversations involving the users themselves and close friends, family or cohabitants. Given the fact that smart speakers are naturally placed into a user's private facilities, most of the conversations were and will be held in a private setting; however, it seems that already the presence of a well-known relative influences the way users think about and engage with smart speakers. It emerged from the data that most users enjoyed using the speakers with their friends. Mathias and Miriam agreed that "*there's something social about it*" and that the smart speaker is a great tool to be used in a conversation in order to fact check things and settle discussions (App. 11). Within that context, Andrea thought that "*it is a bit like a party gimmick*" and Michael adds to that point and says that when friends were around, they would actively engage with the speaker and think about "*Okay, what could I ask her?*" (App. 11). However, he also said that it is mainly "*because it is quite new and not many people are having it at home*" (App. 15). Mathias affirmed the same thought, but also noted that "*the next time the same person comes, the show has gone a bit. Then you've gone through it"* (App. 11). It could thus be argued that once the technology is more common, this initial social exploration of the technology will become less. The data also showed that once other people in the users' private environment were supportive of the smart speaker and were curious to try it out, this would have a motivating impact on our participants. Rebecca stated that "*one of my roommates was very excited about me having the device and wanted to use it all the time. It might have influenced me to be more curious about how it works*" (App. 14). On the other hand, if the social environment was neglecting the speakers it seemed to discourage users to keep using them. Andrea talked about confusing situations in which her roommate "*repeatedly asked who I have talked to*". Similarly, Kasper explained that his girlfriend told him to "*stop talking to Alexa all the time*" and John said that "*sometimes I called Alexa and my girlfriend thought I was talking to her. Or I called my girlfriend and Alexa was responding* [...] *so my girlfriend really didn't like it and was getting annoyed. So I think she was a reason why I didn't use it as much in the end*" (App. 11, 16).

Public

Under the public part of *Sociality* we aggregated all impressions that users had when using smart speakers in front of strangers or people that do not belong to the primary layer of friends and family. Throughout the focus group, our participants agreed that it is not (yet) acceptable to use voice assistance in public. Mikkel revealed that it "*requires a bit that everyone else also understands what it is you're talking to. And I don't feel they would understand that today.*" Mathias added that "*it may be in 5 years that it's the standard that people say "Hey Alexa" or whatever you say.*" Miriam and Mikkel agreed

that "*that's crucial* [...] *if it's going to be useful. It requires that things go hand in hand together*" (App. 11). Consequently, almost all of our participants agreed that it is awkward to talk the smart speaker when other people are listening. Only Michele claimed that even though one of his roommates was rather supportive and the other one rather negative, he "*didn't really feel influenced*" (App. 13). Miriam mentioned that the awkward feeling was amplified whenever certain functions of the devices did not work properly: "*It had been playing music, and then I would ask it to turn off, and it just didn't bother. And then I stood there and shouted at it in English in front of some colleagues, so that was a little awkward*" (App. 11). Rebecca shared the same point by saying that "*it's quite weird to talk to it and then it is even more weird if it also doesn't understand you.*" Shen then further added that there is "*a difference if people know that you have the device or they don't know. Because if they don't know they might be surprised that you just start talking and think that you are a bit crazy"* (App. 14). Another interesting point was made by Andrea who said that "*if it was something everyone used, you would know what it could do",* meaning that more popularity of smart speakers would increase their overall usefulness because people would copy others and learn which use cases make sense and which functionalities work well (App. 11).

Summing up the *Sociality* theme, we can say that our participants did indeed see their speakers as a social product, which can be used in many entertaining ways with friends, and which enriches conversations, and can even be used as a "party gimmick". While this is likely to be accurate for the first encounters that one's friends or family have with the speakers, it is likely that this initial enthusiasm wears off quite fast (see *Fun* in section 7.2.5). Additionally, we found that the private social environment can encourage or discourage people from using smart speakers. With regards to public use of smart speakers, it emerged that our participants did not feel that it was acceptable to use smart speakers in public yet and that talking to it in front of others triggers a feeling of surprise and often awkwardness. This feeling is reinforced if the product is malfunctioning during the use in front of others. Lastly, our users described a certain network learning effect, which means that once more people possess and use smart speakers each individual user would benefit from the experience of others.

6.2.2 Usability

One of the main discussion points during our data collection revolved around the *Usability* of the smart speakers. Hereunder we identified three basic themes, these being *Malfunctions*, *Personalization* and *Operability*. These will all be addressed in the following section.

Operability

This theme contains all data concerning the functional operability of the smart speakers. Most of our participants found it easy to talk to the device and have their spoken words transformed into the correct commands. Mikkel mentioned that he was "*impressed by how good Google Assistant was in understanding speech"* and that it could even understand his English "*with a fairly thick accent*". Andrea said that "*it's a hugely impressive software",* adding that she has "*been playing around with programming such a voice recognition software myself, and it is brainlessly difficult"* (App. 11). Stefan agreed on the good performance of the language processing while noting that in certain cases one needs to formulate instructions in exactly the way that it has been trained for in order to get things right, e.g. "*Ok Google, play song xx by artist yy from Spotify*". He states that he has no problem with adapting his speaking style but that "*for old people that's probably quite important*" (App. 12). Our users also mentioned that with increasing use it was impractical and cumbersome to use the activation phrases. John noted that he "*had to say Alexa all the time to continue speaking*", which interrupted the natural rhythm of the conversation, and Mikkel said that "*it was a quite annoying with Google that you have to say "Hey Google" or "Okay Google". It's super long*" (App. 16, 11). Mathias also wished for the conversation to go more smoothly and naturally so "*that you don't have to do anything extra or spend extra time on it"* (App. 11). Furthermore, our participants addressed the visual signals of the smart speakers. While Michael liked the visual feedback the speaker gave - e.g. when adjusting the volume - Michele reported disturbing light signals during the nights, where the speaker visualized incoming messages by an orange circle around the device. However, Michele was the only participant who experienced such a problem. Additionally, our users reported some confusion about the visual signal on top of the speakers, which appears once the device has switched to listening mode. Mathias "*noticed that every time I speak to it, I look at it to see if it reacts"* and Kasper said "*I have had skepticism sometimes, for example, that I look at it like 'Is it actually listening to me right now?'"* (App. 11). Both shared the opinion that this often feels annoying and counterintuitive. This indeed seems to be a problem considering that the situations in which voice assistants is ought to be used are hands-free situations, meaning situations in which the users are busy doing something else, e.g. cooking or washing the dishes. It can be argued that the uncertainty about whether or not the smart speaker has been triggered takes away part of the freedom that it was supposed to bring to the user in the first place.

Malfunctions

As with any technological device, errors and breakdowns can occur and worsen the users' experiences. All data about the functionality problems that our participants faced during their testing period is collected under the basic theme *Malfunctions*. While none of our participants complained about general technical problems with the speakers (e.g. the device turning off, overheating etc.), most of them faced

certain functional problems in one way or another ranging from changing or turning off the alarm clock (Rebecca, Mathias) and connecting calendars (Rebecca, Michele) to the device not being able to find obvious search results. The latter was mentioned several times with regards to music search. Kasper reported that he sometimes would try to play music by a "*great musician and pronounce it well, and then it says 'I don't have anything with him' and goes to say a completely different name",* and Andrea exemplifies that when she was looking to play songs by Elton John, the speaker would answer *"'Elton John is not in my library', even though I know that if I go in and find it on Spotify, then it can easily play it"* (App. 11). This is an interesting point considering that our participants also seemed to be impressed by the natural language understanding and processing skills of the smart devices. The question is why this technology works perfectly fine when somebody commands various things with a very strong accent, but then does not work in cases where a popular song by a famous artist is being pronounced correctly and also asked in a way the speaker should understand. Furthermore, users mentioned that the microphone did often not trigger when there was a lot of background noise, which especially gets frustrating when music is being played from the device. Mathias describes the situation where one would hear "*music from it, and then you stand there and shout at it, and it doesn't answer*", and Mikkel calls this "*a huge problem*" (App. 11). This seems to be particularly critical considering that music seems to be one of the main use cases of the speaker (see *Use Cases*). Some of our participants reported that their speaker would listen to one person better than to another in the same household. Andrea mentioned that "*we had a thing where it would always understand what my boyfriend said, but not what I said"* and Miriam added "*I have also experienced that, and I don't know if it's because it has gotten used to the voice of my boyfriend and so when I come, it doesn't recognize me"* (App. 11). While both Google Home Mini and Amazon Echo Dot do have a function that lets the user personalize their voice ('Google Voice Match' and 'Amazon Your Voice'), both of these functions need to be actively set up and trained on the specific voices. Interestingly, neither Miriam nor Andrea set up a personalized voice recognition feature. Furthermore, also our third female participant Rebecca "*had a lot of difficulties, which was mainly that the device didn't recognize my voice correctly"* (App. 14). Considering that all of our female participants possess a fairly high-pitched voice, we therefore assume that the current smart speakers are more easily triggered by a deeper tone of voice and might miss certain higher pitches.

Personalization

The last basic theme that makes up *Usability* is labelled *Personalization*. This theme covers all information regarding the degree to which participants experienced or wished the smart speakers and their functions to be personalizable. The main notion was that participants appreciated personalized information and feedback of the smart speaker, however, they had the impression that the devices most

of the time gave "*predefined answers to everything*", as Andrea expressed. Kasper used the example of when one asks the speaker to come up with a story and it does not relate to one's interests. In particular, he mentioned that *"it also has the ability to ask 'what's up?' and then it can give one story, but it's often something completely unnecessary about something with a boy in Lithuania who has found something or stuff like that".* Andrea wished for a personalization of the activation phrase to be able to personalize the experience. She said "*if you could call it something, you would definitely be able to personalize it. Like, if it was some Danish name"* (App. 11). This also links to the topic of *Personality* under the organizing theme *Usefulness*. It became evident that our participants were somewhat annoyed when the speaker answered them in a general way with limited or no personal relation or context. Mikkel commented that the information provided by the smart speaker "*has to be interesting to you. It may not be that we think the same things are interesting, so it's got to understand what it is you're trying to get it to help you with"* (ibid). While most of our participants had a positive attitude towards personalization, it seems that many of them were not aware of the already existing functions. Mathias mentioned that *"it might be nice just to say 'Google, please update me, and then you just got the five things you had programmed it to inform one about"* and several of the other participants agreed (ibid). In fact, however, both Google Home and Amazon Echo offer such functions known as *routines*, as Mikkel pointed out. Furthermore, Mathias said that it would be nice that "*if you have kids, you can go in settings and say that's limited to this. And then you can help yourself to manage what it really could. For example, if you think naughty jokes are fun, then you can get it to tell those"* (ibid). In addition to this point, many of the participants in the focus group agreed without being aware that both Google and Amazon offer several safety and child protection functions in their smartphone applications. In combination with the voice recognition and voice persona building features, a parent user can control, toggle and personalize the contents that each other user has access to. From this, we take two things. First of all, personalization is definitely one of the main topics for users who want to enjoy an experience tailored down to their needs and interests. Second of all, as we noticed within other themes already, users either actively complained about having too little introduction to the speakers, or just passively express that they do not have any knowledge about the range of functions and possible use cases of their speakers.

Wrapping up the organizing theme of *Usability* it is concluded that in terms of *Operability,* participants were impressed with the level of language understanding and processing and appreciated that the speakers would understand them even if they communicated in a second language with it. However, our participants mentioned that conversations were cumbersome at times because the activation phrase had to be said each time before they could exert a command or continue the conversation. This supposedly caused annoying interruptions of the natural flow of the conversations. Finally yet

importantly, the participants complained that they often did not know when the smart speakers started to listen after the activation phrase had been said. In order to know, they had to look at the device and see if the LED lights on top of the speakers had lightened up. In terms of *Malfunctions* our participants reported no technical problems but several minor and major functional issues. One of the most disturbing ones was the fact that music search, while being praised as one of the strongest functions of the speakers, often did not work properly. It seems that sometimes the command to play well-known artists or songs would trigger something completely different. Moreover, our participants mentioned that the microphones of the speakers would often not react once the device played music, which paradoxically is a core feature of the device. The malfunctioning of the microphones was thus labelled "*a huge issue" (Mikkel)*. Lastly, our female participants experienced some problems with triggering the speakers, while their male partners or roommates were able to do so. We could thus assume that the microphones of the speakers are more prone to react to lower pitched tones. However, this requires a controlled audio test. Speaking of *Personalization,* our users agreed that it improves the experience with the speakers significantly if it exerts personalized answers and feeds random information with background knowledge of the users. Our users reported that they were not under the impression that the speakers would do this by default. On the other hand, most users were unaware of the daily routine personalization functions or certain child protection settings they could use. We conclude again that there is a lack of introduction to the core functions and settings of the smart speakers.

6.2.3 Data Privacy

Another organizing theme is one that gathers all thoughts and experiences of our users regarding *Data Privacy*. Even though this theme has been a topic throughout the analysis of the pre-test interviews already, it again appeared to be a major discussion point for our users after they had used the devices. First of all, we have to mention that out of the sample population there were two people who did not want to participate because they were not comfortable with having the speaker in their apartments. Consequently, this means that most of the people who participated in our research naturally did not fear any data privacy breaches, which in turn is a limitation to this section. However, all the users within our sample were aware of the potential risks and most of them shared the same explanations why this would not discourage them from using the device. The most expressed opinion was that an abundance of companies is tracking, collecting, storing and utilizing user data on the internet and offline, and therefore our participants had the feeling that they have nothing to lose. Stefan said: "*Facebook knows everything about me and so does Google so there is nothing to find out",* and John explained "*that with all the devices we use and the stuff we share and like on social media makes us quite transparent already so I don't think this is getting to another level with smart speakers"* (App. 12, 16). Mikkel joined in by saying that *"they* [Google and Amazon] *know, in one way or another, it all"* and added that it's up to

"the legislators that should step in and do something" (App. 11). It can be argued that the legislators are indeed taking data privacy issues seriously as the recently released GDPR shows. Rebecca claimed that "*what I am saying here could not be of any use*", however added that she "*might not use this in a professional environment, where there is information that shouldn't be available for other persons"* (App. 14). Also, Michael said that he would not use it in situations in which highly sensitive information is being talked about: "*something like my bank details I didn't talk that out loud*" (App. 15) The questions here is whether or not a user always has the speaker in mind when living their daily life and in case of sensitive conversations would mute the speaker or leave the room. Out of the ten participants, there was one who claimed that data privacy is a factor that would definitely stop her from purchasing a smart speaker. Andrea mentioned that with recent events such as the Facebook data scandal or the activation of the GDPR (after which she was able to see all information that Google stored about her) she would "*never ever buy such a thing out of pure paranoia, no matter how good it was"* (App. 11) This is interesting because she was fairly open towards the speaker when we interviewed her prior to using the speaker and therefore changed her opinion drastically within a few weeks.

Drawing a conclusion on data privacy, is it acknowledged that while our sample was biased in the way that people who have severe problems with data privacy did not participate in the research in the first place, most of our users were aware, but cared only very little. The main notion was that with their daily presence on the web and on social media, companies know everything about our users anyway. Nevertheless, our participants hinted that they would hesitate using the speaker in a professional setting where sensitive information is being handled and they would try to not exert private information in presence of the speaker. Out of the 10 participants, there was one person who stated that she would not buy such a speaker because of data privacy concerns.

6.2.4 Price

As pointed out in section 7.1.2 under *Price*, it is acknowledged that the participants in this case have not paid for devices that they used (though some have bought them afterwards) which possibly affects their view on the device and its price. However, we still believe that the discussion of price is not only interesting, but also relevant in either case. At the time of conducting this research, the cheapest Google Home Mini available in Danish online stores is priced at 55 EUR, while the cheapest Amazon Echo Dot is priced at 68 EUR.

From the data, it is clear that the majority of the participants found the price to be fair and to some extent even cheaper than they initially thought. "*Really? That's cheaper than I thought*", said Andrea when made aware of the actual price of the Echo Dot again, and Mikkel promptly agrees: "*Yes, that's*

not a lot" (App. 11). Miriam too states that the price of it is lower than she thought: "*I really think it's quite cheap because it can do all this stuff a normal Bluetooth speaker can't do*" (ibid). Both Mathias and Kasper agree on the price being relatively cheap, while Michael, Stefan, and Michele all think that the price is adequate. Michael states that he believes "*it's a good value for the price*", hinting what Michele explicitly states: "*I think it's reasonably cheap* […] *but I think I would be willing to pay 150 EUR instead of 60 EUR and be able to receive a little bit more*" (App. 15). From this, it seems that the participants do not necessarily think that the devices outperform their price tags, but that they are priced fairly according to what they can do. Stefan makes that exact point when he states that "*the price is alright because it's quite cheap and therefore you get a working piece of technology. But I think if I'd buy it privately I would go for the bigger version with a better speaker.* […] *But I think 60 EUR is a decent price*" (App. 12). Only two out of the 10 participants, John and Rebecca, thought that the devices were not worth their price. Rebecca states: "*I think that right now the device is not useful enough so that it would justify the price*" (App. 14). When asked if he thought the device (Echo Dot) outperformed its price, John said "*I definitely don't think so*", and when asked to put a price tag on it, he answered: "*Maybe 30 EUR. At least for how it performs right now*", which is under half of its Danish retail price, whereas Rebecca priced it (Home Mini) at 40 EUR which is 15 EUR off (App. 16, 14).

Wrapping up the interview data revolving the prices of the devices, it is clear that the majority believes that the price is either cheap or at least fair. Only two out of 10 did not think the price was justifiable in terms of what the device could offer them in terms of usefulness at the current time.

6.2.5 Hedonics

Turning focus towards another theme that was being discussed within the interviews, we encounter *Hedonics*, which in the case of this research covers all data regarding the factors that influenced the participants' psychological feelings towards the smart speaker. Having combined all the data regarding this, it was clear that the participants expressed their opinions on mainly two matters: One being the feeling of having fun using it, the other being their feelings towards the personality of the two different assistants, respectively Alexa and Google Assistant. Each of the basic themes, *Fun* and *Personality*, will be addressed in the following section.

Fun

Both Alexa and Google Assistant offer different types of humorous actions, such as joke telling, games, quizzes etc. During the interviews, it became apparent, though, that this part was not a motivating factor in the long-term use of the smart speakers. Instead, it seemed as if the fun factor was only motivating in the initial use of the speaker. Michael said "*In the beginning I tried it a lot.* […] *So, for a couple of*

minutes that is fun, but then I never did it again. So, it keeps you interacting in the beginning" (App. 15). Michele makes the same point in his interview: "*I played a game called 'Yes Sire', which I found was really interesting. But that was only to a limited extent*" (App. 12). Rebecca also makes the point that it can be fun to a limited extent: "*It can be fun to ask it what's this and that in another language or if you ask it questions you can have some fun with it. But for me the fun is limited*" (App. 14). Several people mention this point of getting fun out of trying or testing out the speaker. "*It's a little fun to test. 'Tell me a joke' and such things,*" Andrea says, which is backed by Kasper who says "*For now, it's just been fun to figure out how much she really can*." (App. 11). Mathias exemplifies this clearly when he says that every time a friend, who had not seen the speaker before, came to his home, they would sit and interact with it for fun for 1,5-2,5 hours: "*But once you've done it once, then the next time the same person comes, the show has gone a bit. They you've gone through it*." (ibid). Generally, there is a consensus between 9 out of 10 of the participants that while the fun factor of the speaker is there and is entertaining to some extent, it is not something that affects the long-term use of the speaker. Rebecca even goes to say that "*Fun is not important*" (App. 14). It is thus concluded from the interviews that the 'fun factors' only offer a smaller motivating effect in the initial stages of using the speaker, where in the long term it does not affect the use remarkably.

Personality

Another recurring theme within the interviews was the personality of the two assistants, Alexa and Assistant, to which the participants also had a noticeable opinion towards. Stefan addressed this theme by saying that he did not feel any specific personality from the assistants, and that personality did not really matter for him: "*I am not trying to build a relationship here*", he says (App. 12). Michael makes that exact point as well: "*I think in my situation right now I wouldn't benefit so much from it* [having a personality]" (App. 15). Rebecca extends this point and says: "*I think it needs to be a neutral personality*" (App. 14). John too states that it while it would be fun to be able to change the style of the assistants' interaction, "*in the end it would just be a gimmick*" (App. 16). The general opinion from the participants was that while the personality of the assistant was not really neither a motivating or demotivating factor, it would be convenient to be able to change it according to the users' preferences. Several reasons for this is given. Stefan says: "*For me this a tool, and I don't want to become friends with it. But old people would, maybe? I guess there is a lot of potential for people who have dementia or something similar. But it's not important for me*" (App. 12). Michael too makes this point: "*When it comes to elderly people or people who are sick or disabled and need some company,* [a personality] *can be beneficial*" (App. 15). Several times during the focus group, Kasper made the point that he had a hard time being commanding towards his assistant, Alexa: "*I really should get used to command it. I think that was a bit – not over the line – but unnatural at first.*" He later expressed how he would have

a hard time getting used to that but points out the reason for that: "*But it may be because it has a name. It may be such a little thing that gives it a personal aspect*" (App. 11). He later states that he would like to have had the ability to change the attitude of the assistant in order to really get to use the smart speaker. Michele expresses that it does not matter to him if the smart speaker has a personality or not, and that he did not even feel that he ever was talking to something human-like, which Mikkel also states. It is thus quite apparent that while the personality of the assistants was something that our participants had strong opinions about, most did not think that it was neither a motivating or demotivating factor though. A large portion of the participants did seem to express the point that the possibility of changing the assistants' personality, or even removing it completely, would make sense to implement. Either in facilitating more use - as Kasper would if he could turn the personality off and thus not feel as commanding – or by strengthening the personality so that it could give a feeling of company for e.g. elderly or demented people.

Wrapping up on the organizing theme of *Hedonics*, it is concluded that for basic theme of *Fun*, the vast majority of our participants did not find this a factor motivating long-term use of the smart speaker. It is worth noting, though, that aspects of having fun with the speaker can drive usage in the very beginning, and afterwards only periodically. As for the basic theme of *Personality*, the majority of the participants did not find this be a facilitator of long-term usage of the smart speaker, though a portion of them did see the potential in being able to modify the personalities. In the case of one of our participants specifically, it seemed that the personality of the assistant actually caused less usage of the smart speaker. Thus, it is concluded that personality of the assistant in the case of the population of this research does not facilitate usage.

6.2.6 Usefulness

Looking at what other themes were discussed within the post-use interviews, it was quite apparent that a lot of them had to do with the *Usefulness* of the device, which thus made another organizing theme. Usefulness here refers to how useful the participants perceived the smart speaker to be – or not to be – in regards to what the participants had either anticipated or wanted it to be useful for if they were to continue using it. The organizing theme was made up of four basic themes, these being *Accessibility* – how accessible the smart speaker and its assistant was, *Ecosystem* – how connectable the smart speaker was to other devices, *Locality* – how helpful the smart speaker was in regards to local information, and lastly *Functions* – the degree to which the functionalities of the smart speaker made it useful. Each of these basic themes will be thoroughly walked through in the following sections.

Accessibility

First of the basic themes is *Accessibility*, which was a recurring theme within the interviews. A general opinion voiced was that the placement of the smart speaker in the participants' home had a remarkable influence on how much and how it was used. In the focus group, Mathias said: "*It was placed in my room, so you can say that that also has a lot to say, I think - where it is.*" In further explaining this point, he says: "*If it's out in the kitchen, the other people I live with would also use it, and then it will be used for some other things.*" At another point in the interview, Mathias mentioned that he had used the smart speaker for making a shopping list, but the placement of the smart speaker had shown to make some issues for that: "*It's also in the kitchen you are when you figure that 'Well, we need sugar, butter, let me add that to the shopping list'. You don't do that when you're in your room. So, such a feature also dies if you are in the living room*" (App. 11). It is clear that this participant has found it difficult to find that one spot where he would get the most of out of the smart speaker, which as such has made it less useful to him. Stefan too addresses this when talking about if he had used the smart speaker in any professional context (school or work), for which he said: "*I tried once to read my calendar, so I guess that could be used in a professional way. But as it is positioned in my living room, it's not really meant for any professional purposes. But I think there are ways* [to use it in a professional context], *but then you need to reposition it*" (App. 12). The position of the speaker is yet again pinpointed as an obstacle for some use cases, lessening the usefulness or the speaker. Kasper says that to him, it was a clear limitation in terms of how useful he found it: "*I really think it's a limitation that you have to keep close* [to it] *and talk to it very clearly*," he says and elaborates:" So*, one way or another, you're still limited to one device instead of just talking to the room and feeling sure that you're being heard and understood*" (App. 11). Here he refers to the possibility of the microphone being positioned everywhere that the user might be at a given time, which seems to be something that would make it much more useful. Mikkel addresses the fact that his thoughts of its usefulness were also affected by the placement of the smart speaker: "*I have also had it placed in the bedroom, which may have made a difference. I need to be able to talk to it all the time*" (ibid). Michael expresses the fact that while he did use his smart speaker, his flat mates did not really get any use out of it because of its placement: "*My flat mates didn't really use it. I showed it to them, but I had it in my own room*" (App. 15). Not being able to talk to the smart speaker from everywhere also turned out to be an unpleasant experience for John who said: "*Sometimes when it was connected to my Sonos speakers and I tried to call Alexa it wouldn't understand and so I had to yell through the whole room which was not really pleasant*" (App. 16). Looking at the participants' opinions toward this issue, it becomes apparent that the usefulness of the smart speakers would be greater had it been accessible for interaction at more than just one location. Reflecting on the future of the technology, Mathias said that once it becomes something that "*one can use in more and*

more places" and once the technology "*becomes smart enough* […] *then I guess that's something that becomes a bigger part of one's daily life*" (App. 11).

Ecosystem

Anther basic theme under the organizing theme of usefulness is *Ecosystem*. The term ecosystem here refers to the ability – or lack of, for whatever reason – to connect the smart speaker to other smart devices. This was a widely discussed topic and seemed very important to the participants. Every participants voiced their opinion on this, and it seemed as if the ecosystem is one of the major contributors to the usefulness of the device.

When talking about how participants had connected their smart speakers to different devices, a number of examples were given. Mikkel said: "*I just think it's very cool to manage a smart home; put on some music, put a series on Netflix or something like that*". Miriam too exemplifies it: "*I think it's very cool that it just turns on the TV and switches* [channels on Netflix]. *That it's set up for that*." Mathias agrees with that exact point: "*My television is old and not a smart TV, and I just put the Chromecast in and it turned on. It just worked. I was very pleasantly surprised,*" he says (App. 11). John found it useful to connect the smart speaker to his home sound system: "*And I thought it was cool to connect it to my Sonos System*" (App. 16). When talking about the importance of having a working ecosystem around the smart speaker, John says that that is what he considers the main point of the speaker: "*Otherwise it's just a toy that you can talk to, but it does not bring much benefit into your life. It's not enough to work as a stand-alone product. Or at least it's not enough to make you use it for a long time*" (ibid). A vast majority of the participants point out this notion of how much the speaker could or would be used, had the participants had more devices to connect it to. Michael said that in order for him to use it more, he would need to have some more connections, which he later exemplifies as things like heating or lighting (App. 15). Andrea makes this exact point and says: "*I would not need* [the smart speaker] *right now, but I could imagine if I had a home with a TV and with different lights in different rooms and with air conditioning.. If I had, like, an American mansion, as it's clearly built for, then it clearly has many uses*." Miriam agrees on this point and says that it would only make the most sense to keep using the smart speakers if one had a house where "*everything is set up*" (App. 11). Rebecca also states that she found it less useful because she could only use the functionalities that did not have anything to do with connecting it to other smart devices: "*I think* [connecting it to other devices is] *fundamental to fully exploit all features and possibilities of this device*." She goes on to hint that right now the smart speaker is redundant to her: "*Currently it's an extra item I use which is not integrated in my daily life at all and integrating external devices would change that definitely*" (App. 14). Rebecca also states that she would like to try using the smart speaker in connection with other smart devices, but that she would have to

go out and buy these other devices, here making the same point as Andrea; that while you do not already own an 'American mansion', i.e. a house that is already equipped with a range of smart devices, then the usefulness of the smart speaker is lowered (ibid). Stefan too makes the point that without it being connected to a range of other devices, "*then for me it's not a very powerful thing. But if you could control all things in your daily life with it then there is no way to circumvent it anymore*." He says that the usefulness for him decreased a lot based on the fact that he did not have many smart devices and goes to say that the real motivating factor in continuous use of it is found in building an "infrastructure" of devices; the ecosystem. He says that by then you could also integrate it into e.g. cars, which is something Mathias also pinpoints (App. 12, 11). Mathias at one point says: "*I also think it's a question of whether you have Phillips* [Hue] *bulbs at home that could control the light. That' also a huge advantage to use it daily. My brother has that. 80% of his bulbs at home are those you can control with voice command*", and interestingly, Mathias bought a smart speaker as a gift for his brother right after participating in this research (App. 11).

Based on the empirical evidence gathered from the different interviews, it is concluded that a greatly motivating factor in the continuous use of smart speaker is the existence of an ecosystem revolving around it. All of the participants specifically express how they either found the smart speaker to have less usefulness because of a lack of devices to connect it to, or how they found great usefulness because they had some devices already to connect it to. In extension of that, all participants also saw a wide range of use case possibilities in a future where everything is 'smart' and connectable.

Locality

Processing all of the data from the interviews, it was clear that a frequent theme was the local 'awareness' of the smart speaker. That is, to which extent it could assistant the participants with local information and thereby enhance the usefulness of the speaker. A basic theme under *Usefulness* is thus *Locality*.

As addressed in section 7.1.1.2, a majority of the participants expected to use the smart speakers for a thing like checking the weather forecast. It became apparent that the participants did actually use the smart speaker for just that. When asked about what he used it for, Mathias said: "*Asking for weather in the morning for example, it's nice to know if you have to put some extra clothes on and if it's raining*" (App. 11). While both Michael, John, Andrea, and Mikkel also mentioned that they used it for that, and that it indeed was a useful feature, it is also apparent from the data that the participants would want to use it for more local information than just the weather if it was to be really useful. In regards to that, Mikkel said during the focus group interview: "*It's lacking a little in Danish - some Danish news.*"

Kasper agrees to this and says. "*I would also need it to be a bit more updated in Danish. That's where I feel limited*." There is a general agreement across the table, and Kasper extends his point: "*E.g. 'Where do I get the best Thai food at Nørrebro?"*", to which Mathias suggests taxi ordering as a useful feature as well. Kasper responds: "*Yes, something like that. I would use it much more*", and also suggests asking for what concerts are taking place on a given night, and states that something like that would really make a difference in the usefulness of the device. Andrea also suggest the integration of grocery shopping on Nemlig.com via the speaker: "*I imagine some service where you had a weekly delivery, and then you went all week and talked to it, and then Monday afternoon comes all* [the groceries] *that you've talked about*". Mathias builds on this point and says that information of local traffic information would also be a great motivating factor for him (App. 11). While it is apparent, that the usefulness of the smart speaker and its assistant would be strengthened by a bigger knowledge of local stuff like events, dining, and groceries, it must also be acknowledged that neither the Google Home or the Amazon Echo was officially released in Denmark at the time of the participants using them. Giving Google and Amazon the benefit of the doubt in this case, one must assume that an official release would also mean the release of functionalities and information specific to that country. This assumption is based on the fact that for the countries in which they have been released, e.g. UK or Germany, the speakers indeed do provide locality-based functionalities like restaurant reservation, food ordering, news, and other local information (Amordeluso, 2018).

Rounding up on the basic theme of *Locality*, it is concluded that while the smart speaker only provided little local information seeing as it had not officially released in Denmark at the time of this research, participants still found this aspect of available information useful. A majority of participants expressed how the locality of the smart speaker would enhance their perception of its usefulness and thus enhance their use of it. *Locality* as a feature of smart speakers is therefore concluded as a remarkable motivator in the continuous use of it.

Functions

Last in the addressing of the organizing theme of *Usefulness* comes the basic theme *Functions*. In the processing of the data that sprung from the interviews, it quickly became clear that a lot of it revolved around the actual functions of the device, and how they motivated or demotivated the usage of the speaker. Numerous things were mentioned in this regard, and some of them also stretched lightly between different basic themes.

As pointed out earlier in section 7.1.1.4, the participants expected to use the smart speaker a lot for checking the weather, streaming music, and setting alarms. From the post-use interviews, participants

expressed how they had especially used the smart speaker for just that. It seemed as if the participants were quite fond of using it for these types of non-complex basic tasks. Michael says that for him, connecting it to his music provider not only worked "*quite smooth*", but was also the "*killer app*" (App. 15). Playing music turned out to be the most frequently used function between the participants, with everyone mentioning it as one of the things they used the smart speaker for. The general opinion gathered was that putting on music on the speaker was easier and quicker than e.g. via phone or a stereo. Besides music, Michael elaborates on the functions that he used when he mentions checking the weather, news, and trying to check the traffic, which did not work as well in Denmark at the time of this research (ibid). Rebecca also used it for setting timers as well as searching for information (App. 14). Searching for information is something Kasper also mentions in the focus group: "*I think it's educational. I have learned so much by asking for some things I didn't care about Googling*". Miriam agrees: "*I have too!*" Mathias used the same type of functions: "*asking for the weather in the morning e.g. It's nice to know if you have to put some extra clothes on and if it's raining and what else. So that's definitely something I use it for. And then I've used the timer function every time I've cooked*" (App. 11). Stefan also mentions that he used it for checking the news, linking it to his Spotify-account, as well as checking for traffic information in Germany, which worked well for him (App. 12). As mentioned, and concludingly, there was a general opinion voiced that the smart speaker provided a quick and easy way of completing non-complex and daily tasks such as checking the weather, setting alarms and timers, turning on music, etc. None or only few of the participants mentioned using the smart speaker for complex tasks such as connecting it to other smart devices (besides Google Chromecast) or shopping online.

Looking overall at the functions that the participants found most useful, and thus motivating in the continuous use of the smart speakers, a few things became quite clear. As addressed under the basic theme *Ecosystem*, participants' perception of the smart speakers' usefulness was hindered by the fact that they did not have many smart devices at home which it could connect to. This inevitably led to the participants using the smart speaker for more simple tasks as mentioned above; setting timers, playing music, reading news, etc. Furthermore, and as addressed under *Accessibility*, the majority of the participants expressed that the usefulness of the smart speaker would without a doubt be greater had it been accessible for activation in more than just the place where it was stationed. This would allow for the participants to complete their simple tasks more often and without having to move to wherever the speaker is. Even still, users did find the smart speaker quite handy in the non-complex tasks, and some even found it handier than using their smartphone. Given the fact that the overall perceived usefulness was also influenced a lot by the local information and awareness of the speaker - which was not even readily available at the time of this research, meaning that more of that will come with the official

Danish release - it is quite apparent, that the participants found, and will find even more, usefulness in the smart speaker. This is based on its degree of *Locality* and its assistance in effectively completing non-complex daily tasks. It must be noted, though, that according to the data from the interviews, the full potential of the speakers' usefulness is currently held back by a slight lack in local information as well as accessibility, which thus potentially could bring the usefulness of the smart speaker to even greater heights.

6.2.7 Interconnections of post-test network themes

When looking at the organizing themes of the post-test network analysis holistically, we identify certain interconnections and interrelations. Especially, the *Sociality* part seems to influence and correlate with other topics. Our participants reported that they recognized the hedonic value of smart speakers within a social context, agreeing that fun is either not a factor at all or only has a very short-term effect on the overall experience. Thus, there is a clear link between *Sociality* and *Hedonics*. Additionally, the fact that participants found it not acceptable to speak to the device freely in public and feeling awkward when using the speaker in front of others, we argue that this limits the use cases of the product and subsequently decreases the overall *Usefulness* of smart speakers. The mentioned enforced effect of feeling awkward once the device malfunctions in front of others lets us further draw a linkage between *Sociality* and *Malfunctions*. On the other hand, the aforementioned network learning effect - that is likely to occur when more people within a user's social context possess the device - would probably enhance the *Usability* of the devices. Eventually, there is a clear connection between *Usability* and *Usefulness*. We argue that through effective *Operability* – including perfect speech recognition and the possibility to converse in a completely natural manner – and an absence of *Malfunctions,* smart speakers will be utilized in a much larger variety of use cases, and thereby increasing the *Usefulness* of the products. However, it may be argued that the perfect *Usability* does not necessarily imply that the device is useful, but that a very poor *Usability* (e.g. basic language command functions not working) is likely to heavily deteriorate *Usefulness*. Lastly, we found that *Price* and *Data Privacy* have more of a moderating role and do not directly affect the other factors.

7 Discussion

Throughout the discussion, we aim to answer our research questions using the results of the Thematic Networks analysis. Given that our research objective was twofold, we seek to reach both objectives by addressing them separately. First and foremost, we will identify the factors that seemed to have the biggest impact on the utilization of smart speakers and determine which of the factors make people continuously desire to use the devices. We will seek to rank those factors according to their importance as expressed by the participants of this research, and finally propose the building blocks for a model of our outcome. As a second part of this discussion, we will address the position of our findings amongst existing theory and research about technology acceptance and UX. In addition, we will discuss our results concerning the gap between expectation and experience of smart speaker usage. Eventually, we will address the importance of this paper and discuss the changes and advancements that are happening in the smart speaker industry, and how this paper can be used for further research.

In order to grasp the whole thought process that people have around smart speakers, we conducted two rounds of data acquisition. Firstly, the data we drew from the pre-tests reflects the participants' expectations about smart speakers before they have actually used one of the products. In reality, these thoughts would influence the buying decision and can help us explain what interest's people have about smart speakers in the first place and what motivates them to purchase such a device. Secondly, by interviewing the same participants after they had used the products for a month, we gathered information about what motivates continuous use, and what drives them to either reject or continue using the technology after an initial phase of experimenting.

7.1 The Factors

Throughout the analysis, we identified several factors that potentially motivate and discourage people to use smart speakers. In this section, we want to rank these factors by their apparent importance from least to most, while we at the same time acknowledge that the nature of our research does not allow us to make indefinite statements, and that all outcomes need to be tested quantitatively.

"*Fun is not important*", as Rebecca stated, sums up the general attitude towards hedonics and its pettiness for long term smart speaker usage (App. 14). Through this research, it became obvious that users do not want their smart speaker to be a tool for entertainment or a gadget to kill time with. It is here assumed that this is a result of the fact that most people in the western hemisphere have enough entertainment possibilities in their lives already, with smartphones always by their sides, various social

media accounts, streaming subscriptions at easy access, and so forth. A smart speaker - which is supposed to help a user in his or her everyday life – then does not need to be an additional product for enjoyment. Moreover, with the current state of smart speakers and still several usability issues and limited use cases, people seem rather annoyed by the hedonic facets of the devices. It seemed that users took most of the artificial jokes, Easter eggs or gimmicks as a clumsy attempt of the manufacturers to cover up an only moderately working product. Additionally, it also became evident that people do not seek to engage in a deeper relationship with the assistant. The speaker is seen as a tool, and not more. However, we have to acknowledge that this might be completely different in culturally distinct markets.

Even though price plays a role during a buying decision, in this research this was not a factor since all of our participants were provided with the speakers without paying. Moreover, there is a large range of different prices for smart speakers, and we provided our participants with the lowest priced units of the respective product ranges. Nevertheless, it was found that price does play a role in influencing the expectations that people build before using a product. As our participants mentioned, a higher price makes them expect more of the product, while a lower price has the opposite effect. One can argue that once a user pays a cheap price for a smart speaker, he or she is likely to be positively surprised by what the product can actually do, and thus be more inclined to use it. On the other hand, one can argue that once a user pays a high price for a speaker, they are stuck with the thought to get value out of the product in order to make up for the financial price. However, most of our participants assumed that a lower priced smart speaker would differ from the more expensive models only in terms of hardware, while the software would be the same. And this is indeed true: Both voice assistants – *Alexa* and *Google Assistant* – exist in the form of a piece of code that can easily be stored in any device while the complex processing of all functionality takes place on external servers. Therefore, it does not matter which smart speaker model one gets; the smart function will just be as good in any of them. Assuming further that most users of smart speakers are most interested in the voice assistant technology, and have only secondary interest in the hardware, this lets us conclude that price does not have a direct effect on smart speaker usage once the device is already obtained. Its effect is, if any, moderating the relationship between expectation and experience.

While we in section 7.2.3 acknowledged that all the people who had agreed to participate in this research naturally would have no severe problems with data privacy in using the smart speakers, we still found it interesting how little the participants cared. Just one out of 10 participants said that issues with data privacy would make her not want to use the smart speaker, with all of the remaining participants expressing that the use of it will not make their private data more or less available to the 'big' companies like Facebook, Google or Amazon than it already is. As John said: "*all the devices we use and the stuff*

we share and like on social media makes us quite transparent already so I don't think this is getting to another level with smart speakers", which perfectly describes the general feeling that the vast majority of the participants expressed (App. 16). The only interesting concerns raised was by Rebecca, who stated that she would not want to use the smart speaker in an organizational environment where highly sensitive information could be said out loud, and by Michael, who said that he would not want to speak highly sensitive information into the speaker (App. 14, 15). We note here, though, that Rebecca did not express any wish to even move the speaker to her place of work in the first place, and that Michael did not say that this would discourage him from using the speaker. Concludingly, it is to be said that while the fear of having your private data taken by a given company might be a factor making you not want to acquire a smart speaker at all in the first place, it is not something that either motivates or demotivates the continuous use of the smart speaker.

One of the themes that did indeed reflect motivation or demotivation was the organizing theme of *Usability.* Here we identified that both the *Operability, Malfunctions,* and *Personalization* of the speaker will either motivate or demotivate the use of it. Within *Operability,* it was found that it is important that a conversation with the smart speaker feels natural at all times. This means that the assistant should not feel cumbersome to communicate with, which participants expressed it did because they had to say "Hey Google" or "Alexa" at the beginning of each sentence, even during an ongoing conversation. This hinders the feeling of having a natural conversation, especially in combination with the fact that some participants felt it was difficult at times to tell if the speaker had even heard them say "Hey Google" or "Alexa" and if it was thus listening to the sentence following. As for *Malfunctions*, the female participants also expressed how they felt that the smart speaker had difficulties picking up their specific voices. This too complicates the feeling of having a natural flowing conversation with the smart speaker, ultimately irritating and thus discouraging the participants. The feeling of having a natural and flowing conversation with the smart speaker was also a point under *Personalization*, where the participants expressed the importance of the assistant being able to personalize its answers, the information that it gave, and other functions.

Furthermore, *Sociality* appeared to be a major motivator for continuous use. It was found that our participants found the social aspect of the speaker very important in their use of it. Two themes were found within this - *Private* and *Public* - and for the first one, it initially became clear that the social aspect in a private context (with friends, partners, cohabitants, family etc.) can be a good facilitator of fun and use in the early stages of ownership, later resulting in a higher degree of perceived usefulness. Keeping in mind that participants expressed that they found a lack in introduction to the smart speakers' functionalities and actual use cases, which hindered their overall perceived usefulness of the speaker, a

well-functioning social aspect of the speaker thus seems to play an important role in actually kick starting the owners' own knowledge of all its use cases and thus mostly likely also a continuous use of it. It is thus apparent, that while it is important that the smart speaker is able to personalize to its primary owner's preferences, as has been addressed, it is equally as important that it facilitates use in a social context as well, as this can result in a thorough exploration of its use cases. And while it under the *Public* part of *Sociality* became very clear from our participants, that using the speaker in front of people not personally known by the participants was quite awkward, because they did not really know what or who the participant was talking to, a good facilitation of use in a social (private) context might actually help spread the knowledge of the smart speaker and its assistant, as well as its potential usefulness, which can then facilitate even more use by the smart speaker owner. Furthermore, the fact that it seemed that there was a networking learning effect where users would learn more about the use cases and usefulness of the speaker the more other people used and talked about it as well, it is argued that a facilitation of use in a social context will generally create a self-enhancing effect of knowledge, acceptance, and use of smart speakers in general.

Having in mind that users wish for more personalized content and settings, the task for the developers of the smart speakers then ultimately revolves around creating something that learns from and tailors itself to the owner of the speaker while at the same time opening itself up to be used in social settings. The key here must thus be finding the perfect balance for the smart speaker between being centered around its primary user while still allowing to be used in situations where the owner might not be the primary user at that time. Looking overall at what this all points towards, it is clear that users want the smart speaker to feel natural in the way that you use it; how you interact with it, how it responds to you etc. While users do not necessarily want for the assistant to have a specific personality, it is still important that it is a product that can understand and adapt to different situations, and thus understand and responds to its current users' wants and needs. While that is most likely a question of AI-technology being developed and utilized in its most beneficial way, it is argued here that once the AI-technology is developed to fulfill the needs addressed above, it must also be supported by easy and natural operationality of the software, and furthermore a high degree of quality hardware to eliminate malfunctioning.

Lastly, and thus the most important factor for smart speaker adoption and usage appeared to be *Usefulness*. The overall notion of our participants was that by its nature of being an "assistant", the primary purpose of a smart speaker should be to assist and help the owner with daily tasks and thereby make the life of the user easier. It became clear that once people do not see any usefulness in the product anymore, their usage of it drastically decreased. On the other hand, our participants mentioned that if

they find a useful application of the product in their lives, they could see how using it could become a habit for the long term. We identified four topics that determine the usefulness of smart speakers. Firstly, an available smart *Ecosystem* available to the user in order to fully exploit the power of voice control. This seems to be not the case in most of the households we were sampling from. However, with the current speed of development of the *Internet of Things*, smart furniture and more, the homes of tomorrow are likely to contain many more smart elements, making the smart speaker as its steering element way more useful. Secondly, *Accessibility* of the speaker in more than one location would greatly enhance its usefulness. This seems to be one of the bigger downsides of the speaker, as a physical device obviously is location bound and cannot be at different places at the same time. In order to be readily available throughout home facilities, vehicles and other places where the user is located, the voice assistant needs to be separated from a single device and able to be activated through many different devices and objects. One can thus argue if one smart speaker will be enough to be the center of a smart lifestyle in the future, where a digital assistant is supposed to be readily available in any situation. Thirdly, the degree to which the smart speaker considers *Locality* as a vital part of its service offers determines its usefulness. The more locally important news and information as well as third party services the smart speaker can offer, the more useful it will get to the user. The manufacturers of smart speakers hereby rely on local third parties to create useful services to its users. A challenge is therefore to incentivize the development of as well as the flawless integration of such services. Fourth, the range of *Functions* determines whether users find the smart speaker useful or not. Here it is noted, that users on one hand need to be aware of all the functions that the smart speaker has. On the other hand, the manufacturers should create enough use cases so that the speakers can be used in all life situations.

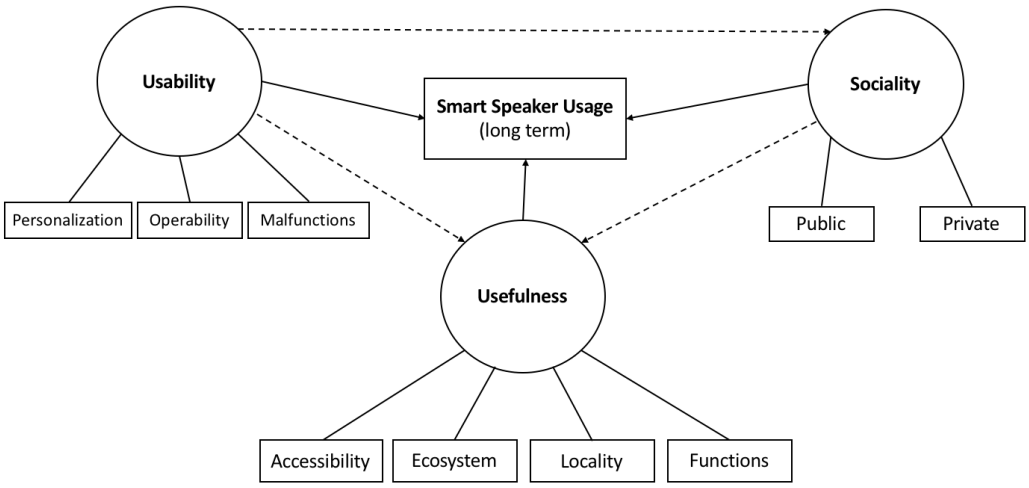

Figure 10: Thematic Network of variables influencing the long-term use of smart speakers

Figure 10 shows the factors - and their subcomponents - that we identified to have an influence on the continuous use of smart speakers. The solid arrows in the above model depict the direct effect of the three main factors on smart speaker usage, while the dotted arrows represent the relationship between those factors. The arrowheads imply the direction of the relationship. While each of the three main components, *Usability*, *Sociality* and *Usefulness,* seem to have a direct influence on how much people use their smart speaker, they also influence each other in certain ways. First of all, there is a clear connection between *Usability* and *Usefulness*. We argue that through effective *Operability* – including perfect speech recognition and the possibility to converse in a completely natural manner – and an absence of *Malfunctions,* smart speakers will be utilized in a much larger variety of use cases, and thereby increasing the *Usefulness* of the products. However, this correlating relationship seems to be much stronger in one direction: even the perfect *Usability* does not necessarily imply that the device is useful – however a very poor *Usability* (e.g. basic language command functions not working) is likely to heavily deteriorate the *Usefulness* of the smart speaker. Similarly, U*sability* has an effect on *Sociality*. If users struggle to operate the device correctly, or it malfunctions when other people are around, they are likely to feel embarrassed and will therefore avoid using the device in social settings. On the other hand, users seemed to be eager to show off their speaker to other people if the device works smoothly and reliably. Lastly, it was found that users find value in using the speaker together with others, or hearing about how others are using it, because that facilitates an exploration of the smart speakers' functions, creating a network learning effect. On the other hand, many participants found it not acceptable to speak to the device freely in public and feeling awkward when using the speaker in front of others. In real life, this limits the range of use cases and operating time and subsequently decreases the overall *Usefulness* of smart speakers. We thus argue that smart speakers could turn out to be less useful, the more people share a living space. However, this obviously does not necessarily need to be the case if the residents are very close friends or family. In either case, it is clear that *Sociality* has an influencing effect on the degree of usefulness.

7.2 Links to TAM and UX-models

While the research strategy of this paper has been grounded theory, the interview guides for the pre- and post-test interviews have both been partly framed by literature about different technology acceptance models such as the TAM's and UTAUT's, as well as theory about UX. One might raise the question of how the model presented in this paper actually differentiates itself from these 'general' technology acceptance models, as well as the theories about UX, and in the following section we will seek to discuss this matter.

When looking only briefly at the visualized models of the TAM's and UTAUT's, one might see multiple similarities between those and the model presented in this paper. A quick look at the TAM1 reveals that some of the variables from that are quite similar to the factors presented in Figure 10. In TAM1, one finds the variable *Perceived Usefulness*, which is directly comparable to the factor of *Usefulness* in Model 1, based on the fact that both of these seek to reflect the general usefulness that a given user finds in a technology or system. Furthermore, the TAM1 also present *Perceived Ease of Use*, which resembles what *Usability* seeks to reflect in the model presented in this paper; how well the user believes the system or technology is to manage. Looking closer at the 'evolved' TAM1, the TAM2, the external variables from TAM1 have here been explained as amongst other things being *subjective norms*, which refers to how the users' acquaintances think of the technology, and which also is a direct influencer on the perceived usefulness. In the model presented in this paper, *Sociality* is argued to be an indirect influencer of the usefulness that users finds in the technology, creating somewhat of a similarity between the two - and while one might certainly be able to point out different similarities, the model presented in this paper differentiates itself from the TAM's by an important fact; that it seeks to explain and predict the continuous use (after acquisition) of smart speakers in a consumer context, whereas the TAM's seeks to predict the acceptance of an technology prior to the acquisition of it and moreover in an organizational context. Not only are the contexts for the models then completely different, but what the two models overall seek to achieve is also different.

The issue with the TAM's only regarding organizational contexts was tried solved with the introduction of the UTAUT2 model, wherein Venkatesh et al. (2012) extended the original UTAUT model in order for it to deal with technology acceptance in a consumer context. While this is also what the framework presented in this paper seeks to do, one might ask what difference there is from the UTAUT2 to this? Just as with the TAM's, it is not hard to find similarities between the two, but we argue that the differences greatly overshadow any and all similarities. The work of UTAUT2 is based on one technology only, mobile internet, and seek to be applicable for all technologies. It can be argued that that is somewhat of a reach. The reach seems especially true while looking at this research, wherein some of the factors that UTAUT2 claim to be important in technology acceptance was found *not* to be important in the case of smart speakers. Where UTAUT2 states that the *Price* of using a technology (e.g. the price of internet or electricity) is an important factor, the price of using a smart speaker - which can be argued to be extremely low in terms of electricity and internet usage - was never even mentioned by the participants in this research. Most noticeable in this regard, though, is the factor of *Hedonic Motivation,* for which UTAUT2 based the inclusion of the factor on the fact that "*fun or pleasure derived from using a technology* […] *has been shown to play an important role in determining technology acceptance and use*" (Venkatesh et al., 2012: 161). In this research, this quote by Rebecca

summed up the general opinion towards the hedonic part of using smart speakers: "*Fun is not important*" (App. 14). While we do not want to dismiss the work of Venkatesh et al. (2012), it simply shows the difference between the two frameworks, where one seeks to predict the acceptance of a technology, where the other seeks to explain (and thereby predict) the *continuous use* of a technology (smart speakers). Ultimately, we return to the question of how feasible it actually is to try and make a general technology acceptance model based on one technology only?

At this point, we also want to explore how our model compares to existing UX theory, or at least certain excerpts of UX literature. Firstly, let us assess our model in the light of the four UX model commonalities, which Hornbæk & Hertzum (2017) identified. As a primary similarity, Hornbaek & Hertzum (2017) stated that most UX models separate pragmatic and hedonic attributes whereas pragmatic attributes are more important to the users. This corresponds with our research; while both pragmatic and hedonic attributes were something our users were referring to, it became apparent that the pragmatic attributes had a dramatically larger impact on users' motivation to use the product. This was made very clear by our participants so that our final model does not even include any hedonic values as factors for long-term usage motivation. Secondly, Hornbæk & Hertzum (2017) identified that beauty and aesthetics of tech products are a vital part in most UX models. Surprising and interestingly, our model does not include those values, which therefore do not play a major role in influencing continuous use of smart speakers. While the smart speakers themselves are naturally designed in an inconspicuous way, there is no visual interface where beauty and aesthetics play a direct role. One could perhaps apply these concepts to the conversation style, language and sound quality, but this seems to be somewhat incongruous. While this has not yet been a big deal in research, seeing as smartphone voice assistants always make use of the visual interface of the phone, it seems that UX needs to take a different stance when dealing with purely speech-based interfaces. Thirdly, most UX models incorporate the idea that the perception of different attributes changes over time. Hornbæk & Hertzum (2017) state that pragmatic attributes are more likely to be perceived differently before and after a product has been used. Hedonic attributes, such as beauty, are supposed to be perceived more or less the same over time. Our model does not explicitly make a statement about any changes of these factors – also because our research was limited in time and does therefore not suffice to draw such conclusions. Fourthly, most UX models have emotion at their core. Since our model simply depicts the factors that motivate smart speaker usage, references to emotions and affect are portrayed rather sub-textually. This meaning, certain factors obviously contain an emotional component, such as sociality being connected to the feeling of awkwardness and malfunctions being linked to anger, frustration and annoyance.

Furthermore, our model touches upon various elements of the models of Hassenzahl (2005) and Morville (2004), while having a different purpose. In our model, both *Usability* and *Usefulness* are directly influenced by the product features as described by Hassenzahl (2005). However, the user witnesses all features not in a visual but in an audible way, which makes the building of the apparent product character far more difficult. Additionally, the consequences of an interaction with a smart speaker are influenced by the display-less nature of smart speakers plus the fact that it is still a new way of interacting with a computer. It becomes clear that most classic UX models were built with a physical product in mind. While a smart speaker of course is a physical product, the real user experience starts when the speech interface is being used.

7.3 Expectation vs. Experience

With the identification of the factors that motivate and demotivate continuous smart speaker usage, we updated and extended the main part of Luger & Sellen's (2016) paper, which we see as one of the base articles for our thesis. We also want to build on their findings on the *Gulf of Execution and Evaluation*. While it is difficult to accurately quantify the level of expectation that our participants had, and compare it to an equally measured level of experience, the following obviously contains subjective assessment. Generally, the expectation of our participants towards smart speakers was moderate to high. Since all of them had experienced voice assistance on mobile phones before, they knew more or less what to expect about this kind of human-computer interaction. In addition, considering the poor user experience that many people had with the first generations of Siri, the expectation about the performance usability and usefulness of voice assistants has decreased significantly. At the same time, our participants argued that the technology is not new anymore and should therefore have improved compared to the first generations of voice assistants. Moreover, people determined that smart speakers are the first products that put voice assistance at the heart of the experience compared to a smartphone voice assistant, which comes as a byproduct to the actual phone. Therefore, the expectation towards smart speakers seemed to be higher than they were for the first generations of smartphone voice assistants. On the other hand, the actual experience that people had with their smart speakers can be described as moderate. Our participants claimed that most of the basic functions worked more or less well, with some functions, such as music control, being the "killer application". Also, the natural language understanding and processing was praised and highly appreciated. Nevertheless, people described several usability issues, and did often not find the product overly useful. Therefore, only the minority of our participants stated that they could see themselves using their speaker for a longer period. In terms of the *Gulf of Execution,* it is concluded that for simple tasks, the participants had clear mental models about how to converse with the smart speakers and what questions should be within their scope. This was mainly based on prior experience with other forms of voice assistants and probably basic instruction material and

promotional videos of the manufacturers. Nonetheless, for more complex tasks, our participants felt left in the dark as many of them did not know how much more intelligent the smart speaker would be to what they were used to. Similar to Luger & Sellen's (2017) findings, our participants reported that playful engagement of the smart speakers – e.g. giving cheeky answers or using irony and sarcasm – created unrealistically high expectations of the users. As Luger & Sellen (2017) describe, this is because the playful interaction function as affordances, which raise the users' expectations about intelligence, language, autonomy, judgement and social norms of the product. As a conclusion, we thus argue that the *Gulf of Execution* has slightly decreased compared to Luger & Sellen's findings in 2016. We believe this is mainly due to the improved mental models of the users, their lower expectation for the product and the enhanced usability of the smart speakers compared to smartphone voice assistants. Regarding the *Gulf of Evaluation,* we can say that this gap remains to be a big issue of voice assistance and, if anything, creates an even bigger problem for smart speakers. Without a supporting visual display, any feedback of the device can only be given in form of speech or by minimalist LED signals on top of the speakers. If this very signal is inaccurate, or the user does not pay attention during the short time in which the feedback is given, he or she remains completely unaware of what exactly happened or if anything happened at all. Furthermore, the single visual feedback to indicate that the speaker is ready to listen was criticized by our participants to deteriorate the usability of the speaker, because they always had to look at the device after saying the activation phrase in order to double check whether the speaker was actually listening. We thus argue that the *Gulf of Evaluation* is larger for smart speakers than for smartphone voice assistants. Summarizing our findings and comparing them to Luger & Sellen's 2016-paper about smartphone voice assistants, we are left to say that the *Gulf of Expectation* has slightly decreased due to negative prior user experiences with voice assistants, while the *Gulf of Evaluation* seems to hit new levels due to the absence of visual feedback. The question is how the *Gulf of Expectation and Evaluation* actually influence the long-term use of a product. Luger & Sellen (2017) state that through a larger gap between expectation and experience the user is more likely to get upset faster and therefore more likely to abandon the product. However, this is hard to say without doing further research and taking more data into consideration.

7.4 Industry Developments

As addressed before, both Google and Amazon seem to continuously test, work and improve their smart speakers in order to opt for a better customer experience. In section 5.2.3, we outlined the very recent developments that were announced by Amazon and Google in early summer 2018. When linking our own findings to the recent developments, it emerges that both companies mainly tackle the core issues of *Usability* and *Usefulness*.

One of the main goals set by the two companies was the focus on giving the users an enhanced sense of natural conversation – which was a big topic throughout our study as well and which is reflected within the *Operability* theme of our *Usability* factor. While our participants were generally impressed with the software, they pointed out that e.g. having to say "Hey Google" or "Alexa" before each sentence hindered the sense of having a natural conversation. "*It's super long*," said Mikkel, with Mathias then expressing that he wished the operability of the smart speaker would go more flowingly so "*that you don't have to do anything extra or spend extra time on it*" (App. 11). Google tackled this issue by rolling out the *Multiple Actions* and *Continued Conversation* features in several markets in July.

In addition, by enhancing the memory ability of the speaker, Amazon is improving the natural feeling of the interaction with the smart speaker, which in our research was found very important in the long-term use of the speaker. In addition, Google promised to provide Google Home with more user content relevant to the user specifically, and the lack of exactly that was mentioned as a flaw by our participants. Furthermore, and in accordance to our *Usability* factor *Functions,* Amazon recognized that the range of functions offered by their smart speakers is overwhelming to their customers. With more than 40,000 unique skills, users have found it difficult to explore and find the ones that are useful to them. As discussed in section 5.1.4, Amazon therefore promised that Alexa in the future will automatically trigger one of these skills, when suitable, without the user needing to specifically ask to start a skill first – this will be called *Discovery* and *automatic activation* of skills (Kinsella, 2018).

Looking at all of the development that is being made within the world of smart speakers as we write, one might raise the question if this research has been made prematurely in terms of the age of this specific technology - is it 'fair' to start concluding and proposing things on a technology that is still being developed on so heavily? And, if no, what can this research then even be used for in six months' time from now? While we acknowledge that such questions are reasonable, we strongly believe that the findings here are without a doubt useful - also in the future. Although it is apparent that Google and Amazon are working on improving some if the things that was found as important factors in the continuous use of smart speakers, improvements do not mean those factors are simply not important to users anymore. Say that improvements are being made in terms of having a natural feeling conversation with your smart speaker - does that mean that this is simply *not* important to the user anymore? We argue no. If anything, we argue that the fact that manufacturers are now working on some of the things that was found important in this research only supports our results. Moreover, with this logic in mind, we therefore argue that this research provides a true, current and relevant insight into what motivates the use of smart speakers, regardless of what areas are currently being developed on from the

manufacturers' side. Insights that can be used to inspire or motivate other studies which can use the insights as building blocks for extended or updated research, just as Luger & Sellen's 2016-paper motivated this research initially. Interesting in this discussion is then how other researchers might be able to take this research further in a meaningful way.

7.5 Recommendations

Conducting this research, we stumbled upon several things that was found relevant to dig further into in other researches. While a master thesis does allow for thorough investigation, we argue that the results of attempting to grasp multiple big research objectives in just one research will simply be too vague. Instead of embarking on such mission, we propose them for other researchers to pick up.

Firstly, we recommend that the factors proposed in our model are investigated by a quantitative study in order to proof and back up our findings and assumptions. We argue that this research presents the 'building blocks' for a definite model that can theoretically be used as what Suddaby (2006) calls 'objective laws' about the use of smart speakers. We invite others to actually, numerically prove these linkages as well as to find other linkages that might lie within the data. Secondly – while we partly investigated expectations in this paper too, it has not been the main focus and therefore we cannot provide any deep insights into this, even though we are left with a range of interesting questions. We encourage future researchers or graduate students to investigate in more depth the gap between expectation and experience and its implications for the use of smart speakers. In particular, we believe that it is interesting to explore where the artificially high expectations stem from (e.g. over projection in media, excessive marketing etc.) and how manufacturers can deal with the expectation, so that users are not disappointed with the device when they start using it. Furthermore, it would be interesting to investigate the tradeoff that the companies must make in deciding whether they should be 'honest' to their customers about what exactly the customers should expect and then risk potentially lower sales numbers, or if they should maintain a high level of user expectation and just keep developing the product 'on-the-go'- thereby selling more units but risking a larger drop out of users. Whatever the case might be, we argue that it is relevant to research the factors that influence the expectations that users might have towards smart speaker in order to find out if these might have an influence on the continuous use of the product itself.

8 Conclusion

Concluding this paper, we look back at our research question and objectives. The overall research question was to figure out what influences consumers to continuously use or stop using smart speakers. The objective of answering that question was to determine the factors that consumers found either motivating or demotivating in their use of smart speakers, and to explore how their expectations towards the smart speakers might have an influence on their adoption and acceptance of it. It was found that while there are several factors that are likely to exert a certain influence on the usage of smart speakers, it seemed that three factors are especially important. Primarily, *Usefulness* appeared to be at user's concern, including the existence of a supporting ecosystem, the degree of accessibility, the inclusion of local information and local third-party features, and the range of different functions. The point is very obvious: If users do not see any added value in using the smart speaker, they are highly unlikely to use it for a long time. Therefore, usefulness and the lack thereof seem to be the major determinant of long-term use of smart speakers. Secondly, the *Usability* decides upon whether people feel in control and enjoy what they are doing, or whether they get upset and annoyed. In order for people to continuously use smart speakers, the devices need to be easy to operate, the language understanding and processing has to be on point, completely inaccurate answers need to be avoided, and the devices should be able to give personalized answers and offer personalized solutions. Thirdly, *Sociality* emerged as a main influence on people's usage behavior. While the appreciation of smart speakers of private social peers seems to encourage long-term use, the lack of public acceptance for using voice assistance in the presence of others seems to be an obstacle. Interestingly, and despite our expectations, we found that several factors, such as price, hedonics and data privacy, did not play a major role in influencing smart speaker usage. By creating a conceptual model of the most important factors and their subcomponents, as well as showing possible interrelations between them, we built a base for future research. Furthermore, we looked into the gap between expectation and experience and discussed its influence on smart speaker usage and its implications for the industry. We extracted that the level of expectation is quite high due the fast pace of technological advancement and the fact that smart speakers are solely based on the rather futuristic and uncommon voice interface. However, the expectation is often retained by poor prior experiences of the users with other voice assistants. At the same time, most users described their overall experience with the smart speaker as quite good, but all of them also acknowledged issues with *Usefulness*, *Usability* and *Sociality,* which ultimately make the user experience worse than the expectation. We argue that this gap could have a negative impact on the long-term use of smart speakers, as the failure of meeting the user's expectations causes disappointment and is therefore likely to make them lose their interest. However, we did not test any of the above empirically. Thus, it cannot be seen as empirical evidence and solely serves as a starting point for future research.

Lastly, and directly derived from the first-hand test phases of 10 participants over the course of four weeks' time, we want to suggest 10 recommendations to enhance the user experience of smart speakers and motivate long-term usage:

- language understanding and processing needs to be improved and refined
- the natural flow of conversation should be given in any dialogue
- the number of simple bugs and malfunctions need to be reduced to an absolute minimum
- users need to be given elaborate introductions and explanations as to how the device work and how to use it best
- the range of functions needs to be continuously extended
- the range of local third-party services needs to be continuously extended
- the third-party service interfaces need to be improved in order to have perfect operability (e.g. accurate music search)
- manufacturers should be open about the limitations of smart speakers (honest marketing)
- smart speakers should cherish and become better at being part of the social environment of the user
- user profiles, answer schemes and settings should be more personalized to make smart speakers more useful for several people within a household (voice detection, personalized content, personalized settings, etc.)

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Appendix 1

Moderator: Hi Mathias.
Mathias: Hi Kasper.
Moderator: I'd like to shortly make an interview with you before we start our testing of the speaker. To start off, I'd like to hear how old you are.
Mathias: I'm 25.
Moderator: And what do you do for a living?
Mathias: I work as a Logistic Manager at Blue Water in Greve.
Moderator: What devices do you own and use?
Mathias: I have an iPhone, a Mac computer, PlayStation, television, a speaker, a Chromecast. I think that was it.
Moderator: Alright. On a general level, how interested are you in technology and new technologies? Is that something you keep yourself updated within?
Mathias: I think it's really interesting. It's not something I follow closely, but if I stumble across something about new technology on Facebook, then it's something I enjoy to read up, but it's not a must to be updated.
Moderator: It's not like a hobby for you to go to TechRadar etc.?
Mathias: No, but I do follow some pages on Facebook that publishes updates about new tech.
Moderator: Cool. What we want to test with this is voice command. Have you ever use voice command for anything?
Mathias: Yes, Siri. At a time when my screen broke, I used Siri to write messages and call people.
Moderator: Okay. How did that work for you?
Mathias: It worked something. It worked surprisingly well. I was surprised. But it wasn't a success each time I tried.
Moderator: Okay, so it's not something you kept doing after your screen was repaired? These voice assistants, as we call them, is that something you've heard about before?
Mathias: Yeah, well you told me that it was regarding that, so I went on YouTube and watched a couple of videos about these devices and what they did and what they gave of value. So I have an idea of what they're used for.
Moderator: If we look past the fact that you know what this project is about, is it then something you've stumbled across either online or in real life?

Mathias: I remember that I once saw an Apple ad from Mark Zuckerbergs home, where he gotten this technology installed in his home. It's some time ago, and it was some kind of an advertisement where they used this technology.
Moderator: Alright. So you know about the technology?
Mathias: Yes.
Moderator: Okay. You say that you've used Siri before, which worked pretty well for you. How do think the differences from Siri to this [Google Home Mini] is? Are they the same or is there a difference?
Mathias: I think the voice recognition will be much better with this. With Siri, you have to have your mouth all the way up to the microphone and speak directly to it. So I think the microphone will be much better. You don't have to be very close to it. Also I think this technology is integrated with a lot of other apps and companies, where Google have made collaborations with them and integrated the technology. So you can use Google's technology and manage other apps with it.
Moderator: Roughly, how much do you think this costs from new?
Mathias: I'd say around 1.000 DKK would be my first guess. I haven't looked it up, but that's my guess.
Moderator: I can reveal that this is about 500 DKK in Danish stores. Do you think that that influences your expectations?
Mathias: It's a huge company that makes it [Google], so they have some economies of scale that makes them able to offer it for a lower price, compared to a smaller company who would have to set a higher price. So, I still have high expectations even though it's half the price of what I thought.
Moderator: Alright. How well do you think this thing works, and why do you think that?
Mathias: I think you have knowledge about what it does. You shouldn't have too high expectations, because it probably doesn't do all these complicated things. It should be quite simple stuff you tell it if it should be useful.
Moderator: Yeah. The expectation you do have, where do they come from? Is it just because it's Google, then you think it's good? Or is it price, hype, marketing etc.?
Mathias: It isn't a new technology anymore, it's been around for years and is being developed all the time by many companies. I don't know that much about it, I haven't used it before. But because it's been on the market for some years, then I think it should be..
Moderator: You think they would have developed well enough by now?
Mathias: Exactly.
Moderator: This speaker, how easy do you think it's going to be to use? Will that be a problem?
Mathias: No. I think it will be super easy to use. I think you quickly get used to what you use it for. I could imagine that it will become a habit for me, the things I use it for. Then I'll use it for the same stuff day after day.

Moderator: That was kind of my next question, if you think it's something that takes a long time to get used to or will it just come naturally at first?
Mathias: I already have some ideas for what I will use it for already. But it's also a question of being inspired by the people who might have used it for many years. Look into what they use it for and see if that's something you could use in your own life.
Moderator: Yeah. I know you don't know everything that it does, but that's also kind of the point with this interview, to get an understanding of your expectations. But based on those, what kind of influence do you think this device will have on your everyday? Will it just be something that will be packed away or do you think you can use it practically?
Mathias: Before we started, I imagined that I could use it in the morning – I cycle to work – then I'd like to know how the weather is. That's one thing that will be one of the first. That would from the beginning give some value. Also something with setting an alarm when you're already lying in bed. I think I can use it for that too.
Moderator: Yeah. Are you excited to use it?
Mathias: Yes! I think it's cool. I can't wait to use it.
Moderator: Alright. What makes you excited about it? Is it just because it's something different or will it change something in your life?
Mathias: Well it's kind of a futuristic thing for me in regard to the fact that it's something that not everyone has in their lives. I look forward to seeing what it gives me of value and if it can help me make my life easier in some smaller things.
Moderator: Do you think it can do that?
Mathias: Yes, to some extent. But I also think you have to think that it's kind of fun. Otherwise it can quickly become redundant. You have to have some sort of interest in making it a part of your life.
Moderator: Do you think this is something that could be part of the future? Like a stable part of your selection of devices? Or will it just be some gadget-thing?
Mathias: I definitely think that all future houses will have this technology in some way. Like controlling your lights, turning on your TV, finding answers to questions etc. Then you can just sit in your couch and ask the question openly. I think that's valuable. The more they develop the technology, the broader their collaborations will be, the more value it will give. I definitely think it's something we will see more of.
Moderator: Okay. On a broader level, there's much debate about data and that it listens all the time etc., what's your opinion on that?
Mathias: I already have a smartphone and I have some sort of idea that if Google or Apple wants to listen, they already do.
Moderator: So they already know what they need to know?

Mathias: Yeah, they already have access to your private conversation because you have your phone on you all the time. It might be that the microphone is better in this Google-device, so it might be that they can hear more, but it doesn't make a difference for me because they already listen via the phone.
Moderator: Okay, so nothing really changes?
Mathias: No, not at all.
Moderator: Alright. So you're not negative towards this? Some people just don't want to use stuff like this.
Mathias: I think it's unfortunate if Google or Amazon are listening to your private conversations without consent, but as it is right now, then this doesn't change anything. They already listen of they want to.
Moderator: Alright. Well, thank you very much for your time and good luck.
Mathias: Thanks!

Appendix 2

Moderator: Good, hi Kasper.

Kasper: Hi Kasper.

Moderator: First I want to ask how old you are?

Kasper: I'm 26.

Moderator: Okay, and what gender are you?

Kasper: I'm male.

Moderator: And you're Danish?

Kasper: Yes.

Moderator: What is your occupation?

Kasper: Actually I'm looking for a job at the moment, but have worked as marketing coordinator for a couple of years.

Moderator: Alright. Just to go straight to the more technical part I want to hear how interested you are in new technologies and development within technology on a general level, is that something you're interested in or do you not care?

Kasper: I'm relatively interested in it, but I don't look at tech news sites..

Moderator: No?

Kasper: But if Politiken or whatever writes an article, then I definitely have a tendency to read it.

Moderator: Yeah? What devices do you own yourself? Telephone, TV, PlayStation and so forth?

Kasper: Actually not that much of that kind.. Computer, stereo, television, telephone..

Moderator: Yeah?

Kasper: No iPads, not Chromecast and stuff like that..

Moderator: No.. So a pretty basic level..

Kasper: Yeah.

Moderator: A basic level of stuff?

Kasper: Exactly.

Moderator: What we want you to test is this voice assistants, as we call it. Alexa. I'd like to know if you have ever used any voice activated devices before?

Kasper: I've tried Siri..

Moderator: Yes?

Kasper: Limited.. Honestly, only to kinda test one time, but it's not something I've made a habit out of.

Moderator: No?

Kasper: Sometimes I've talked to it, but mostly in fun and to test it. It's not something I use on a practical level.

Moderator: So it's mostly just out of interest to see what...

Kasper: Yes

Moderator: .. what it can do?

Kasper: 100%.

Moderator: Have you heard about these voice assistants? By now you've heard a little bit about Alexa, but is it something you've stumbled on before?

Kasper: Not really, not like with this Amazon or the Google. I've heard about other technologies... I think it was some lighting and some other stuff which reacts, but not anything that you can interact with like that, no.

Moderator: No? So it's safe to say that you haven't tried a voice assistants like the one we're about to test?

Kasper: Not besides Siri. That's the closest I've come.

Moderator: Do you think this is different from Siri? And in that case, what do you think the difference is from the Alexa to the Siri?

Kasper: I think that Alexa, first off, that it's easier to use because I don't have to take my phone out of my pocket, or worse, to find it, to activate Siri. And also I think that it will be able to do more, and in that case, I'd probably use it – at least that's what I think.

Moderator: Yeah. I know that you haven't heard that much about it, but is it something you have ever considered that you'd get to use – besides this experiment?

Kasper: It's… To be honest, it's only from this experiment I've found it interesting to try this..

Moderator: Yeah? You've heard a little about it by now, but let's say we had never talked about it, what would you then think this [Alexa] would cost – this piece of hardware and software? What would that cost in stores here in Denmark?

Kasper: Hmm.. Around 750 to 1000 Kroner for the cheap model I'd think.

Moderator: Alright. Let's say.. It was more expensive than that.. Or even cheaper.. Would your expectations follow the price, do you think?

Kasper: Yes.

Moderator: Or is it just pure hype in regards to what you expect?

Kasper: Yes I would expect more of it the more it cost.

Moderator: Yes? I can tell you that this one costs around 500 Kroner in the Danish stores..

Kasper: Okay.

Moderator: If you think about that, how well do you then think this works compared to what you already expect that you're going to use it for?

Kasper: Then I wouldn't have that many expectation to it.. I wouldn't imagine it was some cheap device either though. I probably have a bit less expectations for it.

Moderator: Yeah? How easy do you think this is to deal with? Do you think you'll easily get started with it or will that take some time?
Kasper: I imagine that I'd rather quickly get started with it, especially because it reacts as soon as you say its name. I think that's a huge plus.
Moderator: We've talked a bit about what you can use it for, but if I just told you that it's a voice assistant that you can interact with, what would your immediate thoughts of its use be?
Kasper: Then I'd probably think it was a bit like Siri, that it does some things, but.. My experience with Siri is that if I didn't pronounce something completely correct, or something like that, then I didn't always get what I wanted from it. And it made me call people unintentionally and stuff. That's not a plus.
Moderator: If this [speaker] could call people, would you then use it for that? Or would it just be for fun, not in any practical manner?
Kasper: The practical could be something like weather forecasts, maybe check up on dates for stuff, and in that way be practical. Calling people.. I think that kinda of a phone-thing, that I probably would have a hard time to get that habit [calling via the speaker].
Moderator: Yeah? Based on that, what kind of influence do you then think this will have on your everyday?
Kasper: I imagine that it can make my everyday easier by for example helping me with weather forecasts, I think. That's something I do every day anyway. So that would probably be not only easy, but also fun. What Alexa can, that I can also Google. But for me it's also about testing it and seeing what kinda answers I will get with it rather than with devices where I have to actively seek stuff.
Moderator: Are you excited to use it?
Kasper: A lot!
Moderator: Why?
Kasper: I'm very excited, because I think it sounds interesting. I imagine that I'll be able to use for a lot of stuff. I'm excited to see what kind of limitations it has in regards to being an assistant and when you need to use it for something. I'm excited to see how much fun I will get out of it in terms of games and stuff like that.
Moderator: Do you think it could be a need-to-have device rather than nice-to-have?
Kasper: I think so, yes, if it lives up to my expectations for it. If it does what I wish from it, then from the price of it, I would definitely consider buying it.
Moderator: Yeah? Do you think that it could be an integrated part of people's home devices if it does what you think it can?
Kasper: If it does what I think it can, as in replacing Google to some extent, think I definitely think it can be an everyday-thing in many people's lives. I imagine that if you have guests over and are talking

about something and need to look something up, then you could use it for that. Or if you quickly want to get some music on or whatever. In that regard, I definitely think it can be used.

Moderator: On a more broader level, what is your opinion about stuff like this? There's been a lot of debate about data and that it basically listens to everything. What is your general opinion on an "invasive" technology like this?

Kasper: I think it's not really different from my smart phone. In that sense, it's not really something I see as a new risk. I think it's a premise that I already live with because I already have all these other things [Facebook etc.].

Moderator: So you don't think it's going to change the way you already feel about all this data talk?

Kasper: Not at all. I couldn't even imagine people would be interested in my world.

Moderator: Alright. Well, that was it. Thank you for your time.

Kasper: Thank you.

Appendix 3

Moderator: Good afternoon, Miriam.
Miriam: Good afternoon.
Moderator: Today we want to shortly interview you about the test we are about to start. It's about this [speaker]. First I want to know how old you are?
Miriam: I'm 24 years old.
Moderator: Alright. What is your occupation?
Miriam: I study communication and marketing, and work too.
Moderator: Okay. In regards to your interest in technology and new technologies, how interested would you say you are in that? Is it something you follow?
Miriam: No I wouldn't say I follow it that closely. It's more.. Well, yeah, I'm interested in it, but I don't follow it.
Moderator: It's not that you read some tech magazine or something?
Miriam: No. Only a little bin in relation to my work.
Moderator: Okay. What devices do you own yourself?
Miriam: I have a TV, computer, speaker, work phone, radio. I think that's it.
Moderator: How about streaming?
Miriam: I have a Chromecast and Netflix and Spotify. And Apple TV.
Moderator: In regards to what we're testing, it's about voice controlled devices. Have you ever controlled or activated anything with your voice before?
Miriam: I've tried Siri on my phone, but I don't think that, that was very good, so I've deactivated that on both my phone and my computer. I thought that was becoming annoying because it didn't understand what I was saying.
Moderator: These voice assistants, as we call them, is that something you've heard about before or know about?
Miriam: No, I've only known about Siri.
Moderator: So you haven't tried these voice assistants incorporated in a stand-alone device? Only Siri in the phone?
Miriam: Yes.
Moderator: Okay. Have you tried anything of resemblance or is that the only thing?
Miriam: No, I'm sure that's the only thing.
Moderator: Alright. You say you haven't heard about it before, but could you imagine that this is something.. Have you considered investing in such device?

Miriam: No not really. Because my impression have been through Siri, which I thought was very bad. So yeah, I know that it's part of the technologies of the future, that you don't have to e.g. a controller for the TV and stuff like that.
Moderator: If we look at this [Google Home] specifically, what do you think this costs in Danish stores?
Miriam: Hmm.. 1.000 DKK?
Moderator: I can say that this one is about 500 DKK in Danish stores.
Miriam: Okay.
Moderator: Does that have any influence of what you expect from it?
Miriam: It definitely has.
Moderator: Do you have more expectations if it's more expensive?
Miriam: Yeah, the more expensive, the more expectations, and the cheaper is it, the less.
Moderator: If you think about that this is about 500, how well would you say you think this works?
Miriam: I don't think it works that well because it only costs the same as my own speaker at home, which doesn't do the same [voice activation]. It only plays music, and that was also 500, and it actually looks quite like it.
Moderator: How easy do you think this is to work with? Do you think it will be easy for you to use?
Miriam: Because it's Google, then I imagine that they make it quite user friendly. But.. To talk about Siri again, I didn't think that was super easy, so I don't think this is…
Moderator: No? Do you think it will take some time to get started with?
Miriam: Yes. Stuff like.. You need to figure out what you want from it, and if it's something you can use.
Moderator: Yeah. What do you think you'll be able to use it for?
Miriam: To play music. And then I can see [on the box] Netflix, Spotify, Chromecast.. So maybe something with that.
Moderator: Based on what you think it does, what kind of influence do you then think it will have on your everyday? A big one, or will it be something that's just there?
Miriam: It probably something that I'll just have.. I don't know what I can use it for.
Moderator: No. Are you excited to start using it?
Miriam: Well yeah, I think it's going to be exciting to see what it does, but my first impression is that I won't have that much of a influence on my life.
Moderator: Why do you then think you're still excited?
Miriam: To explore new things and see some new technologies.
Moderator: So it's mostly based on the fact that you haven't actually tried it before and in that way it's exciting?

Miriam: Yes, I think so. And yeah, of course I already have an impression of Siri, but it would be cool if it did more than Siri.
Moderator: If we say you became really happy with it, do you think it could then be a more need-to-have thing rather than nice-to-have, or do you not think it can find its way into your life like that?
Miriam: I think it's more nice-to-have.
Moderator: You couldn't imagine that it wouldn't get some important role in your life?
Miriam: No, I don't think so.
Moderator: No. Do you think, on a general level, that it has a future in our society? Do you think it's something that could be part of the future that everyone would have one?
Miriam: Maybe not this specific thing, but I could imagine that It could become part of the technologies in the future that you can voice control your devices in your home.
Moderator: Yes. On a broader level, what are your thoughts about these devices.. There's a lot of talk about data and some technologies that come into your home and become a part of your life very close.. What..
Miriam: I'm usually quite open about stuff like that, but a lot of my girlfriends are not very welcoming of this big data and the sharing of all your data with big companies that have a big influence on the world. But I don't think it matters that people have these data. But I can also see it on the hand.. I understand that maybe some people think it will have an impact on your life.
Moderator: Alright. But you don't worry too much about that?
Miriam: No.
Moderator: No? Alright. Well, that was it for today. Good luck with it.
Miriam: Thanks!

Appendix 4

Moderator: Hi Mikkel.

Mikkel: Hi.

Moderator: Before we start, I want to hear how old you are?

Mikkel: I'm 30.

Moderator: What is your occupation?

Mikkel: I work at Red Cross with marketing.

Moderator: Alright, and study also?

Mikkel: Yes, cand.merc.it at CBS.

Moderator: What devices do you own and use at the current time?

Mikkel: I have an iPhone 7, B&O smart TV, Apple TV, Chromecast, iPad. I think that's it.

Moderator: Okay, so quite some devices?

Mikkel: Yep.

Moderator: Okay. How interested would you say you are in new technologies?

Mikkel: I'm very interested in new technologies.

Moderator: Is it something you follow closely?

Mikkel: Yep, I'd say that.

Moderator: What we're testing is this Google Home speaker. A voice assistant. Have you ever activated anything with your voice before?

Mikkel: I think only by accident, Siri on the iPhone, which I don't think works very well. I haven't really used it for anything. But sometimes you accidently say something, and then it activates something.

Moderator: Okay, so it's not something you've used actively?

Mikkel: No, not really.

Moderator: Okay. These speakers with voice assistants, is that something you've heard about before?

Mikkel: Yes, I have. I've heard about the one Amazon has made, Echo I think it's called. With Alexa. I've of course also seen this one from Google.

Moderator: Okay, but it's not something you've..

Mikkel: No I haven't used them before.

Moderator: Alright. You say you know about Siri, how do you think this separates itself from Siri?

Mikkel: I think that because Siri is part of your phone, it's kind of limited it by that. I think this [Google Home] is more internet of things, where you can activate things with it. So more like a smart home.

Moderator: Okay, so you think Siri is limited by the fact that Siri is in the phone?

Mikkel: Yes, exactly.

Moderator: Okay. Have you thought about buying one of these for yourself?
Mikkel: No, I haven't considered it myself no, but when you see this stuff with lighting that can be 'smart' and stuff like that, then it kind of becomes more realistic that you can actually use it on a meaningful way at home.
Moderator: Yeah. About this specific speaker, what do you think it costs in Danish stores?
Mikkel: 800 DKK? I don't know.
Moderator: Pretty accurate. It costs a bit under 800, somewhere between 6-800 DKK. Would you say that it's price has an influence on your expectations for it? Do those two things go hand-in-hand, that the more expensive it is, the more it can do?
Mikkel: Yes, of course, but I think if you look at some of Google's other products that are also relatively cheap, e.g. the Chromecast, they work perfectly. In regards to it being a speaker, then maybe 800 will influence that, but in regards to it being something that connects a lot of things and integrates those, I expect it to work pretty well.
Moderator: Yes. When looking at this specific thing, how well do you think it will work?
Mikkel: That's hard to say. I expect it to work pretty well.
Moderator: Okay? What do you base that on?
Mikkel: Google. I have faith in Google. I think their products usually work really well. So I have quite a big faith in that Google would not put something on market that could ruin their brand.
Moderator: Okay. Do you think this will be easy to get started with or will it take some time?
Mikkel: I hope so, but when I first started using the Chromecast, I didn't think it was that intuitive. It took a good 30 minutes. Not that that's a lot, but compared to other products, then I think it could've been easier.
Moderator: So you think..
Mikkel: I expect it to be connected to the Google Home app, which I've used before.
Moderator: Okay. You know a bit about what they do, but what do you think you will be using it for?
Mikkel: When you asked me if I wanted to participate, then I thought about using it for setting an alarm, but it could also be that I could connect it to my TV where I could say "Play something on Netflix". I think that's obvious. I imagine it would be fun to ask it if it could find something on Wikipedia – if it can actually answer some of that stuff that makes sense.
Moderator: Alright. Based on that, and what your other thoughts are, what kind of influence do you think it will have on your life?
Mikkel: I think that's hard to say.
Moderator: Will it be practical value or just some kind of fun gimmick?
Mikkel: Before I use it, I think that it will probably be some kind of a gimmick, but it might just as well be that I think it works really well and that I will then use it for something meaningful. But I think it's

kind of a barrier you have to break, that you'll be talking to something that's not human. But it will be fun to try it at least.
Moderator: Okay. You say it will be fun to use, but are you excited?
Mikkel: Yes, very much. It will be exciting to see how well it works and if it understands my English accent, or if that will be something annoying. If not, then I will probably not use it a lot.
Moderator: What about the fact that it's kind of a person, that you will have to talk to?
Mikkel: That will be kind of weird, but again, it's probably just a barrier you need to break before you feel safe about using it.
Moderator: Do you think it could end up being more need-to-have rather than nice-to-have?
Mikkel: Definitely. If it works really well, then it can be a personal assistant, where you tell it what to do, rather than using your phone to make appointments e.g. Then you can just tell it that you need to meet with this person on this date and this time. That would be very smart and much faster. If that works, then I think it can become something that can actually influence our lives, just as smart phones did when they were introduced.
Moderator: So you think it can actually make its way into becoming a normal device in society?
Mikkel: Yes, I think that actually. But it really depends on how good the technology is, but if it's good..
Moderator: Yeah. On a broader level about these types of devices that's coming into your home and is trying to part of it and is listening to you, do you have an opinion on that?
Mikkel: Well, it's always interesting to think of, but you have to acknowledge that we have so much stuff already, that I don't think I'd think more about this rather than a phone or computer.
Moderator: So it won't..
Mikkel: No, this one will not influence the way I think about that. But of course, it's interesting.
Moderator: We kind of touched upon it, but do you think this can become a stable part of your.. Like a computer or phone?
Mikkel: I think that's really hard to say when I haven't used it, but I remember seeing some TV show where it was used, and in that is seems really natural just walking around saying "turn up the audio" or "what's the time", so if that works, then why look at your phone or go and find your remote controller?
Moderator: So you think it has potential?
Mikkel: Yes, definitely.
Moderator: Alright, well then that's it. Thank you very much.
Mikkel: No problem.

Appendix 5

Moderator: Hi Andrea.

Andrea: Hi Kasper.

Moderator: Can I ask how old you are?

Andrea: I'm 21 years old.

Moderator: Alright, and I can tell you're a female and Danish. What do you do for a living?

Andrea: I soon start a full-time employment in company here in Copenhagen

Moderator: Cool. What we are going to be talking about today are these [smart speakers]. On a general level, how interested would you say you are in technology in general? Is it something you follow closely or not at all or?

Andrea: I'd say I'm fairly interested. I don't necessarily buy all the newest tech stuff, but I read about them online and would say that I'm quite interested in that stuff.

Moderator: Okay.

Andrea: If I stumble across articles about tech on Facebook I most often read through them.

Moderator: Alright. And what devices do you own yourself?

Andrea: TV, Android phone, stereo, PC.. I think that's it.

Moderator: Okay, so pretty basic level of things?

Andrea: Yeah I guess so. I own a Chromecast too.

Moderator: Alright. As I mentioned, what we're talking about today is these smart speakers with voice assistants in them. I want to know if you've ever activated something with your voice before?

Andrea: No, I don't think so. I think I tried Siri when I had an iPhone, but that was only to test it off and not to actually use it

Moderator: Okay so haven't, like, actively used that kind of technology before?

Andrea: No, I don't recall that.

Moderator: So it was mostly out of interest and curiosity?

Andrea: Yeah definitely.

Moderator: Alright so I assume you haven't used a speaker like this before?

Andrea: No, can't say I have. But I've read about them and seen some videos on YouTube.

Moderator: Okay so you know what they can be used for or..

Andrea: Yes I believe they work like intermediaries between other technologies like the WiFi lights bulps and your TV… And.. Yeah for like smart homes.

Moderator: Based on your knowledge about them and your expectations, how do you think this [Amazon Echo Dot] will differ from Siri then?

Andrea: Well, first of all I don't think Siri worked very well. It didn't always understand me when I tried to play with it. I think this works better like that.. With voice.. And generally I just think it can connect to more stuff than Siri. That's what I've read and seen at least. And then of course with this [Echo Dot] I don't have to use my phone, so that should be nice.
Moderator: Alright. Have you considered buying one of these yourself before we contacted you [in regards to the interview]?
Andrea: Not really no. As of now I can't really see what I can use it for.
Moderator: Okay, why do you think that is? That you don't think you can use it for anything?
Andrea: Well, maybe it's not that I can't use it for anything, I just don't see why I should use it, if you know what I mean..
Moderator: Yeah? What do you think it costs in Danish retail stores?
Andrea: I'd say around 1 – 1.500 DKK.
Moderator: What make you think that?
Andrea: Because it's still a new technology and there's not many on the market. So I'd think that prices are still high.
Moderator: Does the price of it influence your expectations for it?
Andrea: Definitely. If it's 1.500 DKK I would definitely expect it to work really well, and if it's just a couple of hundred Kroner, then I wouldn't think much of it, I think.
Moderator: Okay, well I can tell you that this is around 500 DKK in Danish stores..
Andrea: Really? That's not much
Moderator: No, but as it hasn't been released officially yet, prices are not firm.
Andrea: No but still. I would've thought it was more than that.
Moderator: With everything in mind, how well do you think this [Echo Dot] will work for what you expect it to use it for?
Andrea: Hmm.. I would think it works pretty well, but I'm sure there will be some restrictions in regards to the fact that I don't really have a lot of smart devices that it can connect to. So that's also why I haven't really thought about investing in one.
Moderator: Yeah, but in regards to the price of it, does that influence your expectations for it?
Andrea: It does, yeah. I'd definitely have more expectations for it if it was more expensive.
Moderator: Okay. How easy do you think it is to get started with? Like, will you start right away or does it take some time?
Andrea: Because it doesn't have a screen I would think that it's made so that it's quite intuitive to get started with. I imagine you just say something to it and then it goes from there. But it will probably take some time to figure out all the stuff that it can do.

Moderator: I know that you already know some stuff about these, but what do you think you will be using it for during this period of time?
Andrea: First and foremost, music I think. Also I think I will be using it for getting information about stuff like the weather and other questions. And to connect to my Chromecast probably. Other than that I don't really know.
Moderator: Okay. Based on that, do you think this will have a significant influence on your everyday? Like will it change anything?
Andrea: I don't think it will have that much of an impact, but I'm open to it, definitely. Maybe it will make some things easier, like putting on music without using your phone. So, in that sense, I think it can influence my every day.
Moderator: Alright. Are you excited to use it?
Andrea: I look forward to it, yes. I'm not overly excited but intrigued to see what it can do. I'm hoping to be surprised.
Moderator: Do you think this could turn out to be more a need-to-have item rather than nice-to-have?
Andrea: I couldn't really see that happening right now, no, mostly because I can't see what it could possibly do better than the devices I already own. But again, I'm open and hoping to be surprised. And yeah, maybe it would if I had a super smart home where everything was connected somehow.
Moderator: On a broader scale, like generally in society, do you think this [Echo Dot] will find its own space? Like be an integral part of people's homes?
Andrea: I think it will at some point yes. Definitely. I mean, if it will work as good as in those 80s Sci-Fi movies, then why not? So it all comes down to how well it works. And maybe just for simple stuff too, like music and Googling.
Moderator: Again, looking at it on a broader level, how do you feel about inviting this type of technology into your home? Like, seeing as its listening the whole time and all this talk about data and..
Andrea: I generally am aware of the data collecting that's going on. I try not to get too caught up in it, so I don't just buy into all these things and sign up for everything everywhere. But at the same time, I know that it's inevitable. So if I feel as if I have to give up my data to get something I really need, like with Facebook, I will do it. But not for anything.
Moderator: How do you think this device will influence that?
Andrea: I don't think it will influence my thoughts really. If it's really really good, but not really useful, I still might want to use it. But as of now, no.
Moderator: Alright, well I think we've then covered most about everything, so I'll thank you for your time and wish you the best of luck with the testing.
Andrea: Thank you.

Appendix 6

Moderator: So, hello Stefan. Thanks for being here. Can you confirm that we handed over a Google home to you?

Stefan: Yes.

Moderator: Okay. Perfect. So what this interview is about.. it's about your person and then a couple of questions about your prior experience and your expectancy towards this kind of technology. So I just need your very honest answers for this if that's okay with you or if you feel inclined to lying then I can't help it.

Moderator: So first of all to yourself what's your age.

Stefan: I'm 25

Moderator:.. and you're obviously male.

Stefan: yes

Moderator: And what's your nationality and what's your current occupation.

Stefan: You mean professional wise?

Moderator: Yeah.

Stefan: I am working in a hearing aid company and doing an MBA parallel.

Moderator: OK. And how would you rate yourself or your your tech savviness. How interested you are generally in new technologies.

Stefan: I would say I'm quite.. very.. interested..

Moderator: very interested means that whenever there's something new coming on you immediately buy it and try it out.

Stefan: I don't buy all this stuff but I because of my job right now I'm keeping myself informed basically every day. Moderator: OK and what does the technology involve in your job. Like what kind of specific area that you are very interested about?

Stefan: So as it's hearing aids business it's basically everything with regards to audio technology , telehealth and also voice of internet and big data and internet of things.

Moderator: Okay cool. That is very relevant for the study as well. I think so then the question what kind of media do you own? You own a phone…

Stefan: I own a Mac book, my phone, stationary computer ,tablet, headphones TV and actually also a pair of hearbales like that from Bragi. It's like kind of wearable device for the ears. Maybe that is also interesting in regards to that.

Moderator: Ok cool, yeah definitely. So much to your person. Then the prior experience. Have you ever activated anything with your voice before?

Stefan: Yes yes I'm mostly setting my alarm clock with Siri.

Moderator: OK. So you've tried to Siri before which is a voice assistant as well actually. Have you.. Do you use Siri a lot?
Stefan: No I actually not because I think society is still not really accepted to talk to you to your device in front of public folks on the bus. People look at you weirdly. But I think this is also a trend which is decreasing more and more. So, acceptance in society is permanently increasing.
Moderator: OK. And when you at home. You said you were sitting on arms. But you use it for something else as well if you were at home alone and nobody's listening and you're not in a public space?
Stefan: I'm actually checking soccer results with it. But actually, that's pretty much it so far.
Moderator: Cool. So, Siri is a voice system that is built into your phone. What we're trying to research here is some voice assistance built into smart speakers. Do you think that the technology or smart speakers are in any way different than the voice assistants that you have used before? Do you think it gives you a different experience it's smarter, it's better, it's more efficient? Do you think there's any difference or is it basically the same thing?
Stefan: Siri in comparison to what?
Moderator: .. to smart speakers like this. I mean there's Google Assistant in this device and as you said Alexa is for example the present system for the Amazon Echo. And so, do you think there's a difference using this or using Siri on your phone?
Stefan: Yeah. So currently right now at least in all blogs they say that Google is kind of hinking behind Alexa. So Alexa is having the widest introduction to hardware devices so far. They've pushed a lot. So Google is following straightly and all the outlooks say that Google will be governing this area again. I think right now actually Alexa is the most spread voice assistant in the world.
Moderator: And so you think personally if you use it it's different than using Siri on your phone?
Stefan: Personally I didn't use Alexa a lot but I think Google for example is much more understanding in more situations than Siri, I have the feeling.
Moderator: OK so you've actually tried those out before like the Google Home or Alexa.
Stefan: Yeah. I've tried the Google Home, no Alexa actually at a friend's place actually. But actually it also felt a little bit weird. It's always listening to me.
Moderator: OK. Yeah that’s a difference of smart speakers...
Stefan:.. because they’re always on, yeah. So this is actually a thing I need to get used to. But other people, for example Americans have much lower barriers.
Moderator: OK. So you think it might be a cultural effect as well?
Stefan: Yes
Moderator: OK. Cool. And have you ever thought about buying one of these smart speakers?
Stefan: Actually not yet. Because so far they are not included in as many really meaningful services like ordering pizza or whatever but there are a lot of pilot projects, for example Dominos wants to enable

Alexa assistance to order a pizza. But so far I think it's more for play. Like playing a game, like a toy but when they establish a dense network of services which are connected to these Voice systems then they can be very convenient..

Moderator: So you think that the environment is not there yet for you to buy this to have actual value for you.

Stefan: I think that ecosystem is just not built up enough.

Moderator: Okay cool. And yeah that was partly going into expectancy already. How much you think this thing costs?

Stefan: I think it's like 70 euros.

Moderator: Actually it's depending where you buy it, but It's about 60 euros. So this was a quite an accurate guess and if this device would be a bit more expensive would you think that has any… or let's put it differently: This is the Google Home MINI, right? So this is the smaller version. Do you think the bigger version, which is I think 120 euros or something does anything better or is in any way superior to this one?

Stefan: I think the value position is the same. It's just better speakers. I would say I'm not really into the difference of them I never read about it but I think it's mostly the sound quality which is better but the voice assistant and the algorithm which is standing behind is most probably the same.

Moderator: OK good. So, you said you tried a little bits but you haven't tried this one, the Google Home Mini. How well do you think this works?

Stefan: I mean this is as far as I know Google it will work very, very well because if they would publish a device with such a big media attention that would not work they would pee at their own legs. So, I think it's working quite well.One more point towards the price: I think actually Google tried to offer us to the product to a little price as possible because in the end this is an upselling opportunity to get the speakers into as many like homes as possible. And in the end, they can actually build up some business models based on having these things installed.

Moderator: OK. I agree. So how easy do you think it will be for you to use it. Do you think it will take a long time or are you just going to plug it in and set it up and then you're ready to go? Or do you see yourself struggling with this kind of thing.

Stefan: No, I think it's going to be quite straightforward. As I said before I don't think there's too many like small service providers which have connected to the service. But the algorithm and understanding of them is quite sophisticated already. So, I think it's not going to be a problem.

Moderator: So, do you think that this will be better in terms of understanding and processing your input than Siri for example on the phone?

Stefan: Yes. I think Google is further than Siri so far. Personally, I see Google and Alexa in front right now.

Moderator: OK. Good. What do you think you will use this for in your daily life if you set this up in your living room or bedroom or out of anywhere what do you think are going to be the main features?
Stefan: Ah I see myself using it, as I did so far the usual matters like checking the weather, or maybe the news in the morning or like stuff that I'm doing on the go like stuff which is running parallel to my main activity. So, the advantage is that it's always listening to me so I can just say do this or do that and it just does the rest for me.
Moderator: So if you're busy doing something, or your hands are busy with something, you can just instead of going to your phone..
Stefan: Yes, it's a more convenient kind of access to certain kinds of service.
Moderator: OK. Do you think society needs this or this is a step of development for society that really makes things easier or is this just a hype that will be gone in a few years?
Stefan: I think this internet of choice in general. I mean I don't know if the world needs as speaker that is constantly listening in the living room. But I mean this voice assistance and all this stuff I think it's the next big thing because like interaction with electronic device it's much more normal if you're staring on your screen.. It's just more. How do you say.. intuitive if you just say something and the device listens to me like a human being basically that is then converting my command in in an action. And so far, everyone here I mean if you're standing in the metro area when it's looking like a robot on his smartphone it's not intuitive at all
Moderator: Okay so you are saying that you could imagine a world where people in the metro actually talk to their phones instead of just typing?
Stefan: Totally, yeah. Because then actually they can do much more. I mean if you talk to someone, saying something is much faster done than like writing something. So, I don't see people talking like instantly to their phone about but I see them much more interacting with their real environment and less with their phone. And of course then from time to time they have to interact with the phone that this will happen much more convenient and fast due to voice assistants.
Moderator: OK good. And then I think this is the last question just your general attitude towards these things is it rather positive rather negative and why?
Stefan: Personally I have a very positive attitude towards that based on my background in the hearing aids industry.. We are right now working on integrating all these assistants into hearing aids.. or at least all the manufactures are because if you think about old people wearing hearing aids there is infinite sets of opportunities that you can integrate them. These people can have so many more convenient functions which are just enabled by this assistant, which is permanent listening and transforming voice commands into certain actions and if you then think about further topics like telehealth.. Or whatever.. Which you can link to such a voice assistant, there's incredible not only business opportunities but also opportunities where this thing really makes sense for the user. And it can enable many things.

Moderator: Okay cool. Thank you very much. That were the questions. Good luck and have fun with testing this and we will talk in four weeks' time.
Stefan: Thanks.

Appendix 7

Moderator: Hello Michele, firstly I have a few questions regarding your person. How old are you?
Michele: I am 23 years old.
Moderator: And what's your gender?
Michele: Male
Moderator: And where are you from?
Michele: I am from Italy.
Moderator: And what is your occupation?
Michele: Uhm.. I am a student and have my own consultancy company.
Moderator: And how would you rate your tech savviness?
Michele: I am an absolute prosumer. I follow 15 different tech news site and support people on Indiegogo. So I would say that I am at the forefront of new technology.
Moderator: Okay, perfect. And which devices do your own yourself in terms of media?
Michele: What do you mean? I do not possess a virtual assistant but I own MacBook, iPhone, PlayStation..
Moderator: Okay, so much about your person. Then some questions about your prior experience: Have you ever activated anything with your voice before?
Michele: Absolutely yes.
Moderator: What have you activated?
Michele: Well, Siri I am using to a quite large extent. I am using it a lot on my MacBook for different task. And also with Alexa I played around quite a bit.
Moderator: What are you using Siri for on your computer?
Michele: Mainly Google web search and on my phone a lot for reminders. Because creating a reminder on my phone "Remind me to pay my rent until Thursday" takes a lot of time but with Siri it's pretty awesome. And you can even tell it where you live and then say "Remind me of something when I leave or get to my home" because of GPS. That's also pretty cool.
Moderator: Yeah, that is indeed pretty advanced. I think not many Siri users do that.
Michele: Yeah, Siri I like quite a bit.

Moderator: Okay, next question: Do you think that Smart speakers are different to voice assistants that you have used before. So e.g. Siri on your phone or MacBook.
Michele: I wouldn't say that Alexa is better than Siri but Alexa is made by Amazon and its purpose lies in the Smart Home and Siri is made for your phone. So I would say different: yes.
Moderator: Cool, have you ever thought about buying a smart speaker?
Michele: Actually yes, I have played around with Alexa a bit at a friends place so I thought it could be cool. But then my home is pretty minimalistic.. and I have Siri on my MacBook with which I control everything. And the laptop is located close to the TV and speakers and then I can control my LapTop with my smartphone using Siri.. and yeah with Siri I am happy so I didn't think I needed an Echo thing.
Moderator: Alright.. Then some questions about your expectancy. One question would be if you know how much it costs but it sounded like you know already that they can be quite affordable.
Michele: Yes, I was surprised actually. But there are different ones I think. But you know I am pretty audiophile and really need good quality speakers.
Moderator: How well do you think this speaker works and why?
Michele: I am pretty confident that for the purpose that it has been created for: web search, do this – do that, send messages it works really well. I think that ever since the Siri breakthrough I expect this to work.
Moderator: How easy will it be for you to use it?
Michele: Super easy. I think if you use something like this in your daily life already then it is a matter of what are the basic commands for the new device, and as long as you are not trying to do crazy things it should be easy to handle. The only limitation I see with Amazon. Because I expect that you can only buy stuff with it that you know already... and also to buy stuff that you don't even see just with your voice... I don't really know what's the use case there? What kind of products would you buy.
Moderator: It could be consumables or daily products such as toilet paper or detergent. Similar to what the Dash buttons do.
Michele: Ah okay, yeah that makes sense.
Moderator: Hmm.. What kind of influence do you think it have on your life. Will it improve it?
Michele: I think it will make it easier but then there is always the worry that you are getting more stupid and don't care. And also, that you lose your intellectual brain. Best example: back in the days you knew 20 telephone numbers by heart and nowadays you don't.
Moderator: Do you think you would become dumber through the use of a smart speaker in your house?
Michele: Yes absolutely. Alone that you don't have to remember things. I believe that if you do that for 10 years that's a stimuli that is missing in your brain.
Moderator: Okay, and you don't think that your brain mayb has capacities for something different or you have more time to do focus on your job or your studies etc?

Michele: No, I don't think so. Because it's not only about time. Back in the days everybody who was in sales needed to be good with numbers and nowadays I do everything with excel or something. So I do not do anything in my head and that is something that is missing and which will in the end lead to the situation where everybody is thinking less.

Moderator: And what are you going to do then?

Michele: Yeah, I think your brain will just be slower and you will have more time to consume more useless media.

Moderator: Okay, interesting. That also leads to the question: What's your general attitude towards these things : positive, negative or neutral?

Michele: Uhmm.. well I am not sure. On the one hand it's cool because it's fun and it makes your life easier. I am using it and it takes work off my shoulders. But it also definitely takes away intellectual tasks that you used to do yourself. And I think that not everything that makes your life easier makes your life better. And I think in this case you pay for a comfortable service with your data, your credit card but also with your abilities. Even though I do not really care about the privacy concern even though I think many people would find that worrisome that there is a machine in your living room always listening. So bottom line: I see it rather negative because I think the more innovation in your life is making your life worse.I think we are going to end up like in the movie "Wally" where all humans are fat and are being fed by machines and have VR glasses on their heads. And while that is super convenient is that still real life?

Moderator: But do you think it will still be part of the future or is it just a big hype?

Michele: Absolutely it will be. There is no going back. But then in the end it's just one interface and the question will not be "if" it will be there in the future but rather "in which form" will it shape our future.

Moderator: Cool, thanks a lot for your input. Those were all the questions for now. Have fun testing and talk to you in 4 weeks' time.

Michele: No problem, talk soon!

Appendix 8

Moderator: Hi Rebecca, thanks for being here. Today we want to do a pre-testing interview with you about your expectations and your prior experience with voice assistants. So can you confirm that we handed over a Google Home Mini to you?

Rebecca: Yes, I received a Google Home Mini.

Moderator: Cool, first we would like to ask you some question about your person. What's your age?

Rebecca: I am 23 years old

Moderator: And what is your gender?

Rebecca: Female

Moderator: And you are from which country?

Rebecca: Germany

Moderator: And what is your current occupation.

Rebecca: I am a student and I am working besides as well.

Moderator: You are working as a part time working student I assume?

Rebecca: Yes.

Moderator: And how would you rate your tech savviness. In general, or just in a few words.

Rebecca: I am interested in it but I am not following the newest trends.

Moderator: Okay, so you wouldn't say you are a very early adopter of new technologies and try to be at the very forefront?

Rebecca: No.

Moderator: Okay, and what devices do you own yourself in terms of media?

Rebecca: I have an iPhone, a laptop, a Smart TV, an xBox 360 gaming console, sound systems..

Moderator: Okay that's fine. So much about your person. Now we have some questions about your prior experience that you have with voice assistants. So the first question would be: Have you ever activated anything with your voice before?

Rebecca: Yes, I have because usually if you receive an iPhone you try out Siri. So that's what I did.

Moderator: Okay, and what have you tried to do with Siri, which is a voice assistant.

Rebecca: Hmh, just asking stuff.. mainly fun.. trying it out, how far you can go, what does it know, what can it do.But yeah, I only used it a few times and then I stopped because in my opinion it's not really useful.

Moderator: Okay, so you played around with it in order to get an insight into how it works, what it does..

Rebecca: Yes.

Moderator: Do you think that Smart Speakers are different to what you've used before?

Rebecca: What is a Smart Speaker?

Moderator: A Smart Speaker is what we handed over to you. It's a speaker that is bluetooth and WIFI enabled and that contains a voice assistant. A small software that is intelligent in a way and helps you do things, and yeah let's you control smart devices.

Rebecca: I think it's not different to Siri. It's just the matter of fact that you can connect it to other devices maybe but I think that Siri or your phone should be capable of doing the same. And there is also the thing with Siri that you can activate "Hey Siri" so it reacts to your voice.

Moderator: So why do you think Smart Speakers exist or have gotten so much attention from companies and users as well? Why would people want to buy these things?

Rebecca: I think it is good marketing. And you can actually create a smart home if you have the correct devices at home.

Moderator: Okay, but you think a smartphone could eventually be able to do the same thing.

Rebecca: Yes.

Moderator: Alright, so much to your prior experience. And yeah, so I figured from what you said that you never used a Smart Speaker before?

Rebecca: No, I haven't. But I bought one for my dad as a present once but did not use it myself.

Moderator: Ok, so now some questions towards your expectancy. You just said you bought one for your dad. So figure you know how much one of these devices costs?

Rebecca: Hmm, yeah it was around 90 euros. But it wasn't the cheapest one, there were also cheaper ones.

Moderator: Okay, and the devices was a..

Rebecca: Alexa Echo

Moderator: Echo or Echo Dot? The small one or…?

Rebecca: The Echo, the bigger one.

Moderator: And do you think that the bigger one -because the device we just gave you is around 50 euros - do you expect the bigger one, the more expensive one to perform better than this device?

Rebecca: Sure, it's just logic that it costs more so it will be better.

Moderator: Okay, so in your opinion price really says something about usability and the sophistication of the product?

Rebecca: Yeah, I think that just the product quality could be better not in terms of what it can do. I think that both can do the same. But the bigger one might have a better speaker.

Moderator: Cool, so how well do you think these devices work?

Rebecca: Since I have never tried it I can't really tell but I am expecting it to make my life easier and I think it is designed that the set up is super easy and quick and that you will understand everything super easily.

Moderator: And do you think it will be easier to use or it will be able to do more things than Siri on your phone?
Rebecca: It might be able to do more things as it is a device just for recognizing your voice and your smartphone is also there for other things. So it is a specialized device.
Moderator: So you would say that because the main purpose of the device is the voice assistance it should perform better than Siri, which is basically a part of a smartphone that you buy.
Rebecca: Yes!
Moderator: Okay, so you said that you think that it will be easy to set up. So you think that it won't take a long time to get used to or do you think it will be a bit hard in the beginning?
Rebecca: I think of course you have to familiarize yourself with the products and how to connect you may have to read the manual or watch some videos how to use it. And of course like every technical device you receive, just like a new phone, you have to explore how it works.
Moderator: Okay, and what do you think you will use this device for? What's gonna be the main thing over the next 4 weeks that you will do with it.
Rebecca: I hope that I can connect it to my spotify account and my TV. It might be helpful to organize my day, so that it maybe will remind me of what I have to do. That it maybe will wake me up in the morning. Just easy daily tasks.
Moderator: In general are you excited to use it?
Rebecca: Yes, of course because it is a very new technology and it's always nice to get to know something new.
Moderator: And is there anything particularly you are excited about it when using it? Or is it just the general experience that you are curious to see?
Rebecca: I think I am excited to see how the device can connect different elements for example playing music and I don't have to use any external speakers. And also just to see how it can start Netflix on my TV by just saying it out loud.
Moderator: Cool, do you think that society needs this or it is going to improve like the way people live. Is it going to make things easier? Do you think this is a valuable step in the development in today's society.
Rebecca: I think currently it's more or less in its first steps of development. So right now, you just play around with it, maybe even harder because there is some bugs which have to be fixed. I think in the future and especially in regards to smart homes, when you can connect the device to your heating and your lights and maybe even to your cameras in the house, it will be very nice.
Moderator: Okay cool, and do you have any fears about using it?
Rebecca: Yes, a little bit because it is always listening and I think that's a bit scary. And also the technology is quite new so it can be hacked.

Moderator: I see. And last question: What's your general attitude towards these devices?
Rebecca: It's neutral with a slight negative touch. Because I don't really that it will make my life so much easier. I think it's also a very hyped item right now. And I don't know if this hype will stay.
Moderator: Okay, cool. Thank you very much for the interview. Enjoy testing the device out and we will talk in 4 weeks from now.
Rebecca: See ya.

Appendix 9

Moderator: Hi Michael, Thanks for being here with us. Thanks for taking part in this study. Can you confirm that we handed over one Amazon Echo Dot to you?
Michael: Yes, I am holding it in my hands as we speak.
Moderator: Okay, so right now we are doing some interviews before the actual tests, which are supposed to ask some questions or find out about your prior experience, just to gather some information about you and your person and about the expectancy that you have towards using this product.
Michael: Alright.
Moderator: So, first about yourself. What is your age?
Michael: My age is 31.
Moderator: ..and you are male obviously?
Michael: I am male and I am from Germany.
Moderator: You are from Germany, okay and what is your current occupation?
Michael: I am a student at CBS, studying e-business and part time worker at Vestas.
Moderator: okay, and in terms of your tech savviness. How interested would you say are you in general in new technology?
Michael: I am pretty interested, besides my age, in trying out new stuff.
Moderator: Okay, so are you saying that you are an early adopter and really at the very forefront of technology?
Michael: Yes, but it is not like I am always trying to buy right away. But I am trying to try it before.
Moderator: Alright, or read up on it etc?
Michael: Exactly.
Moderator: Okay, and which devices do you own?
Michael: Phone, Laptop, I do not own a TV but I am using a second screen at home. Work phone, no console.
Moderator: Okay, good. Fair enough. Then towards your prior experience. Have you ever activated anything with your voice before?
Michael: Yes, but accidently on my phone. Since I am using an Android phone and by saying okay google I apparently started it. And also, on an iPhone by double tapping the home button.
Moderator: Okay, so on your phone it is predetermined that once you say OK Google the voice assistant turns on.
Michael: Yes, it was. But I switched it off.
Moderator: Okay, so apparently you have heard about voice assistants before, you know what they are I guess.

Michael: Yes, I heard about it during the 3rd semester. We talked about it in a course - Artificial Intelligence. And since then I know a bit more.
Moderator: Okay, and are you actively using a voice assistant on your phone? Maybe the one you were just talking about where you would say “okay Google”?
Michael: No, in that sense I am more the old school guy who uses the finger to find information.
Moderator: Okay, and why is that? Why are you not using it. Is there any specific reason?
Michael: Hmm.. maybe I am feeling uncomfortable talking to a device in general. And also, I do not have the impression that I am being faster, because it is maybe to slow or it does not understand me.
Moderator: Okay, so maybe you even had some bad experiences, which now keep you from using it.
Michael: Yeah, or maybe that’s my impression.
Moderator: That’s your impression, okay. Do you think that - because in this study we are talking about these smart speakers, which is a voice assistant built into a speaker - do you think that a smart speaker is different to a voice assistant in a phone?
Michael: (break).. hmm yes it is. Because it is located somewhere. So you.. right now it is for example in that Echo Dot, it’s located in my home, so I can’t really bring it when I am travelling or something like that. That’s one thing.
Moderator: Hmh..
Michael: ..and the Google Assistant on my phone I can basically reach all the time if I have my phone in my hand. So I think the mobility is the biggest difference.
Moderator: Okay, so you think a smart speaker has a fixed location, and in that way..
Michael: Yes, and I have heard that they have - from a technical point of view- better speakers so you can use them to listen to music.
Moderator: Okay, and do you think the technology is in any form better or worse than the ones you have used before.
Michael: No, I think it is the same technology behind it.
Moderator: Okay, and have you ever thought about buying one of these?
Michael: Yes, I was thinking about that once because I … I think I wrote a paper about Amazon in a different context but in that time it launched so I was thinking.. because the price at that time was also quite low.. so.. yeah but I didn’t do it.
Moderator: And why didn’t you when you were thinking about it and the price was low? Was there a specific reason?
Michael: It didn’t happen, I don’t know why.
Moderator: But there was nothing that actively kept you from it?
Michael: No.

Moderator: Okay, cool. So much to your prior experience. Then about your expectancy. How much do you think this cost? You were talking about price just now.
Michael: This Amazon Echo Dot.. uhm.. I know it's a smaller version so I think it's below 100 euros.
Moderator: Hmh.
Michael: 75 maybe? yeah
Moderator: Okay.
Michael: 70, 75
Moderator: Okay, actually this is around fifty Euros.
Michael: Fifty Euros? Okay
Moderator: Yes, depending on which market you are buying obviously.
Michael: Ah okay.
Moderator: Do you think that - now that you know the actual cost - it decreases the expectation that you have of the device. Now that you know it is a bit cheaper than you thought - you said something like 100 euros.
Michael: Hmm maybe the quality of the speakers is less good. But I think in that cost frame it is still the same.
Moderator: So you don't think the technology is worse now?
Michael: Noo.. especially because it's a big name behind. You are used to that they are delivering.
Moderator: Okay, how well do you think it will work in your home. Just in general, do you think there will be a lot of problems with it or do you think it will work right away, and super easy and will be the perfect assistant in you daily life.
Michael: First, I am interested to see how it is to set it up. And I think that in the beginning when I am using it I will try to speak clearer, then I think I am speaking normally with my flat mates for example. So.. Then I will find out how precise it is in understanding me.
Moderator: So you think there is going to be some time for you to adapt and get used to it.
Michael: Yes, to get used to it and see what works best.
Moderator: Do you think it will take a lot of time to get used to?
Michael: Noo, it's just more about that I am not forgetting that it's there and I keep using it.
Moderator: So what kind of influence do you think can this have on your life. Do you think this will help you in specific areas more than others?
Michael: From my prior knowledge I will definitely try to get the weather forecast, I will try to connect it to my music account, and to let see how that will work. And uhm, right now I am using my phone to wake me up.
Moderator: Do you have a Spotify account or something to play music?
Michael: I am using a similar software right now, called Deezer.

Moderator: Ah okay, I am not sure if that is a partner app.

Michael: Yeah, I don't know.

Moderator: And in general, are you excited to use it. Or are you indifferent?

Michael: Yeah, I am looking forward to use it. I am a bit excited to be honest.

Moderator: Is there anything that you are particularly excited about. Or is it just to try something new?

Michael: Yeah basically that. But also, how is it is to use and also how easy it is to integrate it into my daily life.

Moderator: Okay, cool. Then we were wondering if you think that this is an upgrade to society, is it going to bring us a step forward. Or is this just a gimmick?

Michael: Yes, I think it will be more of a hype thing and techies will use it quite a lot. But I think for disabled people it is a really, really cool thing to have for them. And already now but also in the future. People will use them much more.

Moderator: So, you think it will be more attractive to certain niches, such as you said disabled people, maybe blind people - than for mainstream customers so that everybody will have one at home?

Michael: Yeah, it is hard to predict but probably everybody will have a personal assistant around themselves all the time. Its not connected to a device but it will be like interdevice assistants I think.

Moderator: So it is not fixed to one speaker, but its going to be..

Michael: Yeah, it should also be interconnected to all the hardware you use.

Moderator: Okay, cool. Good, than the last question would be: What's your general attitude towards these things? Is it rather positive or rather negative as of right now before you've used them?Michael: Rather positive because I like to try new technology, so let's see how that will work out.

Moderator: Okay, cool so then thank you very much for the interview and enjoy and good luck with the testing.

Michael: Thanks.

Appendix 10

Moderator: Hi John, we handed over an Amazon Echo Dot to you. Can you confirm?

John: Yes

Moderator: Cool, then we have some question about your person. First of all, what's your age?

John: 24

Moderator: And what's your gender?

John: Male

Moderator: And what's your nationality?

John: Norwegian

Moderator: And what's your current occupation?

John: Student

Moderator: And you work as well?

John: Student worker

Moderator: Okay, and how would you rate your tech savviness? How interested are you in new technology?

John: On a scale from 1 to ..

Moderator: No, just in general, just some words.

John: Fairly interested

Moderator: Fairly interested. Okay, so you are not always on the forefront of when it comes to new technologies?

John: No, but I know what it is often.

Moderator: Okay, that's good. And what devices do you own yourself? In terms of media.. phone, a computer I guess?

John: I have a Huawei 8..

Moderator: Yeah, we don't need it on that kind of level

John: Ah okay.. Gaming computer, PlayStation, Sonos speakers

Moderator: Okay, then we have some questions about your prior experience. Have you ever activated something with your voice before?

John: Yes.. but to a very limited extent. Just for fun, you know? Did not use it for anything.

Moderator: And what kind of device was that or..?

John: Both Siri on iPhone and I don't remember what it's called on Android but it's Google's speech thing

Moderator: Hmh, okay. What I am getting from this is that you've used voice assistants before and you have at least activated something with your voice and know a little bit about that kind of stuff. So you just said that you've used Siri and Google Now?
John: Maybe it's called Google Now?
Moderator: There is Google Now and Google Assistant
John: I think it was called Google assistance.
Moderator: It was similar to Siri?
John: Yeah, same kind of thing.
Moderator: Okay, so what our research is about, is about these voice assistants embedded in speakers - so called smart speakers. Have you ever used a smart speaker before?
John: No, but I've seen other people use it.
Moderator: Okay, and have your ever thought to yourself about buying one of these?
John: No, not really?
Moderator: And why is that? Any specfic reason?
John: I guess I have prejudices against these kind of systems because they don't always work and when that's the case it becomes more of a hassle than really a utility I think… So I guess that's the main reason. And also maybe a little bit in terms of privacy,
Moderator: Hmhh.
John: .. you know that everything is recorded and is sent to respective companies, which withholds the information.
Moderator: Okay, understand. That was it about the prior experience, now we have a couple more questions about expectancy: How much do you think this device we handed over to you cost?
John: In what currency?
Moderator: If you can in Dollars?
John: 200 Dollars
Moderator: Okay, so actually this thing cost 35 dollars. So how does - now that you know the actual cost - how does that increase or decrease your expectation ..or doesn't.
John: It decreases a little because now I don't think it can do that much.
Moderator: Okay, and how well do you think that thing works?
John: Uhmm.. I would probably thing it can do trivial stuff like you know, giving me the weather, play the next song - stuff like that.
Moderator: Okay, but in terms of the purpose for which it was created, do you think it will work at all? Like will it understand all your requests and tasks? Most of what you want it to do?
John: Well, that depends but considering this technology has progressed so fast...there is a lot of similar services as well. So I think it is pretty sophisticated for that price.

Moderator: Okay, and how easy do you think it will be for you to use it?
John: Pretty easy. Or at least setting it up. Yeah, I don't think there will be a problem at all.
Moderator: Okay, do you think it will take some time to get used to it or will you be able to start right away and start talking to it?
John: I guess it depends a little. Because, if I bought it myself I would've of course inclined to test it out. And I guess similarly, when you gave it to me I have never anything like it before. So yeah, I think I will use it right away but for very simple stuff in the beginning.
Moderator: Okay, and in general are you excited to use this thing?
John: Sure
Moderator: And what are you excited about?
John: Music Control. When I'm in the kitchen listening to songs on my Sonos speakers and wanna switch the song but my hands are to greasy. I think that would be the main thing I am excited about.
Moderator: Okay, do you think these technologies will make your life easier, or do you think society needs this?
John: Well, not really. Or not me at least. But I guess there are some use cases for people with disabilities.. for several things I would say. Yeah definitely, for example for blind people it could help them to dress accordingly. But for society.. I think it is more of a gimmick right now before it has some real functionality or before it becomes integrated in our lives. You know, like smart phones. In the beginning you use it for simple games but now you use it for everything. So it is more about the behavior and not so much about technology itself. If people get used to it, adopt it at some point then it has it's place in society.
Moderator: Okay, so you think it will be part of the future, it's not like one big hype and it won't be there in a couple years.
John: It could be, could be definitely one big hype. But voice technology will definitely be there in some way in the future. But I don't know how yet. If it will be with these devices or if it will be within our homes, you know. But yeah, maybe at some point. But right now I don't see the need for it. Right now I don't. But I haven't tested it yet so let's see.
Moderator: Okay, so this is the closing question: What's your general attitudes towards these things. Is it rather positive or rather negative.
John: It is neutral to a little negative I would say. You know, due to my past experience that I did not have any use cases for it. Both in terms of that and yeah therefore that I don't need it. But maybe it would be fun, you know, to try it out. Try some new things. So yeah.
Moderator: Okay, cool. So thanks a lot for this interview and have fun testing the device.
John: Thanks.

Appendix 11

Moderator: Yes. Thank you all for coming. We are very happy with that. Just so you know, this is all being tape recorded. You might have guessed that. The reason we tape it, and meet today, is that we would like to use some of the inputs you come up with for answering our thesis where we try to find out what factors motivate and demotivate the use of the speakers you've all used here lately. And since we want to find out both of those, there are no answers that are more right or wrong than others. We have no interest in making it sound like it's a cool or uncool product at all. We are totally neutral in the sense that we try to see it from both sides. Therefore, you also don't have to agree with each other. The only requirement is that you listen to each other. If you agree, you can say that, and if you disagree, you can say that too. I know you all have just greeted each other, but I'm thinking we can just introduce our selves once again.

Miriam: Yeah, that's probably a good idea.

Andrea: Well, my name is Andrea. On Wednesday I'm finishing as a Master of Science in Economics, at the University of Copenhagen. I have a general interest in technology, so I though this was quite fun.

Miriam: And where do you work?

Andrea: Right now, at the Ministry of Finance - two days yet.

Kasper: My name is Kasper. I am 26. I've known Kasper [moderator] since we were young. I usually work with online marketing. Living at Nørrebro.

Mathias: My name is Mathias. I know Kasper and Kasper from Esbjerg. I work at Blue Water and live at Østerbro. I'm not a very big tech nerd, but I should nevertheless be a part of this and actually think it's a little fun.

Miriam: My name is Miriam. I live at Nørrebro. I also deal with a bit of tech in relation to my work with Samsung, for example, who's also made such devices as the one we have tested. I'm also a little tech-nerd, you could say. Slightly.

Mikkel: My name is Mikkel. I'm 30 years old. I'm studying with Kasper at CBS. I work with online marketing at the Red Cross. I'm really interested in tech, so I also think it was very exciting.

Moderator: Yes. I think you know who I am and what I spend my time on for the time being. As a little exercise before we start talking, I think... As you may have seen, there is some paper, and I think if you're okay with it and have some inputs, then before we start talking, please write down some inputs. It doesn't have to necessarily be a top 3, but at least 3 things - if you have it - which you think has been cool and has motivated you to actually keep using it, and then 3 things that have been challenging, and made you think you will not actually use it. We'll start with that. You have all the time you need.

Mathias: Should we write one on each?

Moderator: Yes. And there is no need for super specific things, it may be a on a broader scale that you have thought about. It doesn't have to be very concrete examples – just anything you're thinking about.

[PAUSE FOR CARD WRITING]

Moderator: I'd like you to present your cards, one by one. May you want to start Kasper?
Kasper: All of them, or?
Moderator: Yes. You don't need to explain them so thoroughly, but please say something about it.
Kasper: Yes. First plus I have written, I've called "routines/habits". It's very much a morning routine to ask "what's the news?", "how's the weather?". I got that quickly incorporated. So that has been a huge plus.
Miriam: Yes.
Kasper: So that was easy to make a part of my everyday life. I think if you have to turn on the stereo [to listen to music] and such things, it will take a long time, so it will be a busy morning for me. So, it was very easy for me to just put it [Echo Dot] on, also because I don't need to hear it all. It was just nice that there was a little noise. The second plus is that I think it's very up-to-date. Of course, especially on American stuff, but I noticed that in regards to Trump [news], that it was very well updated daily. I think that was a pretty cool feature.
Miriam: Yes.
Kasper: Third plus is that I think it's educational. I have learned so much by asking for some..
Miriam: I have too!
Kasper: ... things I didn't care about Googling. So, I've used it like Google. And sometimes it has been fun to.. "Does she know this?" and such. It became a part of it for me. And then to the minuses. Number one I've written is personalization. It's both a plus and a minus somehow, but I really should get used to command it. I think that was a bit, not over the line, but unnatural at first. "Alexa, do this and that" and then she could get angry and stuff.

[Everyone laughs]

Kasper: So that's something I had to get used to. Number two is this geographical constraint. I think it would be very nice if I could ask "how do I get to Nørreport the fastest?" or "where should I eat a pizza at Amager?" or something like that. The third is again constraints in terms of info. I'll be visiting the United States soon and thought it might be fun to ask "what should I see in New Orleans?" or something like that. And then it could only say things such as population and something like that, and I know it

will probably come in the future, but as it is right now, I think…. Some things day-to-day things she knows a lot about, but some of the static things I think there were some gaps or what to say.
Mathias: My number one was the same as yours [Kasper]. I've written "daily habits". So, asking for the weather in the morning e.g., it's nice to know if you have to put some extra clothes on and if it's raining and what else. So that's definitely something I use it for. And then I've used the timer function every time I've cooked.
Miriam: Okay?
Mathias: I think it's easier than pulling the phone up. And then I have played a lot of music from the.. Just put a playlist on the Spotify, so I don't have to choose anything, and it's really just background music. I really think that was really nice. And of minuses, I have written that it lacks cooperation with Danish companies. I think it would be smart if, when I get up in the morning, I know if there is a delay with the trains. It would be perfect for me just to know before I get out of the door. And the other I've written is that it doesn't work when there's music. When there is noise, the microphone doesn't work. And I hear much music from it, and then you stand there and shout at it, and it doesn't answer me.

[Everyone laughs]

Miriam: I know that well.
Mathias: Yes, exactly. I haven't written any number three.
Miriam: Okay. I have written "Smart and surprising". I think sometimes you are totally surprised that it could actually do this and that.. Yes.. Info about all this stuff you didn't know. "Fun to use" - it's a bit the same. "Teachable" - that you can discover new things. Yes, and ask it about all this stuff where you think, "that might be fun to ask Alexa or Google about." Then I have written "unnecessary" and I have written that because I don't… I think it's been a bit difficult to get it into those routines in one way or another. So, it was really fun at first, but it's obviously gone downhill because.... I think it's just as easy to take out your phone and play music from it. But I can see, as you guys [Mathias and Kasper] say, it's very smart that you should not choose a song sometimes and just say "Play some music on Spotify "
Kasper: Yes
Miriam: And in that way you can hear some other music than you normally do.
Mathias: Yes, maybe some background music.
Miriam: Yes, exactly. But otherwise I think.. Yes.. I just haven't figured it out.. I think it's a bit unnecessary really. Yes. And so I have written "Awkward to use in front of others".
[Everyone laughs and nods]

Miriam: I had some colleagues visiting from work…

Kasper: Especially if it doesn’t respond!

[Everyone laughs]

Miriam: Yes, some of my colleagues was visiting, and so I just wanted to show how it [smart speaker] worked. And it had been playing music, and then I would ask it to turn off, and it just didn’t bother. And then I stood there and shouted at English in front of some colleagues, so that was a little awkward. And I hadn’t connected it to my phone so I couldn’t just turn it off, and that was a bit.. I was like "Google, come on!"

[Everyone laughs]

Miriam: That's it.
Mikkel: Yes. I've written as number one of the pluses that I was impressed by how good Google Assistant was in understanding speech, like, it's actually very impressive. I think I speak with a fairly thick accent, and I was simply impressed. It's pretty cool that they have come so far. Then I've tried to use it to create appointments in a calendar, and I think it worked very well. Yes. So, I was actually impressed. I think that was something I could use it for in my daily life. And then I just think it's very cool to manage a smart home; put on some music, put a series on Netflix or something like that..
Miriam: Yes
Mikkel: .. where you can just say it, instead of having to find the remote control and something like that. So I think it's very cool. And I think it’s something I could actually use. Of minuses, I've written that it's hard to use when there’s noise, for example music, then it usually doesn’t hear what you're trying to say and that's a huge problem. And then I've written that it seems awkward to use it publicly or when there are others listening. I can’t imagine walking down the street and talking to it.

[Everyone agrees]

Mikkel: And if it should work with, for example, calendar management, or just things in general, you have to be able to use it all over the place.
Miriam: Yes.
Mikkel: .. because it replaces you picking up your phone. So I don’t fully think it's ‘there’ yet..
Miriam: Yes, I think that's a barrier too.
Mikkel: And then I think it's quite clear that Google has made integrations for their own products, for example Chromecast, but what about Apple TV and all these other things? It will have to work with all

products, otherwise it doesn’ matter, and it smells a bit like it’s been programmed for some special features. It is not a person, it is quite clear at the current level. It has to be that it can figure out these things itself. I think that is also a minus. But I’m assuming they’re working on that.
Andrea: Yes. I have written that it has a very good general knowledge database for easy facts, a bit like the weather and stories and such fun things that you just want to know a little about. I'm going to travel soon, so I sat a lot and tried to pronounce long words in Sri Lankan language, and it could actually find, and tell me about the different temples and so on. It's brilliant. For Wikipedia-knowledge, it’s really good.
Mikkel: Yes.
Andrea: Then I think it's a hugely impressive software. I’ve been paying around with programming such a voice recognition software myself, and it is brainlessly difficult. And that in my opinion, is just a phenomenon, really impressive. And then there are many integration options. I also think I have.. I would not need it right now, but I could imagine if I had a home with a TV and with different lights in different rooms and with air conditioning.. If I had, like, an American mansion, as it clearly built for, then it clearly has many uses. I think it's hard to get used to, mostly because it doesn’t really do anything that I can’t already do now. And I believe that it's actually quicker for me to operate many of the things I use it for by hand or with some other type of controller.
Miriam: Yes.
Andrea: I think it's generally paranoia, a bit dissuasive, that it’s there recording me all the time. You don’t have to see many YouTube video where people's children say, "Hey , are you listening?". And all that big data show.. And so I still think there is.. There is a bit of a long way for great user-friendliness. I also think there's a lot of music I have not been able to find where it's pronounced correctly - also big musicians - and just said something "Elton John is not in my libraby" even though I know that if I go in and find it on Spotify, then it can easily play it. And I don’t know where that goes wrong. So, there are definitely some integration bumps.
Mathias: That’s funny, because it knows all the names of Pitbull - Mr. 305…

[Everyone laughs]

Mathias: It just plays it. Not because I listen much to Pitbull..

[Everyone laughs]

Mikkel: Can we talk about which one we all had as?
Miriam: I've had Google.

Andrea: I've had an Alexa.. Echo.
Kasper: Yes, me too.
Mathias: Google.
Andrea: Okay? That's funny.
Mathias: There must be some difference between them in one way or another?
Moderator: Yes, there is at some level. Well, I think, that were some good inputs. It's fun to hear.. To have some other eyes on it. Mathias, do you want to start telling a little about how much you actually used it and in what contexts? Have you used it more or less than expected, do you think?
Mathias: I've used it a lot to start with. For everything I could come to, because I thought it was funny. So, I tried to use it for almost everything. Also, just for things I would not use it for.
Miriam: Yes.
Mathias: But lately, I have more or less just used it to ask about the weather in the morning, and to set timers, and put music on sometimes. It was placed in my room, so you can say that that also has a lot to say, I think - where it is. If it's out in the kitchen, the other people I live with would also use it, and then it will be used for some other things. It's also in the kitchen you are when you figure that "Well, we need sugar, butter, let me add that to the shopping list". You don't do that when you're in your room. So such a feature also dies if you are in the living room. But definitely, lately, I have not used it that much. It has only been for timers and music and the weather.
Miriam: I also think it's gone a little bit downhill, as I said before. It has become a bit unnecessary. But I can also see what you [Andrea] are talking about with an American house, where everything is set up, that that is the point. And with the fridge or.. So yes, I definitely used it more in the beginning.
Moderator: Yes? How about the others?
Mikkel: I actually think I used it fairly evenly, but I still don't think I've used it very much. I've used it a lot to put an alarm clock, put some music on, that's really it, I think. I have also had it placed in the bed room, which may have made a difference. I need to be able to talk to it all the time.
Mathias: Exactly.
Miriam: Yes! Have you had your phone connected to it?
Mikkel: No. I don't know what I expected of how much I was gonna use it. So it's a little hard to say if I've used it a more or less. But I have probably not got it integrated well into my routines and such. That takes a little more time, I think, than the period we have had.
Miriam: Do you think it's because of time?
Mikkel: Yes, because I really think I could use it, but it's also about finding out what's possible and all those things, and I simply haven't read up on that enough.
Miriam: No, I haven't either.
Mikkel: So there's a time aspect, clearly.

Miriam: I don’t think it's because of time, I just think that it didn’t fall into place. I think we’ve had enough time. But it would definitely help if it was plugged in with more devices.
Mathias: I’ve also noticed that every time I speak to it, I look at it to see if it reacts

[Everyone laughs]

Mathias: It would have to be something that just happens naturally instead of having to say "Hey Google"

[Laughter]

Mathias: And then it's running. So, in some way, it loses the effect that it just has to be a natural use in everyday life
Mikkel: Yes.
Mathias: That you don’t have to do anything extra or spend extra time on it.
Andrea: But it's not too much time you save on it either.
Mikkel: No.
Andrea: That was something that occurred to me. That's it’s an extra feature, it's not because it actually gives you some general benefit in your everyday life. You have to do it because you think it's fun.
Miriam: Yes, exactly.
Mathias: It’s a bit redundant at times.
Mikkel: It is the current level of it, at least. It’s just “lir”.
Andrea: I had the same experience that in the beginning I focused a lot on using it, but as soon as I forgot about it, I go back to operate with my other stuff.
Mikkel: Yes, because it has to be easier in one way or another.
Andrea: It's faster for me to open Spotify on my phone than to ask it.
Mikkel: Yes
Kasper: We have talked a lot about habits, and that when I don’t want to hear a particular radio or some particular music, I use Alexa. So I have heard a lot of BBC Radio 6 and such things that I would never go online, only because I knew it was available with Alexa.
Miriam: Yes
Kasper: Jazz channels in the United States and such things.
Miriam: Yes, stuff like that is very nice.

Kasper: I think that was very interesting. But otherwise it has also been a little downhill for me. I've tried to make it a morning habit, but there are also sometimes where two days have passed and then I just noticed Alexa and thought "oh yeah, she's there too." It hasn't become quite natural either.
Miriam: No.
Moderator: So it just stood and listened to you for two days?

[Everyone laughs]

Andrea: Now that's really valuable data!

[Everyone laughs]

Mikkel: But it's…. For morning routines, it's quite cool, but it's a little lacking in Danish, some Danish news.
Moderator: In terms of what you've actually used it for, how do you feel the usability of it has been? Like, if you think about all that you have used it for, how useful is it actually? How are the features and the quality of them?
Miriam: I think it's very cool that it just turns on the TV and switches.. That's it's set up for that. It would make the most sense, again, that it was set up with all the smart things at home.
Mathias: I was also surprised by that. My television is old and not a smart TV, and I just put the Chromecast in and it turned on. It just worked. I was very pleasantly surprised, and as you say with voice recognition, like how well it actually registers it. You can almost mumble something, and then it catches it anyway. I was impressed by that.
Kasper: And then other times, you [???] touched it before, I have had skepticism sometimes, for example, that I look at it like "Is it actually listening to me right now?"

[Laughter]

Kasper: And also that you can ask for something about a great musician and pronounce it well, and then it says "I don't have anything with him" and goes to say a completely different name. Then I think "So fuck it, it doesn't matter then." It becomes a bit challenging sometimes, you feel stupid a times.
Miriam: Yes!
Andrea: We had a thing where it would always understand what my boyfriend said, but not what I said.

[Laughter]

Andrea: And she always became angry. "Why doesn’t it understand me?"

[Laughter]

Miriam: I have also experienced that, and I don’t know if it's because it has gotten used to the voice of my boyfriend and so when I come, it doesn’t recognize me. I've really tried many times "Hey Google, Hello Google, fucking hell ".
Mathias: I had one morning when I couldn’t turn off the alarm clock, that was frightening to me.

[Laughter]

Moderator: I think you talked about it a bit, Kasper, but the personal aspect of these things. They are somehow kind of real people that you talk to. Called Alexa, and Google's name is just Assistant, but has it been fun to talk to some “fake” person? Has it given any enjoyment?
Andrea: It's a little fun to test, "tell me a joke" and such things.

[Agreement around the table]

Andrea: It's quite clear that they've made really, really much of user research , and then they've had some smart programmers who've been sitting and writing funny responses. It's a lot of fun. But I still think that you can feel that it's not an AI [Artificial Intelligence] in any way. It's still predefined answers to everything.

[Agreement]

Mathias: It is also limited so that children can use it. You can’t get it to tell naughty jokes, for example, and stuff like that. It never..

[Laughter]

Mathias: Will.
Andrea: Well yes, but they are American right?
Moderator: But like, is it an important factor that it has this…
Mathias: I would’ve liked that I could go into the settings and go in and set it “open” or something.

Kasper: Yes
Mathias: And so if you have kids, you can go in settings and say that's limited to this. And then you can help yourself to manage what it really could. For example, if you think naughty jokes are fun, then you can get it to tell those.
Miriam: Yes

[Laughter]

Mikkel: I haven't really thought of it as a person actually. I don't know if it's because Google doesn't have a name.
Miriam: I've also thought of that! Because I think it's much cooler to say "Hey Alexa", it did something to me that she had a name.
Andrea: You're thinking about that one iRobot figure..
Kasper: But then I also think the other way around, I think I became very commanding if I, for example, played loud music and really shouted, and at times I could get mad if she did not hear me. "Please just shut up! No, please stop "

[Laughter]

Kasper: I think that something I will have a hard time getting used to.
Miriam: Yes
Kasper: But it may be because it has a name. It may be such a little thing that gives it a personal aspect.
Andrea: My roommate has repeatedly asked who I have talked to.
Kasper: Yes! My girlfriend was also like this at the beginning "Stop talking to Alexa all the time"

[Laughter]

Mathias: I also think the personal aspect went a bit away because there are many things they can't answer. So all the time, "I don't know" or "I can't answer", and then you suddenly realize, okay, it's still just a computer, it's still very limited in what it can answer.
Moderator: But I think it's very interesting that you [Mikkel] have not thought about it [the personal aspect], but maybe that's because it [Google Assistant] doesn't really have a name.
Mikkel: I certainly thought of that, at least.
Andrea: What kind of voice does it have?
Mikkel: It has some men's voice

Mathias: You can choose between two
Moderator: Yes between man and woman.
Andrea: I would actually like the ability to change its names in one way or another. Because I think Alexa..
Mathias: You can do that too.
Andrea: Well, can you?
Mathias: There are four different names for it.
Miriam: Really?
Andrea: Okay, but if you could program it.
Mathias: Yes, okay.
Andrea: If you could call it something, you would definitely be able to personalize it. Like, if it was some Danish name.

[Agreement]

Andrea: "Come on, Carlo"

[Laughter]

Moderator: Are there any of you who have used it instead of some of the other things you usually use? Like did it replace anything? You have mentioned alarms and weather, so I think there are at least two functions where it could be used to take over, but there are other things?
Andrea: Music most definitely.

[Agreement]

Andrea: Speaker and stuff like that. Now I never got it connected to my real speakers, but if I did, it would probably take over the regular amplifier.
Kasper: I usually also listen to music on vinyl, but with that you have to wash your hands, turn on the system, brush off the vinyl, so it’s an effort. It's much easier to say "Play something with someone" if you’re in a hurry.
Miriam: Yes if you’re in a hurry, most definitely.
Kasper: That's right. So at times when I would normally have thought "I don’t have time to hear music", I could just put some radio channel on. I think that was pretty good.

Mathias: And then the thing with that you can quickly search for some Wikipedia facts. It's not something I've used a lot, but at times when there was something I quickly wanted to know, I could ask it and then you got the answer without opening the phone.
Miriam: Yeah. If you were sitting there arguing about something with someone.
Mathias: "Then we'll have it decided! Google! "

[Laughter]

Moderator: Has anyone used it in professional contexts where it could help you with school or work? Or is it just for leisure in your spare time?
Mikkel: It has been spare time for me, but I think that also has something to do with the time we had. You have to get used to it and stuff like that, so it might be that with time it could be used in other parts of one's life.
Mathias: I could really see it being used at work in a meeting room if we were to make a conference call with somebody, it would be perfect instead of those big blocks we have standing in there now.

[Agreement]

Mathias: It certainly would. Also just like a small radio in the office. It doesn't play that loud, so it would be a nice little thing that could just stand in the corner of a small section of the company so you don't blow up the entire office.
Miriam: I don't I think the speaker are that good either.
Mathias: No.
Mikkel: No, you can't say that.
Miriam: It's a bit scruffy.
Andrea: I could imagine that you could use it. Also private. I haven't really thought about making calendar appointments.
Mikkel: No, that's very smart at least.
Andrea: I also think it has to do where I am in my life right now. If I don't have anything work-related to use it for.
Miriam: Yes. And so I think too. I have just switched to Samsung, and you can actually talk to the phone and then she answers through the speaker.

[Suprisement]

Miriam: I did not know at all. It's obvious when Samsung uses Google as a... Yes, I really think that was very cool.
Kasper: I really think it's a limitation that you have to keep close and talk to it very clearly.
Mikkel: Yes.

Miriam: Yes, exactly. I think that [speaking to it through the phone] was very cool.
Moderator: Some of you have touched uponit a little on it with your cards, that you think it's hard to make a habit of using this. Do you think it could go and become a thing you actually use? Like how you use a phone or radio or? And if not, why don't you think so?
Andrea: I'm sitting and thinking that you need to get an introduction to it. Because I think if I went home with it now and have heard what you've all used it to, I'm sure it will be of real use to me. While the things I've found it useful for has been a bit along the way and there has not been enough to help.
Mikkel: I can't help thinking about the time you first got smart phones. I use my smart phone for much more today than I did the first two weeks. So I think that's something you should learn to incorporate. But it also requires everyone to do it, because otherwise..
Miriam: Yes, but you also have Siri, which you don't use.
Mikkel: No, that's right. I have never ever used that.
Miriam: I don't know how good it [Siri] is in comparison Google and Alexa, but I think it has become useless too. I've completely turned it off because I think it's rally annoying that it comes up and says something.
Mikkel: It comes up asking for something strange when you haven't talked to it.

[Laughter]

Miriam: But I know my cousin uses it [Siri] every day. He is an Apple fanboy too, so..
Mikkel: I can't help thinking about that if you're walking down the street and talk to it. People they might look at you weird, I think, if you did. So it kind of requires a bit that everyone else also understands why it is you're talking to it. And I don't feel they would understand that today.
Miriam: No.
Mathias: It may be that in 5 years..
Mikkel: Exactly!
Mathias:.. it's the standard that people say "Hey Alexa", or whatever you say.
Mikkel: Exactly.
Mathias: And then nobody looks strangely because of it.

Mikkel: I think that’s crucial for me if it's going to be useful. It requires that things go hand in hand together.
Kasper: I would also need it to be a bit more updated in Danish.. That's where I feel limited.

[Agreement]

Kasper: Eg. "Where do I get the best Thai food at Nørrebro?"
Mathias: “Order a taxi”, whatever.
Kasper: Yes, something like that. I would use it much more. For now, it's just been fun to figure out how much she really can. I’ve caught myself using it of more out of interest than to make my life easier for myself.
Andrea: I could also think that it had some more automation, that is, when it comes to the sound of a door that opens, my light turns or something like that. When there is no sound in the room for two hours, the TV turns off or whatever it may be. That you could use it that way.

[Agreement]

Andrea: Obviously then it will have a feature that is not in the remote control. Then it's not just an alternative to something else.
Kasper: Yes.
Mathias: Yes, that it would be more intelligent.
Andrea: Yes, then it can surpass [other devices]. Then it's not just a competitor for another way of using things.
Mathias: I also think it's a question of whether you have Phillips [Hue] bulbs at home that could control the light. That’ also a huge advantage to use it daily. My brother has that. 80% of his bulbs at home are those you can control with voice command.
Miriam: Really?
Mathias: So I bought an [Alexa] for him, because it's perfect for him to turn off the light when you’re in bed, I think.
Miriam: Yes.
Mathias: I would really think that was nice.

[Laughter]

Miriam: Get it to read things out loud for you.

[Laughter]

Kasper: Also something like blinds. I could really see myself lying in bed and saying "Alexa, run the blinds up". That would be great. "Make a coffee" and something.
Andrea: If it could be a little more like that one in Iron Man that just does everything for him.

[Laughter]

Mathias: If you could personalize.. I also think a that now I get the morning updates. It might be nice just to say "Google, please update me" and then you just got the five things you had programmed it to inform one about.
Mikkel: Yes.
Mathias: Then you wouldn't have to ask "how is the weather", "put some music on", "what's new", just give a command and then it runs a series [of tasks].
Mikkel: I think you can do that with Google.
Mathias: Can you?
Mikkel: I was playing a little bit in the settings, and at least I could control my morning routine in one way or another.
Mathias: Okay.
Mikkel: I didn't try it, but again, it also means that we just don't know it well enough. An introduction.
Andrea: But it's also something that, like.. If it was something everyone used, you would know what it could do.
Mikkel: Yes.
Miriam: Yes.
Moderator: It may also be a question of how the two respective companies market these products. In regards to the talk with had about updates, and you [Andrea] speak about automation, how you felt that there has actually been some companies "behind" these products? Like someone who's actually working on it and that it gets better? One may feel that it has been put on market and then just been forgotten about. Do you think there is actually a structure behind it, someone working behind the stage?
Andrea: It is clear that if you have the Alexa app.. You then confirm whether it has understood one or not. There is certainly some kind of automated learning behind it. But I think it's a bit too short of time to see improvements or updates. I don't think it has updated in the time I've had it.
Moderator: No? But do you feel that someone is actually working on this? Or do you feel that the companies who put it out are looking at it as a bit of a gimmick?

Mathias: I think it's something that really is being spent a lot of resources on. You can see that Apple is entering the market now with a speaker. On one level or another, it's something that you can do it when sitting in a car - that it has that [voice command] function. That it becomes something one can use in more and more places, this voice command. I think that once it becomes smart enough and can replace some of the things, such as the phone can, then I guess that's something that becomes a bigger part of one's daily life.
Kasper: I think I could feel it [updates] very much, for example "What's the latest about Donald Trump?" There it's really updated everyday and that's a really cool. But one the other hand, it also has the ability to ask "what's up?" and then it can give one story, but it's often something completely unnecessary about something with a boy in Lithuania who has found something or stuff like that.

[Laughter]

Kasper:.. where I simply think "There must be other interesting things" - or give me three options. It's always one random story. So I quickly stopped using that, and I think that's an easy thing [for them to improve], for example, to give three major news and then "Which one do you want to hear more about?"
Miriam: Yes.
Mathias: It may be because it's just a programming that it just chooses this news from this. There 's no human behind thinking "What's interesting to hear ? "
Kasper: Right.
Mikkel: It's also a matter of that is has to be interesting to you. It may not be that we think the same things are interesting, so it's gotta understand what it is you're trying to get it to help you with.
Kasper: Exactly.
Mikkel: I don't feel it's doing that today.
Mathias: I also think that it requires crazy development.,
Mikkel: Certainly!
Mathias:.. to make all of these collaborations with companies to get that information. I really think it's hard to make.
Andrea: It also requires for you to use it a lot to make a data set that is even the slightest bit sufficient [to give information interesting to you].
Mathias: Yes.
Andrea: It may be that in a year, for example, it could pinpoint news which is more interesting [to you].
Kasper: Sure.

Miriam: In general, I also think it’s clear that it may be a little competition for them about who makes the best [smart speaker]. Google, Amazon, Apple. And it's so scary to know that they know, and will get to know, so much about you.
Mathias: There was some of the first things I thought about. Now, of course, there is better microphone in Amazon [Echo Dot] than in Apple [iPhone], but if you have your phone lying on the table, they're completely the same with the microphone e. So, in principle, they have the same access to one's home on the phone.
Mikkel: Yes.
Miriam: Yes.
Andrea: It just doesn’t make it [the situation about data] much better.

[Laughter]

Andrea: We might as well give up. I want to say right away that I will never ever buy such a thing out of pure paranoia, no matter how good it was. Right now. Especially not with all the leaks that appear at the moment [from Facebook]. With the new *dataforordning* you can download your entire Google data dump, where you can see everything Android has.. I have always had Android. It can follow my daily movement for the past six years. That's minute to minute.
Kasper: Wow.
Andrea: It is in a very nice JSON file. You can just go in and there is a likelihood of the means of transport you are in if you are in the process of being in transport.
Mathias: What ?
Andrea: I just tried to plot it for fun, and I could see my run 1.5 years ago in a park in London. Such something can’t be overlooked. It is the big issue for me.
Mikkel: I haven’t really thought about it. In reality it’s probably because you don’t want to give up using it [Facebook etc.]

[Laughter and agreement]

Mikkel: Like, it's Facebook, Google, Apple, and we're using it all very much anyway.
Mathias: And it also proves they can’t take care ofthe data.
Andrea: You can probaly say that about the [Danish] Health Platform too.

[Laughter]

Miriam: No. Before you asked Andrea [to participate], you also asked two of my girlfriends, one of whom just did not want it at home. She had so much paranoia. I think that made me think "Okay, it's really crazy, what you use it for" - so like, what bigger companies can use it for. But at the same time I've also been a bit like that, "okay, I've had an iPhone and a Samsung phone all my life" and that's what they do. Facebook also knows everything. And you have said yes to the fact they can use all one's apps too, so you can't even delete Facebook because it still has one's apps.

[Agreement]

Miriam: So I think it's okay, they can get my data.
Mathias: I read somewhere that when you downloaded Messenger and accepted the terms, it was completely fucked up what you gave Facebook permission to. You actually gave Facebook permission to write a message to your friends. I did not read the things through myself, but there were some who just pinpointed some of those sick things that you actually gave permission to.
Andrea: There were some who made a joke some years ago, where they just copied Mein Kampf in the middle of those "Terms & Conditions ".

[Laughter]

Andrea: There was not anyone who ever noticed that.
Moderator: How important would it be for you? Now you [Andrea] say that it's a big concern for you, but what about you others?
Mikkel: It's not important to me, because I don't feel it makes it better or worse. Because they know, in one way or another, it all. I think that it's the legislators that should step in and do something.
Miriam: Yes.
Mikkel: Something that limits it to everyone instead of just for me.
Kasper: Totally agree. It's nothing.. Like, I don't look different at it than on a phone. It's annoying, but it's a premise that's there.
Mathias: I'm a little divided around it. Because at the same time, what makes it good also in the future, is big data. It can't develop without actually having all that information. So it's also a matter of how good it should be and how much we should give of our information. But it is scary to know that they actually know so many things about one.
Miriam: Yes, yes, they know.
Andrea: It's a long debate this.

[Laughter]

Moderator: We have touched the social aspect a bit. There are several of you who mention that it's strange to talk to it on the street, but is there anyone who has used it in social contexts at home? For fun and games?
Andrea: It's a bit like a party gimmick.
Mathias: Every time a new friend comes over and sees it for the first time, we sit for 1.5 hours and try it off.

[Laughter]

Mathias: I did that at least a couple of times. For the first time, maybe we sat for 2.5 hours and tried everything we could. Talked Chinese and everything. There's something social about it, but once you've done it once, then the next time the same person comes, the show has gone a bit. Then you've gone through it.
Miriam: Yes, that's right.
Kasper: Yes, it's the same with me. What's a hit every time someone is over is saying "Alexa, make a fart"

[Laughter]

Kasper: But then you also become so childish, right? But that's what makes the biggest smile "How fun that it can do that!" And there are different types of farts.
Miriam: Yes, that's right. I've seen something about that it might be laughing awkwardly in the evening. Really scary. You can hear abut that afterwards.
Mathias: I have read that it does it without command. Someone could not get it to stop again.

[Laughter]

Kasper: I've also tried that it started to say something while I was in a completely different room and hadn’t said "Alexa". I think that was a little creepy.
Mathias: They have known been out and apologize, Amazon, and talked about software bugs and such. But people have become totally paranoia.
Andrea: There’s not a long way to things such as chemtrails and desert people.
Mathias: [Laughter] No, there’s not.

Miriam: I think it's very nice that it can play for example sounds of rain, that very distressful..
Kasper: Yes!
Andrea: Really?
Miriam: I assume they have also tested quite a lot about what works well in relation to such a thing when you go home and lie on the couch and relieve.
Kasper: Linnea [girlfriend] and I've fallen asleep to ocean sounds many times. Really many times. I actually think it's very nice.
Andrea: Something like that, for example.. I didn't know that existed at all.
Mikkel: No, I did not know either.
Andrea: I have not thought about that at all. Who would not want to fall asleep to that?
Kasper: That's very nice at least.
Moderator: Maybe it's a matter of just not getting well enough introduced to it.
Mikkel: Yes.
Moderator: For all those features. It obvious that you get very surprised – I do so too – when you find out, that it does something.
Mathias: I couldn't help myself going to YouTube and just seeing "top 10 features" and stuff like that.
Mikkel: I should have done that too. I think I have to buy one. now
Andrea: What is the price tag on it?
Moderator: It has not been officially published in Denmark, but POWER [shop] has just imported some, and they sell the Google Speaker for DKK 490 and Echo Dot for 595 DKK for.
Andrea: Really? That's cheaper than I thought.
Mikkel: Yes, that's not a lot.

[Agreement]

Moderator: Compared to the price, what do you think? Now that your hear their prices, is it worth it?
Andrea: I thought it was more a luxury asset. I thought it was like 1,500 DKK. If the market you want to hit is such tech enthusiasts , then it may almost have the reverse effect that you are priced too cheaply.
Mikkel: I don't know who they want to target. I think they want to target everyone.
Andrea: Yes.

[Laughter]

Mikkel: I had thought.. If you look at Chromecast , it's relatively cheap. I might have thought that it [Home Mini] would cost 800 DKK.

Miriam: I had compared it a bit with my own speaker, which is also a small round one, and that cost 4-500 DKK. So, I really think it's quite cheap because it can do all this stuff a normal Bluetooth speaker can't do.
Mathias: I can't help but think that when they sell it so cheap.. I think a bit, what about updates of it? If it updates, people don't even have to buy another one in two years. Or will it even be updated all the time? When there is a new generation, do they stop updating the old one?
Mikkel: One could imagine paying in personal data instead of.
Miriam: Yes, it's so cheap because they get one's data which is even more valuable [than money].
Mikkel: When you think of those companies that try to get into this market, it's also those who fight over who will have world domination.
Andrea: You can't ignore the fact that having all these devices, it is the basis for all other research. Google has a lot of research going on with something like medication-something, relative *stemmeføring*, etc. This database is worth gold. All languages, all types of people.
Mikkel: I think so too.
Miriam: Yes.
Mikkel: So that they may make some other products they can sell too.
Andrea: Yes! And then again, as you say, he who comes first wins. As soon as the others are out competed, they can set the price as they like. Then you are in the system.
Mikkel: Yes. I've thought about that too, that prices are so low. I think it's crazy.
Miriam: Yes.
Moderator: Does the price have any influence on your opinion as to whether you would use it?
Andrea: I'm just becoming more conspiratory.

[Laughter]

Mikkel: No, I think that.. now it's not just about this product, but the fact that we are giving data, it gives me more back For example, Facebook is insanely good in helping to create events and keep contacts and such, and that's something that gives me more than what I feel I give back[in data]. And I think that's the same with some of these [smart speakers].
Kasper: I feel the same way. I think the whole thing here with big data is pretty scary when you are in it. But it has also made many things easier. I just think it's a premise. Then you just have to decide whether you are in or out. You can't avoid that decision. Unless there is legislation.
Moderator: Yes. We are about through. I don't know if you have anything else on your mind? If you look at your cards now, have you become wiser about something?

Andrea: I was very surprised that it was not better integrated with Amazon's purchasing platform. For that I tried..
Mathias: Is not it?
Andrea: I could not make it work.
Mathias: Is not it because you have to have bought something in there before? Then you can just buy it again? Eg. “Order toilet paper". Then it just makes a repurchase.
Andrea: It may be. I also don’t have One-Click shopping activated in order to limit myself in buying things..

[Laughter]

Andrea: But I think if any circumstances, if there was anything that it should be able to do, then it was to buy from their own platform.

[Agreement]

Andrea: I had a little trouble with that. But that's also because a lot about purchases is also about sitting there and looking at things..
Kasper: Yes. I would never use it for it [shopping]. Never. I want to look myself and have seven tabs up and find the cheapest and read reviews etc. Maybe not on toilet paper.

[Laughter]

Mikkel: Yes, but if you stand in the kitchen and say "sugar" and it just orders it, that would be very smart.
Andrea: It would be crazy to implement it in such something Nemlig.com. I imagine some service where you had a weekly delivery, and then you went all week and talked to it, and then Monday afternoon comes all that you've talked about.
Mikkel: But of course it also makes it difficult for us that we have no such thing right now in Denmark.
Andrea: Yes, we need to have those [delivery] drones coming.
Mikkel: Yes
[Laughter]

Mathias: Is it Domino's in the US where you can just make a reorder of your last order and order pizza?

[Laughter]

Moderator: That's right. There are still some clear geographical restrictions [in Denmark]. You also came across that, Kasper. It’s not very local yet.
Mathias: You could still ask about some local stuff, right? I think when we asked about restaurants, it found some on Ndr. Frihavnsgade [the street where Mathias lives] and such.
Miriam: Did it?
Moderator: It may be that Google [Home] can, but not Alexa.
Mathias: Google may, I believe. I think so.
Kasper: It would really make a difference. Those things. "Who’s playing a concert tonight?".
Mathias: We also asked, and then we got some concert in New Orleans. "Order a ticket, please".
Moderator: Is there anything else you were surprised about during the this focus group?
Mikkel: I was surprised at the features I had not discovered.
Andrea: Same here!

[Laughter]

Mikkel: But it's also because you don’t have anyone to talk to about it. You don’t talk to your friends about it because they don’t own one.
Andrea: Yes, you could use some a kind of Alexa community.
Mikkel: But I remember it was the same with smart phone when I first got it. "Can it do this?" "Wow!".
Mathias: Yes, like when you found out you could swipe it [iPhone menu] up from the bottom [of the screen], and then be able to access the camera and calculator from there.
Kasper: It could be very nice if you weekly.. I know that for Alexa you can go to Skills.. but if you could just ask "what are your latest updates?" I think that would be really good. Also to get people involved in using the new updates, it will also be in their interest.
Miriam: Yes. I just think it's.. You are constantly sitting and thinking what the hell should I ask it?
Mikkel: Yes.

[Laughter]

Kasper: It's scary how little..
Miriam: No suddenly you’re not very creative.
Mikkel: But it also just means that it's not a natural part of one's life, that you have to think about it.

Mathias: But it’s also because, if you make a sentence a little too complicated, it will just answer "I'm not sure about that".

[Laughter]

Mikkel: I think it was a quite annoying with Google that you have to say "Hey Google" or "Okay Google". It's super long.

[Agreement]

Mikkel: That could’ve been shorter. I don’t know how.
Mathias: Again, if you could choose what to call it, that would be smart.
Kasper: All if its attitude, I think. Alexa. It had played something, so it asked if I would hear it again, to which I replied "Yes please, " and then she said "Please is not an option"

[Laughter]

Kasper: That was a little strange, I think.
Mikkel: You've really been fighting with it [Alexa].
Kasper: Yes!

[Laughter]

Mathias: You've been too polite.
Kasper: It really says that! I think that was very strange.
Miriam: "Yes bitch "

[Laughter]

Mikkel: You might have been fighting less with your girlfriend then.
[Laughter]

Andrea: Another observation I've had is that it's such a sci-fi utopia to talk to things. And perhaps the stream of information is just bigger with all these other traditional kinds of controls than just the voice. Perhaps it's [voice] not just the optimal way to control things.

Miriam: I also feel I need something where I can go in and push "Stop" instead of saying something.
Mikkel: Yes, also that you might write to it too. There are some situations where you can't speak if, for example, there is a lot of noise. Then you have to be able to connect to it differently.
Kasper: Yes. Also, that you have to look at it to see if it's listening. So, one way or another, you're still limited to one device. Instead of just talking to the room and feeling sure you you're being heard and understood.
Mathias: Also, the visual part. I can better get information by looking than hearing. So, if I get some information, I'd rather look at it. Then I better remember it.
Andrea: It reminds me of all the school debate that they've tried to integrate digitalization everywhere. Then they found out that you may actually learn better from reading books and taking notes on paper.
Mikkel: Yes.
Andrea: For me it's… Google Glasses also just made a crash and burn. Maybe it's just not the 80's utopia that's the right future.
Mathias: I could not imagine giving my grandmother a Google Home. That would go wrong.

[Laughter]

Moderator: If you don't have anything else to say, I would like to thank you for today.

Appendix 12

Moderator: Welcome Stefan, Thank you very much for being here and participating in this research. You have been using a smart speaker for the last 4 weeks and today we want to ask some questions about the experience that you had with the device. We are tape recording this interview in order use the data for the analysis of our master thesis. I think I told you before: Our goal is to find out what factors motivate and keep people from using smart speakers. Some ground rules maybe: There are no right or wrong answers. We are not trying to sell any of those devices. So if you have any negative comments that's of course part of the research. Okay, so far so good. Are you fine with this being recorded.
Stefan: That's fine for me.
Moderator: Then maybe to start off: Could you maybe in a few words say how your experience was?
Stefan: Yeah, so 4 weeks ago I started to use this Google Home Mini and installed it in my sleeping room at home. In the beginning it was a bit weird to use it, because I am not used to using such a device which is always listening. So in the beginning I kind of had to force myself to sensibilize myself to it. I was using it then almost everyday for stuff when I was getting home from work, for example for the daily news and stuff.
Moderator: Alright and how often did you use it?
Stefan: I think in the beginning I used it at least everyday once. Probably something like 2 to 3 times a day.
Moderator: Cool, and what did you use it for?
Stefan: Uhm yeah so firstly for the news. Secondly, I linked it to my Spotify on my mobile phone which was quite nice and works really well I have to say. And then I used it for going home in the weekends for traffic information. So I could do that whilst I was packing that was quite convenient.
Moderator: In general, did you use it less or more than you expected it to use?
Stefan: I think I actually used it more than I thought in the beginning. I always had a quite sceptical mindset in the beginning towards these devices because they are always listening, which is kind of awkward. And yeah.. Google has all these rules that they do not misuse your data and so on but anyways there is still a device in your living room that is always listening. So that's quite private and I know that my parents for example would never do that. It's a completely different generation. And I think our generation is way less sensitive to this data privacy regulation. So but yeah.. I was a bit critical in the beginning but then I just started using it.
Moderator: In terms of usefulness of the smart speaker. Do you think that the functions you were able to use were useful and were adding something to your daily life?

Stefan: I think for me the usefulness was kind of limited because I don't own many smart home devices which increase the usefulness a lot. And also I had the problem that my WIFI is not the best in my room so sometimes it wasn't able to connect. So if that doesn't work the device is not useful at all.
Moderator: Okay and in terms of the interaction style the voice assistant has. Could you describe that in any way?
Stefan: Uhm. At the beginning when I just started to talk in a natural way to it, it was a bit annoying because it didn't catch all of the stuff I was saying. But then if you learn how to interact with it it's running quite smooth. So if you somewhat follow the rules within the framework then this device can deliver and it works decently. But also last week I was at a friends place and he has the Alexa version and it felt to me that that was even smarter and understood more.
Moderator: Ah okay, that's interesting. So you said once you kind of adapt to the interaction style, so you know how to talk to it, it works. But you can't just talk to it right away like with another human being?
Stefan: Yeah I think that's pretty much what I mean. So I have to say "Ok Google, play song xx by artist yy from Spotify" then it does exactly what I mean but when I just say something like "Hey Google I'm in a bad mood, do something" then it's getting hard. Because it's not a human being you have to give it a clear instruction.
Moderator: Is that something that demotivates you or do you just accept it and then use it this way?
Stefan: No it's not demotivating me. For me this is not a replacement for a human being, it's just an interaction tool for other devices and services. And you can learn and get along with it and then you can use all the functions via speech recognition. Of course the smarter it is, the more it understands the better it is. And for old people that's probably quite important. But in my own case: I am able to adapt my speaking style.
Moderator: Okay. Did you have any problem controlling the device?
Stefan: No actually not. I just plugged it in and then used the Google Home app and within the App there is some instructions. And it worked out decently.
Moderator: Okay, and how satisfied were you with the output quality of the speaker once you asked it something?
Stefan: Uhmm.. well it is quite smart but as I said before sometimes it doesn't get what I mean so I have to reformulate my request.
Moderator: Did it have any professional relevance for you in terms of studying and working?
Stefan: Well, let me think. I tried once to read my calendar so I guess that could be used in a professional way. But as it is positioned in my living room it's not really meant for any professional purposes. But I think there are ways but then you need to reposition it.
Moderator: Okay, and do you think a smart speaker could become a product that you use out of habit?

Stefan: Yes, I think I would probably position it in my living room instead of my bed room but then I imagine that I have a smart TV connected or an oven or whatever then I would freaking love it. So I think as soon as my infrastructure would be there and also the intelligence of the device would increase then I would definitely use it out of habit.
Moderator: I think you briefly talked about it earlier. Were you worried at any point that your private data would get stolen or that there would be any security breach or anything like that.
Stefan: No, I mean after putting it up it took me 10 minutes and then I didn't think about it anymore. But I am not a person worrying about that. Facebook knows everything about me and so does Google so there is nothing to find out. But as I mentioned before I believe this really is a generation thing. Our generation just doesn't care really to be transparent to these tech companies. So I never felt really observed. But I now also saw that Amazon now launched other Smart Home speakers with a screen and a camera integrated and for me that's really borderline then. I also always have a sticker on my webcam because I think that's another step of observation.
Moderator: Okay, so you think the visual recordings would be a different thing?
Stefan: Yeah, for me being observed visually is kind of like big brother. And my voice being observed is kind of tough as well but it doesn't feel as intrusive..
Moderator: Are you under the impression that there is an appropriate structure behind the devices which is provided by the manufacturers. In that case by Google. So what this means
Stefan: do you think this is a standalone product and they just put it out there and that's it. Or do you have the feeling they are providing something to support this product?
Stefan: No, I am really certain that for Amazon and Google this is a cheap tool for them to get into the homes and then they are trying to make the real money off something else. So for Amazon this is a tool to sell their goods. So for them it's just a consumer touch point and there is probably an immense structure behind it with an insane power. So I am quite sure that there is a clear approach behind it and the voice commerce stuff is probably one of, if not the most important strategic capability they are building up right now.
Moderator: Alright. Earlier you were also saying that you were missing an external
ecosystem. Would that be an important factor for you to use it in the long term?
Stefan: No yeah, I think to really use it in the long term you need the infrastructure for it. Because in the end it's just an extension of the use cases you have. Because if you just use the Google web search then for me it's not a very powerful thing. But if you could control all things in your daily life with it then there is no way to circumvent it anymore. So I think building a broader infrastructure around it is gonna be the real motivating factor. And you can imagine that they build this technology into cars or whatever so it's not restricted to be used only in speakers.

Moderator: Okay, interesting. And then about the hedonic motivation. How did you feel about the personality of the speaker?
Stefan: I am not a person that feels any personality there. And I am not trying to build a relationship there.
Moderator: Do you think you could build a relationship, or is the lack of personality a reason why you wouldn't build a relationship?
Stefan: For me this is a tool and I don't want to become friends with it. But old people would maybe, you know? I guess there is a lot of potential for people who have dementia or something similar. But it's just not important to me.
Moderator: Okay, in terms of fun and play did it bring any of that into your life?
Stefan: Yeah there were one or two situations were friends were here and you know we would ask the device to tell a joke or whatever. But I mean it's not putting my fun to a new level (laughs).
Moderator: So the fun factor is not really anything that motivates you for a long time?
Stefan: No, it's really just a tool to interact with but nothing more.
Moderator: About the social influence: How did you social environment influence your use?
Stefan: Hmm I think it's similar to using Siri in a bus. So people look at you smiling and thinking what are you doing? So I think it's more a fun thing but yeah it's definitely not a natural part of the society. Or it could be different in other countries, for example in the US I think the smart speakers are way more spread. But at least in Germany it's a new thing and people react a bit shocked if you use it.
Moderator: And whenever other people were around would that then increase or decrease your use?
Stefan: Neither nor I would say. It really depended on the situation. But people are just not used to it so they are very surprised and a bit sceptical.
Moderator: Okay cool, I don't know if you remember how much the price was actually but it was around 60 Euros. The question now: do you think that the device outperforms the price or the price is exactly right or the price is actually too high?
Stefan: I think the price is alright because it's quite cheap and therefore you get a working piece of technology. But think if I'd buy it privately I would go for the bigger version with a better speaker. Because then this music use case gets quite big. But I think 60 Euros is a decent price.
Moderator: Alright cool. Those were all the questions I had. Do you have any additional comments?
Stefan: Yeah maybe. Another experience that I had was that I used it in German language in the beginning. And there the language recognition was not the best I would say. It didn't seem that smart to me so I really had to give the sentence a specific structure which was proposed by the app. And that made me switch at some points to English language settings. But yeah. That's all I have. Otherwise I think it's a great topic. And these devices will get quite smart quite soon and will definitely be included in big business of Google and Amazon especially. So nice topic.

Moderator: Nice. Thanks a lot for the interview and testing. Have a great day.
Stefan: Thanks.

Appendix 13

Moderator: Welcome Michele, Thank you very much for being here and participating in this research. You have been using an Amazon Echo Dot for the last 4 weeks is that correct?
Michele: Yes.
Moderator: Yes. And today we want to ask some questions about the experience that you had with the device. We are tape recording this interview in order use the data for the analysis of our master thesis. For that purpose we are tape recording the interview. Is that fine with you?
Michele: Absolutely fine, yes.
Moderator: Cool. I think I told you before: Our goal is to find out what factors motivate and keep people from using smart speakers. Some ground rules maybe: There are no right or wrong answers. We are not trying to sell any of those devices. So if you have any negative comments that's of course part of the research. Okay, so far so good. Maybe to kick it off: Could you name the things that you thought were really motivating or really demotivating when using the speaker?
Michele: What I found motivating was that I could integrate a lot of different apps [skills] and kind of give a profile to the device as you desire. This is interesting in a way that you can really play around. But then I think this fun exhausts quite soon. Also because right now this app [skill] offer is not that wide in terms of complexity. They are all more small games as in the App store of the iPhone. So I believe we are still in the Pacman era of this… So yeah some of them were cool and others were just super simple. Nevertheless it was motivating in the first moment. Demotivating I thought was that some functions were not precise. For example for the calendar I was not able to integrate several calendars or import it in a single on. So it had some compatibility issues there. Also what I think was demotivating is that right now I don't see the smart speaker as a substitute for a smartphone. They are not actually enriching the functionality of the smartphone but more substitung visualizations on screen by audiolizing information. But the things that they substitute are not complex enough so that you could not do it with the smartphone. So for example the calendar. Having it on the speaker does not substituting having it in more detail and more accurate on your phone. They are ramping up to start to include more and more functions but right now it's pretty basic stuff that doesn't justify using it instead of the smartphone.

Moderator: So you think it doesn't really offer you more than your smartphone could do?
Michele: Yes, but also because I don't own any other smart device that I could connect but even then I could just use the smartphone in exactly the same way. For example controlling lights with a dimmer, or a button to switch it on or off. And we are having our phones in our hands so long during a day so..
Moderator: How often did you use the smart speaker?
Michele: In the first days I used it quite a lot. I even took it to work because I wanted to see what it could do and what they would have liked to do with it. Just because I myself was a bit short on ideas in terms of what to download. So in the first days I used it all the times and also tried to make some experiments like setting an alarm to wake me up and then start a relaxation music stream to sleep. Then after that the times I used it got less and less until a point where my curiosity expired and I didn't use it anymore in the end.
Moderator: So do you think you used it more or less than expected?
Michele: I don't think I had big expectations before. So I was just curious to see how it could build up on existing technologies. To be sincere, I expected something more. It was a little bit dumb in understanding natural language. But I also think that's something that will develop quite a bit over time. So maybe if I use it in 4 months again I find it good enough.
Moderator: You said you used it for a lot of games but then you also said you brought it to work. Did it have any professional value for you?
Michele: No. I tried to give it some work relevance but it doesn't really have some function right now on the app [skills] store with any kind of office usefulness.
Moderator: Okay, fair enough. In terms of interaction quality: how did you experience the interaction with the device?
Michele: I think it's good. But then again I think that the interaction is so much in our hands in terms of what we install or what we ask. So right now it's so blank in a way that the amount of fun or the user experience depends on what you put into it, how you configure it and to install the right applications [skills]. So yeah.. if I were to give it a grade I would give it a 6 out of 10.
Moderator: Okay. And in terms of how the speaker communicates and responds. Is that something that is fun or annoying et cetera?
Michele: I don't know. I can see how some people find it annoying if you can not iterate questions to make them go from the most general to the most specific.. but being quite a nerd myself and knowing the challenge behind it, I don't really get pissed off when I ask super hard questions and I don't get the best answer. So I just try to work around it. But it doesn't create something that I do out of curiosity. But I don't really feel anything like happy, angry.. I was just doing it.
Moderator: Did you have any problems in controlling the device?
Michele: In what sense?

Moderator: In a sense that it wouldn't be able to recognize your voice, so more in a technical way?
Michele: Hmm not really. One thing was annoying. So everytime you receive a notification on the app the device gets a yellow ring. So for example if you are sleeping during the night and you forget to turn your phone off or unplug Alexa, then it could be that you receive notifications and is really bright at night.
Moderator: Okay, but you never had the problem that it wouldn't respond at all?
Michele: No, only if I made it artificially complex by playing loud music next to it.
Moderator: So technically you think it works more or less fine?
Michele: Yes, it would even hear me when I was in the living room and calling and it was positioned in my bed room. So no problem there. Moderator: Okay, cool. And if you talk about the output quality. More about the information that it gets back to you with more than the interaction style. Could you say something about that?
Michele: It is not like Alexa is either dumb or smart but it's the apps [skills] that are either good apps [skills] or not so good apps [skills]. Some of them were very accurate and comprehensive. Like I tried this super accurate weather forecast. Others were just plain dumb. So I think it's not about Alexa but more about the apps [skills]. Also if you ask for your news flash, with some skills you are not able to go exactly to what you want but rather Alexa is listing all possibilities and then also reads the entire description from the app store. So it gets horribly lengthy and that makes it absolutely unusable.
Moderator: So you think the AI is not as advanced and could replace somewhat a human being at this stage?
Michele: To be sincere I never ever had the impression to talk to a person.
Moderator: And did you expect that beforehand?
Michele: No I didn't. Because of common knowledge and news I went through in the last year. Even big news like this AI powered robot who got the citizenship in the UAE. Even that was clearly not natural and so I didn't think this would be like a human being.
Moderator: Do you think smart speakers could become a product that you use out of habit?
Michele: Again, they could if they make things more lean, so replace and shorten some complex functions. But the problem is that the things it tries to build upon and make more efficient are already so much optimized for smartphones that having any time savings are basically impossible. So unless you use them as a gimmick other devices in an IOT manner – but then it's not necessarily about a voice assistant but general about an IOT control - I could not see myself using it out of habit because I could just do everything faster with just clicking. I think the problem is triple in this case: One thing is that you build upon certain functions so that you have a deeper degree of integration, secondly you could make things more lean and thirdly it can just be a universal integrator or connector in the IOT world. The last one I think is the easiest one to build some value right now if you have a lot of smart devices

in your home. While the others are easier to build upon it's really really hard to make things quicker. Because in that sense these smart speakers are late comers in the industry.

Moderator: Okay, and do you think in IOT environments eventually we will have voice assistants steering it all?

Michele: A hundred percent, definitely. because then you have a lot of complex interactions that are not easily steerable through a phone. And I think if you are inside a place - for example your house - then it makes most sense to interact by voice.

Moderator: Okay, so you acknowledge the power of voice. But for smart speakers it's not enough right now?

Michele: Yes it has just some inherent technological limits which makes it either unaffordable if you want to have the proper technology - because in the end these [Echo Dot] are cheap devices. So I assume that if I was to spend a 100k I would get this super advanced machine. Like an IBM Watson or so.

Moderator: I see, yeah. Next question: Computer anxiety. Where you concerned about any privacy or security issues?

Michele: No, not at all. We already live in a data rich environment where data miners extract data from us for such a variety of interests.. so it gets trivial. Even if they would listen to my conversations they would not learn anything that they don't know already.

Moderator: Okay I understand. And in terms of external factors. You had the Amazon Echo Dot. Were you under the impression that Amazon is providing some infrastructure or support system for the Echo Dot?

Michele: To my knowledge and to my use it is more a stand alone thing. But if I subscribe to AWS or GCS then I could use tensorflow or any other machine learning tool to train the AI I guess. And then obviously it has some interconnections with other services of Amazon, such as the Amazon web services but for the rest I didn't do it to shop online or to do anything else: like reading Kindle. So I believe that is possible yes, but I didn't use that. So paradoxically how I would use the external system of Amazon is to train my own AI.

Moderator: So you would say that you are aware of this ecosystem but didn't really use it?

Michele: I am a hundred percent sure that the device was built in a way to encourage more profitable interactions for the firm. Such as making purchases more easy on Amazon or for making reading books extremely easy, so you buy more.

Moderator: How important do you think is an external ecosystem, e.g. smart home, to motivate continuous use?

Michele: 100%. It's the only reason right now that keeps you using it. It's the killer thing.

Moderator: In terms of hedonic motivation: How did you perceive the personality of the voice assistant if there was any?

Michele: I didn’t perceive any personality and it didn’t matter to me.

Moderator: In terms of fun and play did it bring anything into your life?

Michele: Ah I mean I played a game called “Yes Sire”, which I found was really interesting. But that was also only to a limited extent and for the rest it didn’t bring too much happiness in your life.

Moderator: And do you think this fun factor would be something that motivates long term use?

Michele: Yes, however there is the risk of making it a game station where you play vocal games with, which then it outplays the rest of the usefulness. So yes, maybe.. but I don’t see it happening right now.

Moderator: In terms of social influence. Did your social environment influence your use in any way?

Michele: Uhm, so my one roommate really encouraged me to use it. But for the rest I think it was pretty much neutral besides a considerable amount of scepticism by another one of my roommates, who didn't really want me to use it. But in both senses I didn’t really feel influenced. But I could really see how when there is four people around that continuously detract the device then it becomes annoying and then you stop using the device to maintain social harmony.

Moderator: Alright, then in terms of the price. It was about 60 Euros. Do you believe the device outperforms the price?

Michele: Definitely, not. I think it’s reasonably cheap. And they are trying to make it as cheap as possible. But I think I would be willing to pay 150 Euros instead of 60 Euros and be able to receive a little bit more.

Moderator: Receive a bit more in terms of..?

Michele: Yeah that’s the problem..It’s not because of the tool itself, it’s rather because of the skills are not good enough. So if Amazon takes this premium of the price and instead focuses on development, which also Apple has done, and thereby encourages the development of better software, then it would make sense. And if I know that the money I am investing is used to produce better software then I would have no problem paying it.

Moderator: If you were to put a price tag on the product right now?

Michele. It’s a gimmick: 20 to 30 Euros.

Moderator: Okay, those were all the questions. Do you have anything else you want to mention? Anything else we didn’t discuss yet.

Michele: No not really. The key concept I wanted to explain was those 3 things. About either building up, cutting down time or integrating. That’s how I would sum up the current structure. And also that right now for me it’s a substitute for a smartphone without making it more efficient.

Moderator: Cool, thank you very much and have a good day.

Michele: Thanks, you too.

Appendix 14

Moderator: Hi, welcome and thank you very much for being here for this second round of interviews. We are tape recording this interview in order to transcribe it in order to use the data for our interview. For you to know what this data is for: we are using this data for the analysis of our master thesis where our goal is to find out what motivated and what kept you from using those smart speakers. The ground rules for this interview: there are no right or wrong answers. Just use your gut feeling. We as the survey creators have no interest in promoting the smart speakers or making them seem cool in any way. So if you have any negative feedback that is of course fine as well. Okay, so much about the ground rules. Can you tell me how often and when you used the smart speaker approximately?

Rebecca: I used it almost every day but very limited meaning maybe 1 time a day.

Moderator: Was it more or less than you expected?

Rebecca: It was way less than I expected.

Moderator: Okay, and about the times when you used it. Was it more in the mornings, evenings or?

Rebecca: It was pretty random but I guess more in the evenings when I had more free time.

Moderator: Hmh, and what have you used it for?

Rebecca: I used it for information searching, for alarm clock in the morning and probably the most for playing some music and for setting a timer for cooking.

Moderator: And did you also use it for any fun activities or games?

Rebecca: I would not know how to do this, so no.

Moderator: So for you it was more of a practical use?

Rebecca: Yes exactly.

Moderator: So you said you did not use it as much as you thought you would. Why is that?

Rebecca: Uhm, once I got the device I was playing around with it and obviously you are discovering all features. But once it's figured out and you know what it's able to do of course you use it less. And after discovering all the features it appeared to me that it didn't have as many features as I thought it would have. Which is maybe also due to the fact that I am not very tech savvy. And I also had a lot of difficulties, which was mainly that the device didn't recognize my voice correctly, especially when it came to music and searching for tracks on spotify. Very often I got the answer "I cannot yet do this" or "I don't know if I understood this"..

Moderator: Alright, and in case it gave you a good answer or it was a decent dialogue. How did you feel about the interaction with the device?

Rebecca: I personally feel a little bit weird talking to the device. Especially in front of other people. I think it's weird and that also probably affected why I did not use it as much. Because I was afraid it

wouldn't work and most of the time the device didn't do what I wanted it to do. And that was kind of annoying.
Moderator: And when you are only thinking about the interaction style of the device. How it speaks, what kind of language it uses, the speed it has to answer questions etc. Was that enjoyable or was it not important to you at all?
Rebecca: I used it in two languages, first in German and then in English. And I found that German sounded quite unnatural in regards to the melody of the sentence and the pronunciation. English sounded much more authentic and also cooler.
Moderator: Okay, so was it close to talking to another human being.
Rebecca: Yes it was very authentic. But then if it doesn't understand what I am saying then it doesn't really matter how nice it sounds.
Moderator: Okay, so for you it was more about the usability. Were there any other technical constraints that you had when you used it?
Rebecca: Yes, for example I couldn't connect to my iPhone calendar. So when I tried connecting it said "I cannot do that yet". Another example was changing the alarm clock. Apparently that's not possible. You apparently have to delete the alarm and then set a new one. And also changing the language was quite difficult in my opinion, so I had to google it.
Moderator: Alright, and was there any professional use for you? In terms of studying or working?
Rebecca: I mostly did not study at home so I couldn't use the device for that.
Moderator: Okay, and do you think a smart speaker could be something that you use out of habit?
Rebecca: If the functionality would be improved then I can definitely see myself using it. But it would need some time, maybe a month or even two to make it a habit.
Moderator: I see. So you know that the device is in listening mode 24/7 right?
Rebecca: Yes.
Moderator: .. so were you in any way worried about your privacy or security?
Rebecca: To be honest I did, yes. Especially, since the Facebook data scandal came up. I was thinking about that it is recording everything but then again I think what I am saying here could not be of any use. Maybe could see what I am searching for but eventually it's the same as if I use my laptop. But I might not use this in a professional environment, where there is information that shouldn't be available for other persons.
Moderator: Okay, and would that be a reason for you to not buy or use the product or is it something you are aware of but do not really care?
Rebecca: Yeah it really depends on the use. For personal use yes but not at work.
Moderator: I see. And did you have the impression that Google is improving the speaker and the is building a supporting environment.

Rebecca: No, not at all.

Moderator: So you have the impression that this is a stand alone product?

Rebecca: Well, it depends on how many updates there will be but right now..

Moderator: .. did you notice that it was showing any form of learning while you used it?

Rebecca: No, not at all.

Moderator: Or was it getting much smarter?

Rebecca: Not not at all.

Moderator: Alright. How important do you think is a working eco-system in order to motivate continuous use?

Rebecca: I think it's fundamental to fully exploit all features and possibilities of this device because I think I can only use certain parts of this device because I think I can only use a certain part of what it is capable of. So currently it's an extra item I use which is not integrated in my daily life at all and integrating external devices would change that definitely.

Moderator: Okay, so apparently it's very important point for you. Then, how did you feel about the personality of your assistant? Was there any and did it motivate you to use the device more or less?

Rebecca: I was not under the impression that there was much of a personality behind the device.

Moderator: Okay, and do you think if it had more character and was maybe a bit more edgy it would make it more interesting to talk to it?

Rebecca: No, I don't think so. I think it needs to be a neutral personality.

Moderator: I see. So you said you used it for a lot of practical things. Did you also use it for some fun things?

Rebecca: No not really. I mean it can be fun to ask it what's this and that in another language or if you ask it questions you can have some fun with it. But for me the fun is limited.

Moderator: Okay, so you wouldn't say that fun is a motivating factor for using the device?

Rebecca: I think fun is not the issue here. Fun is not important.

Moderator: Okay. If you feel like that, that's totally fine. Earlier, you said that your social environment influence the way you used it.

Rebecca: One of my roommates was very excited about me having the device and wanted to use it all the time. It might have influenced me to be more curious about how it works.

Moderator: So you have the feeling that because your roommate was curious about the speaker it also increased your interest in using the device.

Rebecca: Yes, exactly.

Moderator: Okay, anything else?

Rebecca: Yes, it is a bit weird to talk to "nothing", to talk just into the air. And the fact that it didn't understand me most of the time in front of my roommates it made it even worse. Because in the first

place, it's quite weird to talk to it and then it is even more weird if it also doesn't understand you. So. this kept me a little from using it when other people were there.
Moderator: And did you notice a difference when there were people you know around, and people you don't know?
Rebecca: Yes, it is also a difference if people know that you have the device or they don't know. Because if they know they might be surprised that you just start talking and think that you are a bit crazy. But once they know it's okay, but it's still a little bit embarrassing if you start using it and it doesn't work.
Moderator: Aha okay. Then once more question towards the price. I am not sure if you remember from the first interview how much the device was?
Rebecca: Hmm around 40 Euros, 30 Euros?
Moderator: I think it was actually around 60 Euros. Do you think that the device outperforms the price?
Rebecca: I wouldn't say so. I think that right now the device is not useful enough so that it would justify the price.
Moderator: Okay, so if you were to put a price tag on the device to value the experience that you had. Could you name a price?
Rebecca: 35/40 Euros I think.
Moderator: Okay, so there must be at least some value for you.
Rebecca: It is a technical device which costs money and has a speaker.
Moderator: Okay and now in general. If you could name three things that motivated your use and three points that demotivated your use?
Rebecca: Uhm yes, first of all it's something new and it's always nice to try a new technology. And of course, the brand google plays a role because it's a very famous brand which produces these interesting products and you kind of want to be part of the whole thing, of the innovation. And also, I would like to try it out with some external devices but then I probably need to buy them. But it's also nice because it looks cool in my room and it's nice to show it to my friends and say "Yeah, that's my Google Home Mini, come and give it a try". And I think it would be interesting to integrate it into my study process.
Moderator: Okay, and do you also have some factors that demotivated you?
Rebecca: Yes, I mentioned it a couple of times now that it sometimes didn't understand me and some easy tasks didn't work, like connecting it to my calendar and to my Smart TV because I didn't have a Chromecast. So yeah for me there were too many technological limitations.
Moderator: Cool, thanks! Then I think we can close this interview. Thank you very much for participating and have a nice day.

Appendix 15

Moderator: Welcome Michi, Thanks for being here and thanks for participating in this study. We are tape recording again if this is fine with you?
Michael: Yes.
Moderator: I think we talked already about what this is for. The results of this study we will use for our master thesis. We will transcribe this audio recording and then use it for our analysis. The goal is to find out the factors that motivate and keep people from using smart speakers. Small ground rules: There are no right or wrong answers. We are not trying to sell any of these products, nor try to make them cool or something. So, if you have any negative comments that's of course fine and part of this research.So first of all: you have used an Amazon Echo Dot for the last 4 weeks. Could you maybe name three things that motivated your use?
Michael: First of all, it was interesting to use such a device, or test such a device because we talked about it in some courses in university. So, it's somewhat a hot topic, so I wanted to get more into that. I also wanted to find out how good is it in understanding me.
Moderator: Cool, and how often did you use the speaker?
Michael: I would say almost daily.
Moderator: Okay, and were there specific times in which you used it more often?
Michael: I would say in the morning I used it most of the time to get my music running and sometimes, not everyday I would ask for the weather. And sometimes I tried to get information about the news, and I downloaded a skill to get one of my newsletters read out to me. So that was pretty cool.
Moderator: So, was your use more for practical task or more for fun stuff or was it equal?
Michael: Mostly fun tasks like music. Practically, weather, news, traffic, but that didn't work too much.
Moderator: Okay, and did you use it for any kind of work related tasks or study related tasks?
Michael: No not really, I didn't use it as a calendar. Just tried to set some alerts or some reminders to set an alarm for two hours or something.
Moderator: Then in terms of the usefulness. How did you perceive the usefulness of the speaker?
Michael: When it comes to music I really enjoyed it because you don't have to use your finger anymore. And I would say 85% of the time it understood what I wanted to play. And also when I wasn't using Alexa but was using my iPad it was different. I had the feeling that it sometimes took longer for me to find the music I wanted to listen to. And sometimes, because I am using Deezer, you really needed to tell the device that you wanted to listen from Deezer and not from your Amazon Music account. That was sometimes a bit.. not frustrating.. but it needed some time.
Moderator: And how did you experience the interaction style of the device? Was it smooth or fun or annoying or…?

Michael: On the one hand the voice interactions I didn't have much problem with that on the other hand the visual interaction with those LED lights I really liked. Especially, when you want to lower or higher the volume.

Moderator: ..what exactly happens then?

Michael: The LED switches to white and then you can see how loud it is. So, a full circle means it's at maximum volume and then you can adapt that.

Moderator: Ah okay.

Michael: ..and I think you also get some feedback of where you stand in the room because the microphone that is closest to you then turns on so I think that's pretty cool that the LED is also giving you an impulse in the conversation. What I didn't do is using the physical buttons on the device.. or just once turning it on.

Moderator: Okay, did you experience any problems controlling the device. Any problems triggering it or to make your voice heard or something?

Michael: I had some problems setting it up.. Because I am using Amazon with my German account. But then I wanted to test the Alexa application in English. And that worked well in the beginning up to the moment when I wanted to download a skill. That didn't work out so I needed to switch back to German and then I was able to download it. So, there were some issues with setting it up.

Moderator: Okay, but you didn't have any situation where you wanted to call Alexa and it didn't respond at all. From a technical point of view?

Michael: No, it was more in terms of the clearliness of the input I was giving then at that moment I guess.

Moderator: Okay and how satisfied were you with the output quality of the device. Was it accurate information, accurate service given it understood you correctly?

Michael: Yes, because it helped that you also have the smart phone app because it helps to set up your location and news feed and skills. And you can also connect it to your music provider. So that worked quite smooth.

Moderator: And did you have any bad experience with the usability of the device?

Michael: Hmm, well the downloading of the skills didn't work so after that I did not download any other skills. I decided okay, for me playing music is the killer app and that's how it is.

Moderator: Alright. And in terms of your expectations that you had would you say now that it met these expectations or did it do worse than what you thought it could do?

Michael: My expectations in the beginning weren't that high and also the experience was.. I was satisfied was the product and I was also thinking about getting one but I also wasn't blown away.

Moderator: Okay, so you would not exactly buy this product right now?

Michael: Hmm I think I would try another device, maybe the Google Home and then see. And I also probably would need some more connections.. speakers and stuff like that.
Moderator: I see. Do you think that the smart speaker could become something that you use out of habit?
Michael: Yes, I think in the mornings especially when you wake up and you don't want to stand up right away. So, in that moment you can ask your voice assistant to play music or give you some music or ask for the news.
Moderator: Okay, cool. Another point: probably you are aware that this is on an always listening mode. Was that ever a concern for you, in terms of privacy or security. Did you ever feel uneasy?
Michael: No because I knew beforehand that it was always on.
Moderator: Okay, so you were never in doubt that your private data could be conveyed to some external party and be used to serve you ads or something like that.
Michael: I know that that's happening and I am not concerned about that.
Moderator: Alright, interesting. And also, no security related worries?
Michael: No, and also something like my bank details I didn't talk that out loud.
Moderator: Alright, but you also wouldn't say it then?
Michael: No, I wouldn't say my pin code out loud for example.
Moderator: Okay, in terms of external factors. Do you think that there is some big structure behind it. So, put differently, do you think this is a stand-alone product or there is a lot behind it to support it and integrate it?
Michael: I think it is integrated. Because you have to use your existing Amazon account so it also gives them the knowledge on who is using the device. And I also got a newsletter after I set it up.. so, I probably agreed to it but still I didn't expect that. So now I am receiving newsletters about what you can tell Alexa and stuff. So, in that sense you can really feel that there is like a framework behind that supports the product and the development. So, you can really feel that they are learning on the input of the user and also trying to monetize it of course.
Moderator: Did you have the impression that your Alexa got smarter over time?
Michael: I think it was too short the test period to answer that properly.
Moderator: Okay, cool. I think the next one you touched upon earlier. The question would be "How important do you think is an external eco-system in order to motivate continuous use"?
Michael: I think it is important. Especially for the Echo Dot, which is the smaller device of the Echos. The sound quality wasn't that good so if I was using that device for a long time I would try to connect it to a bigger speaker. And besides of music I think it is cool to pair it with other smart devices such as heating or lighting.
Moderator: So you think that would make it more useful and motivate you to use it more?

Michael: Yes exactly.

Moderator: Do you think there was any personality behind Alexa and was the personality a factor that motivated you to use it?

Michael: Not really. I think in the beginning I tried a bit and asked a bit more funny questions or more personal questions and then the feedback was.. she got back as a person but you could really see that the programmers developed it in a way that you can't really dig deeper. So, it's always a closed answer and that's it.

Moderator: Okay, and do you think it would make it more interesting to use if there was more of a character?

Michael: Maybe yes. I think in my situation right now I wouldn't benefit so much from it but when it comes to elderly people or people who are sick or disabled and need some company this can be beneficial.

Moderator: In terms of fun and play, did it bring any into your life? Did you enjoy having it around and using it?

Michael: Yeah in the beginning I tried a lot. And sometimes I asked about a bad joke or something like that. So, for a couple minutes that is fun of course but then I never did it again. So, it keeps you interacting in the beginning.

Moderator: Okay, but you don't think that is enough to motivate people to keep using it.

Michael: No, I think the fun factor is key in that context.

Moderator: Okay, cool. So, you live in a shared flat if I am correct?

Michael: Yes.

Moderator: Did your social environment influence your use?

Michael: Not really, my flat mates didn't really use it. I showed them but I had it in my own room.

Moderator: Okay, and did they appreciate it or dislke it?

Michael: Hmm no nothing in that sense. They were a bit surprised about it but then I showed them and then it was fine.

Moderator: Okay, and did you ever use it when there were some other people in the room?

Michael: Yes.

Moderator: ..and did that influence your use in any way?

Michael: Hmm, no it was more funny. Thinking about "Okay, what could I ask her?".

Moderator: So, this was something you would show off to your friends.

Michael: Yeah exactly, because it is quite new and not many people are having it at home.

Moderator: And if you think if there were some strangers in the room, would you still talk to Alexa?

Michael: Yes, I think it's funny in the first situation.

Moderator: And after that “fun phase” in the beginning. Would you use it for practical things as well in the presence of other people?
Michael: Yes, because I am at home. That makes a big difference. I don’t use a voice assistant when I am in public transportation or something but at home it’s fine.
Moderator: Cool, then in terms of the price. Do you think it outperforms the price or maybe the other way around?
Michael: No, I think it’s a good value for the price. Of course, I didn’t use the full possibilities. I think that’s also the goal of Amazon to keep it in the low-price segment to extend their data. But I think the value for the money is good.
Moderator: Okay, and one question I forgot to ask earlier. Did you actually use it more or less than expected?
Michael: I think I used it more because I really liked the music functionality, which was surprising. But for the rest it was more or less like I expected.
Moderator: Cool, and do you have any additional thoughts that you want to mention. Anything we did not discuss or any flaws you had?
Michael: No.
Moderator: Alright, cool then we can close this interview. Thank you very much for participating and have a great day.
Michael: Same to you, thank you.

Appendix 16

Moderator: Hi John, welcome and thank you very much for being here for this second round of interviews. We are tape recording this interview in order to use the data for our interview. For you to know what this data is for: we are using this data for the analysis of our master thesis where our goal is to find out what motivated and what kept you from using those smart speakers. The ground rules for this interview: there are no right or wrong answers. Just say whatever comes to mind. We are not trying to sell the smart speakers so if you have any negative feedback that is of course fine as well. Okay, so much about the ground rules. So you have used the speaker for 3 to 4 weeks now. Could you maybe come up with 3 things that motivated your use of the speaker?

John: I used it for very few use cases. So for example for setting the alarm clock and asking it questions. And I thought it was cool to connect it to my Sonos System. So that was cool.. And yeah I used it for some fun activities.. I played the jeopardy game, which I sucked at..

Moderator: Okay, and did you use it for any professional or study related tasks?

John: Not really, no. I mean I asked it some things about general knowledge but I guess that does not really relate to studying. So yeah, not really.

Moderator: Okay, and could you say how often you used it and to which times?

John: Yeah well, I used it a lot in the beginning. And then less after that. Because I then figured that there were not as many use cases, at least for me.. And I guess I used it mostly in the mornings for checking the weather and stuff. yeah..

Moderator: Alright and did you use it more or less than expected?

John: Way less than expected I would say. I tried it out but then I didn't help me with much and I needed to set up a lot of things in the app and I got a bit frustrated. And also my girlfriend was getting annoyed by it . So yeah that made me use it less I guess.

Moderator: Okay, I'll try to dig into some topics here. So how did you feel about the interaction with the smart speaker, the way it engaged with you?

John: Uhmm.. fine I guess. I think the interaction itself was okay. But most of the time it was not really a conversation because I had to say Alexa all the time to continue speaking.. and yeah so it kind of interrupted the natural rhythm. And also it sometimes kept babbling on without me saying "Alexa" and that was very creepy. So it was just talking and sometimes it would try to add stuff to the task I prompted. So when I ended the game jeopardy it would say "Hey try this and that or do this and that" and I just wanted it to shut up then.. like I don't want to hear that, be quiet. So I think the voice and language was okay but just the way it was talking and sometimes not stopping and adding stuff was really annoying. And that also annoyed my girlfriend even when she was in another room.

Moderator: Okay, so in your opinion it is not like talking to another human being.

John: No, not really.
Moderator: Alright, and did you have any problems controlling the device? Like for example we have heard of cases where people were struggling to have the speaker hear their voices.
John: Oh, yeah we had that all the time.. that sometimes when it was connected to my Sonos speakers and I tried to call Alexa it wouldn't understand and so I had to yell through the whole room.. which was not really pleasant.
Moderator: Okay, and when it gave an answer and given it understood correctly, how well was the information? Do you think it was doing a good job then? It's about the output quality.
John: It was like expected. So for example it gave me the correct weather information and said "Today it will be sunny in Frederiksberg". So yeah there was not too much to do wrong.
Moderator: Cool. And do you think that a smart speaker could become a product that you use out of habit?
John: No. Or at least not right now. Because it's not a product that you can take of the shelves and it works and you can connect it to your TV and all other devices…
Moderator: So you need an eco-system for it to work?
John: Yeah, I think that's the main point because otherwise it's just a toy that you can talk to but it does not bring much benefit into your life. It's not enough to work as a stand-alone product. Or at least it's not enough to make you use it for a long time.
Moderator: Okay, so would you say that is one of the main things that keeps you from liking it or wanting to use it more.
John: Yes, I think you could say that.
Moderator: Alright, fair enough. Uhm different topic: So you know that the device is on "always-listening"-mode. Were you ever concerned about privacy or security?
John: Not really, I must say. It sounds strange but I am not so concerned about my private data. And I believe that with all the devices we use and the stuff we share and like on social media makes us quite transparent already so I don't think this is getting to another level with smart speakers.
Moderator: Cool. Then a question about the structure behind it. Do you think Amazon just put this out there and are like okay buy this product or are they pushing it more and supporting around it?
John: I've read that there are different services that amazon offers and I think also some other companies. And you can buy from the amazon online shop. But yeah more than that I am not aware of. But I read about this so it's not like I know about this from the device.
Moderator: Alright. Cool.. Uhm, how did you feel about the personality of the speaker? Was it pleasant or annoying or was it indifferent to you?

John: As I said earlier it was more the way it was programmed to respond, by for example adding things to an answer and trying to suggest something that made it annoying. The personality I think is fine. It's a robot so I do not expect much personality.
Moderator: And do you think that a stronger personality or character would make it more enjoyable to use?
John: Hmm, yeah it could be fun to have some different voice styles but in the end it would just be a gimmick.
Moderator: Alright, fair enough. So earlier you were talking about your girlfriend being annoyed by the speaker. So, in regards to that we would like to know how your social environment influenced your use.
John: Uhm yeah so sometimes I called Alexa and my girlfriend thought I was talking to her. Or I called my girlfriend and Alexa was responding.. so yeah it got quite confusing at times. So my girlfriend really didn't like it and was getting annoyed. So I think she was a reason why I didn't use it as much in the end.
Moderator: Okay, and do you think the other way around if your girlfriend really appreciated you having a smart speaker and would be into it herself that would motivate you?
John: Could be yeah. But I don't really think that would influence me if I was annoyed by the speaker.
Moderator: Okay, I see. And did you ever use it when somebody else was around?
John: Yeah, I used it when a friend was over the other day. And it was actually quite fun because we had this discussion about cats.. And like what was the name of this specific breed and then we asked Alexa some questions and it actually worked out and gave a good answer. So, in that sense it was a great addition to the conversation.
Moderator: interesting, okay. And in terms of the price. I don't know if you still remember the price of the device?
John: I think it was around 60 Euros.
Moderator: Yes, exactly. Do you think the device outperforms this price?
John: No.. I definitely don't think so.
Moderator: Okay, so if you were to put a price tag on the device. What would that be?
John: 20 Euros.. maybe 30 Euros. At least for how it performs right now.
Moderator: Alright, fair enough.. I think then that's mostly all the questions I had. Are there any other points that you want to bring forward right now? Anything else that comes to mind.
John: No, not really. I think it's a very interesting topic but for me it doesn't really have enough use cases. And it also made my girlfriend annoyed so yeah..
Moderator: Fair enough. Then thanks a lot for participating and have a good day.
John: Sure. You too.

Appendix 17

About you:

- Age
- Gender
- Nationality
- Occupation
- Tech savviness
    - How interested are you generally in (new) tech?
- What devices do you own?
    - Phone, laptop, TV, game console, etc.

Prior experience:

- Have you ever activated anything with your voice before?
- Have you heard about these voice assistants before?
- Have you used voice assistants before?
    - If yes: Which ones?
    - If no: Have you tried anything of resemblance?
    - Do you think smart speakers are different to what you have used before?
- Have you thought about buying a voice assistant yourself?
    - If yes: why didn't you?

Expectancy

- How much do you think it cost?
- Tell actual cost -> Does the cost increase or decrease your expectation?
- How well do you think this thing works and why?
- How easy do you think it will be for you to use it?
- Do you think it will take a lot of time to get used to? Or will you start right away?
- What do you think you could use this for?
- What kind of influence do you think it can have on your life/your everyday?
- Are you excited to use it?
    - If yes: What are you excited about?
    - If no: Why not?
- Do you think you need this in your life?
- Do you think it would make your life easier?

- Do you think society needs this?
- Do you think it will be part of the future?
- What's your general attitude towards these things?
    - Positive? Why?
    - Negative? Why?
- Do you think the world could be a better place with them?

Appendix 18

In Depth Interviews	**Technology Acceptance of Smart Speakers**	
1 Introduction	*Welcome*	• Thank you for coming • We're tape recording
	Overview of project	• Results will be used for our Master Thesis • Goal: Find out factors that motivate and keep people from using Smart Speakers
	Ground rules	• No right or wrong answers • We are not trying to sell or have any interest in making them appeal cool and great. So, negative comments are of course part of this research
2 Kick Off	*Could you name 3 things that motivated your use and three things that demotivated you to use the speaker?*	
3 Usage of devices	*Please tell us about how often and when you made use of* / *How much have you used your smart speaker?*	• More/ less than expected? • Why not more?

	your smart speaker?		• Specific times?
		What have you used it for?	• Practical tasks • Fun & games?
4 Usefulness	*How did you perceive the usefulness of your Smart Speaker?*	*How did you experience the interaction w/ the device?*	• Smooth, fun, annoying, boring? • How was the personal aspect of the assistant?
		Did you have any problems controlling the device?	• Problems to trigger and/or make your voice heard? • Device not doing the task you wanted it to do?
		How satisfied were you with the system capabilities?	• Were there any technical constraints when using it?
		How satisfied were you with the output (if device understood correctly)?	• Accurate information • Accurate service
		Did you use it for stuff you'd normally use another device for, and if so, how was the experience in comparison?	• E.g. normal speakers, alarms, Siri?

		Did you find it had any professional relevance?	• Studying? • Work?
	Habit	*Do you think Smart Speakers can become one of the products you use out of habit?*	• Yes: In what sense? • No: Why do you think it didn't?
5 Computer anxiety		*Were you worried about any privacy concerns or security issues?*	• Always listening • Theft/misuse of sensitive data
6 External Factors		*Are you under the impression that there is an appropriate structure behind the devices?*	• Google • Amazon
		How important do you think is an external ecosystem in order to motivate continuous use?	• E.g. having lights, other smart devices
7 Hedonic motivation		*How did you feel about the personalities of your assistant?*	• Did they facilitate more or less usage?
		In terms of fun and play, did it bring any of that into your life?	• Playfulness • Fun

8 Social influence	*Did your social environment influence your use?*	*How much did your social environment support and appreciate you using the speaker?*	• If e.g. your roommates,friends,boy/girlfriends were enthusiastic about it
		Did you use it differently when other people were present?	• If yes, how?
9 Price		*Do you believe the devices outperform their price?*	• Mini: 490 DKK (58,99 €) retail • Dot: 595 DKK (59,99 €) retail
10 Follow Up Questions	*Do you have any additional thoughts you want to bring forward?*	*Any additional factors that you think are important and have not been addressed?*	• Positive or negative
		Any closing thoughts?	• General opinion about this topic or research
11 Closing	*Thank you & goodbye*		• Hand out of presents