CINEMA OF THE FUTURE

Value Creation Through Digital Technologies and IoT

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by
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SYNOPSIS:
I dette kandidatprojekt er Nordisk Film Cinema blevet undersøgt. Studiet omhandler, hvordan de Skandinaviske biografer kan skabe mere værdi for deres organisation og for biografgængerne. Nuværende tendenser viser at flere forbrugere i dag forventer og påskønner personaliserede services. Af denne grund begynder mange virksomheder at ændre deres platforme til at efterleve forbrugernes behov. Nye teknologier såsom Internet of Things og digitale services, kan bidrage til at indsamle mere data om forbrugernes præferencer og behov. Studiet forsøger at undersøge, hvordan biograferne kan bruge digitale teknologier til at forbedre deres viden om forbrugerne, samt skabe personalisering. Opgaven er opbygget på grundprincipperne i business modellen STOF. I studiet er der blevet fortaget seks interviews, hvoraf de tre var med Nordisk Film medarbejdere, og de resterende med specialister indenfor privatlivspolitik og sensorer. Et spørgeskema er også blevet distribueret til 152 biografgængere, hvoraf ni efterfølgende interviews er blevet fortaget. Projektet har resulteret i en række anbefalinger til Nordisk Film Cinema. Disse inkluderer anbefalersystemer til personalisering, flere automatiserede processer, fokus på forbrugeren i organisationen, mere vidensdeling i Nordisk Film og en fremadrettet fokus på fremtidens biografgængere og deres behov.

Key Words

1. Digital Technologies
2. Internet of Things
3. Mobile Services
4. STOF Business Model
5. Innovation
6. Personalization
7. Recommendation Systems
8. Cinema
9. Entertainment and Media Industry

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IoT	Internet of Things
NFC	Near Field communication
ECG	Electrocardiogram
AI	Artificial Intelligence
E&M	Entertainment and Media
IDC	International Data Corporation
PwC	PricewaterhouseCoopers
VR	Virtual Reality
AR	Augmented Reality
RFID	Radio Frequency Identification
VoD	Video on demand
IPTV	Internet Protocol Television
VoIP	Voice over IP
4D	Four-dimensional
3D	Three-dimensional
NIC	US National Intelligence Council
R&D	Research and Development (department)
M2M	Machine to Machine
ICT	Information and Communication Technology
PVR	Personalized Video Ranker
DFI	Danish Film Institute
CV	Coefficient of Variation
SD	Standard Deviation

1 Introduction

In the last decade, consumers' media consumption and demands changed significantly. They became more mobile and their usage of audiovisual entertainment is different. The vast number of new digital entertainment alternatives consumers can choose from today creates a higher need for personalization. (Giesecke & Immonen, 2010)

Consumers are also expecting personalized products and services to a higher extent than before – they got used to it, because many platforms already offer them. These changes put pressure on organizations to create more intelligent products and services to accommodate their users' needs. Personalized services lead to more loyal consumers and an increased amount of knowledge that can be used for targeted marketing. Companies can filter the content with algorithms and thereby create more intuitive platforms. (Thurman, 2011)

Most consumers prefer following recommendations over having to choose for themselves (Crespo, Martínez, Lovelle, García-Bustelo, Gayo & Pablos, 2011). This suggest that an increase of personalized selections through recommendation systems makes it more likely that customers will use the product or service.

Many media companies sought after innovating their businesses to adapt to the changing social and market conditions and be able to convert into digital media by using new commercial models. The rise of digital media platforms presents many new challenges that must be handled, as the consumers' demands continue to change (Mills, Metcalfe, Lochrie & Gradinar, 2016). Because of the change in technology and consumer requirements, digital distribution channels have been altered and nowadays more media content and services are offered online (von Rimscha, Wikström & Naldi, 2014). Many organizations are now using advanced algorithms and gather data through tracking, which simplifies prognoses about consumers' preferences and purchasing habits. (Datnow & Park, 2014)

Companies in adjacent industries have moved more into the media market with Netflix being one of the prime examples. Netflix celebrated its huge success due to the high development in technology and the usage of advanced data processing for recommender systems. Today, there are many ways to acquire more information about users. Most methods are based on the users' own inputs and, in some cases, their contextual data provided by mobile services. (Choi & Bargar, 2017)

Sensors offer another way to understand customers better. They create new opportunities for tracking and automated solutions, which requires the use of an intelligent network system. The Internet of Things (IoT) is an interconnected network of everyday objects that are able to communicate with each other. It is a self-configuring, wireless network of

distributed sensors that are incorporated into hardware objects and communicate with programmed software. These objects can provide a more seamless experience for the consumers that proprietary solutions can no longer offer. (Kim & Kim 2016)

IoT creates new options for media exposure and meets both the demands of digital audiences and commercial actors. The greatest challenge, however, is for media publishers, product designers, technologist, and human-computer interaction specialist to develop meaningful IoT experiences. (Mills et al., 2016)

Compared to other media companies, cinemas are not necessarily known for exploring many innovative technologies, except for new screening solutions, of course. Therefore, most cinematic technologies do not focus on generating more consumer knowledge. (Motion Picture Association of America, 2017) Nevertheless, it has been forecasted that many media companies will begin to invest more in IoT (Trepkeviciute, 2017). This might also apply to cinema companies, as that they should consider the unexplored opportunities that can hide in IoT solutions.

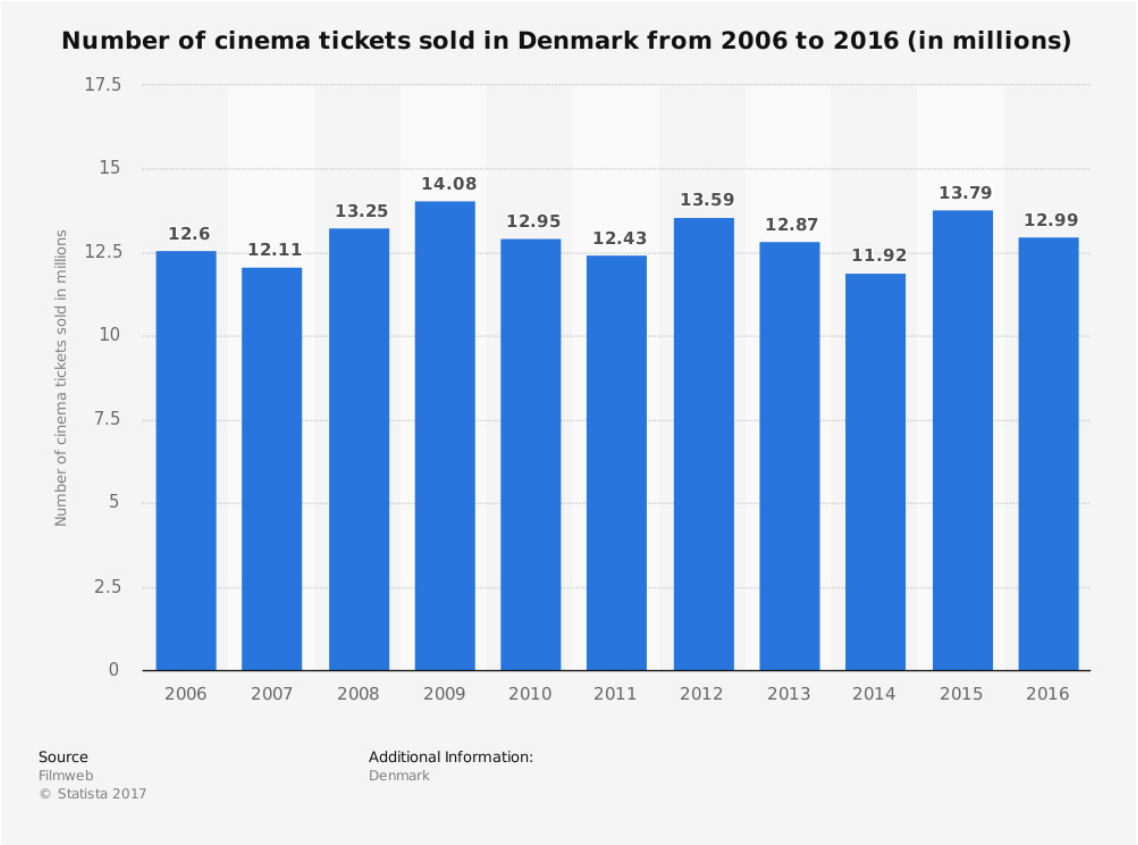

Figure 1: Number of cinema tickets sold in Denmark
(Statistics Norway, 2017, para. 3)

Compared to other industries, the Scandinavian cinema market is very stable. As shown in Figure 1, the number of cinema tickets sold in Denmark can be characterized as stable

with only little fluctuation in the years from 2006 to 2016 (Statistics Norway, 2017). However, it can only be speculated how the changes in the media industry in general will affect the cinema in the future.

In 2011, film author and reporter Roger Ebert voiced his concerns regarding the decline of cinema industry. He believes that the biggest imposed risk is the increase of ticket prices in combination with the wide variety of on-demand streaming services. Cinema ticket prices increased due to the special audiovisual effects that are added to the movie experience in order to lure people to the cinema. Because of the use of more technology for improving the experience through state-of-the-art projection and sound, cinemas are forced to increase their prices to pay for the upgrades. In the US, this amelioration has kept many people away from the theaters and the revenues from movies that can be streamed on-demand surpassed feature films in the cinemas. (Zipin, 2015)

This is further supported by the fact that the US theatrical box office revenues only amount to 15 percent of the total revenues, whereas the remaining 85 percent come from ancillary markets, such as streaming services and online movie rental (Hagener, Hediger & Strohmaier, 2016). It can only be speculated, if the Scandinavian cinema market will soon face similar issues.

1.1 Nordisk Film in Short

For the thesis at hand, Nordisk Film Cinema was chosen as a case company to investigate the aforementioned changes further.

Nordisk Film was founded in 1906 in Valby, Denmark. The company is the leading distributor of movies in Scandinavia. In 2016, they recorded the highest revenue in the company's lifetime. Nordisk Film is comprised of seven sub firms: Nordisk Film Cinema, Nordisk Film Production, Nordisk Film Shortcut, Nordisk Film Distribution, Nordisk Film Interactive, and GoGift.com and it also partially owns film production companies. Nordisk Film is part of Egmont, one of Scandinavia's leading media companies. (Nordisk Film, 2018b)

Nordisk Film cooperates with multiple partners including Zentropa in Denmark, Maipo Film & TV-produksjon AS in Norway, Avanti Film AB in Sweden, Solar Films Inc. in Finland, Fridthjof Film A/S in Denmark, and Sony PlayStation. They also deliver Danish content to Netflix, such as movies and popular Danish dramas that have been developed in cooperation with other Danish production companies. Regarding their cinema opera-

tions, they cooperate with the American film company Lionsgate to distribute international movies. In 2017, Nordisk Film also started a cooperation with 20th Century Fox film and came to agreements with Participant Media and Amblin Partners. (Nordisk Film, 2018d)

Nordisk Film Cinema is the largest cinema chain in Denmark with 22 cinemas in Denmark and 21 cinemas in Norway. In total, this makes 220 cinema halls, which are all equipped the newest technology available on the market. In Denmark alone, they have about 6 million visitors a year. (Nordisk Film, 2018a)

Nordisk Film Cinema wants to be on the forefront of new cinematic experiences and concepts to provide the best possible experience for the cinemagoers, which makes them a suitable case company. The cinemas offer three-dimensional (3D) and four-dimensional (4D) movies and also introduced other concepts, such as the new premium "Supreme" experience. It includes customized luxury seats, a Dolby Atmos sound system, and extra-large wall-to-wall canvas screens. In 2018, Nordisk Film will open its first cinema in Sweden. (Nordisk Film, 2018c)

1.2 Problem Field and Research Questions

The theses at hand aims at investigating how Nordisk Film Cinema can create more value for both the consumer and the organization by using advanced technologies, such as IoT and other digital solutions. Subsequently, digital technologies including IoT have been explored to learn more about the potential benefits these technologies can bring.

The **problem field** can be summarized in the following three statements.

1. The changes in consumers' media consumption and demand have challenged many organizations to change their products and services and make them more personalized.
2. Advanced technologies like IoT and digital services create new opportunities for data gathering and user tracking, which generates more knowledge about users' preferences.
3. The Scandinavian cinema industry could soon be facing challenges and a decrease in their box office revenues, because other related markets (e.g. in the US) have already experienced such changes.

Therefore, the research question reads as follows:

What value can digital services and technologies create for both the operator (e.g. through data analytics and personalization) and the consumer in Nordisk Film Cinemas?

This includes below mentioned sub questions:

- What is the value of IoT technologies in the context of gaining more knowledge about cinemagoers?
- What is the perceived value and acceptance of these new technologies on the consumer side?
- Can the value be conceptualized in a business case scenario?

2 Investigations

In the following chapters, theories and cases that are related to the problem formulation and research question will be investigated. This includes general technical trends in the media industry, state of the art research in this field, and the state of the art of cinemas. These investigations will build the foundation for the further proceedings and research methods.

2.1 Technological Trends in the Media Industry

To begin with, technological trends in the media industry will be presented to get a better understanding of the current developments. According to recent findings presented in 'The Global Media Report' by McKinsey & Company, the entertainment and media sector (E&M) is going through profound changes considering the consumer spending. It is hypothesized that by 2019 the average spending on digital media products is going to increase its market share by over 50 percent. Some media companies will struggle to accommodate the future needs of the users. (Lugmayr & Grueblbauer, 2017)
The E&M industry is influenced by three basic drivers:

1. more consumers,
2. *"the rise of global content intermediation and distribution"* (Lugmayr & Grueblbauer, 2017, p.33)
3. and a higher need for global advertisement.

Due to rapid changes in technology and the economic environment of media companies, many new ways of creating media have been introduced. The older, more established media houses have begun to transform and focus on becoming more digital, as they must adapt to the new forms of digital media. The management practice of these firms has to change, because the intra-organizational levels need more information systems to process and analyze the new technological developments. Media companies' old and new operational elements need to merge, which could cause a market fragmentation, as many of the newer forms will replace the old ones. Modern technologies can transform the society once they are in use. Therefore, scientists question how media companies can cope with these new technological changes and trends. Information systems will create a strategic resource that can refine the organizational performance level. That also applies to the creation of new strategies for systems that can improve and control the information quality. (Lugmayr & Grueblbauer, 2017)
Recent studies have shown a growth potential in new technologies such as IoT. McKinsey has forecasted that from 2020 there will be between 26 to 30 billion connected de-

vices. This is a year-on-year growth between 15 to 20 percent. According to the prognosis by Cisco, the total number of connected devices will be around 40 billion by 2019. Considering these numbers, it is not surprising that the data activation of these devices increases. In 2014, Verizon found that there was a 135 percent revenue growth of US 4G LTE IoT connectivity. IoT innovations are also easily accessible with simple device implementations through the use of Arduino open source communities and at home accessible 3D-printing options that make it easy to create IoT solutions. (Mills et al., 2016)

Many researchers discuss the great potential of IoT, but none of them highlight the fact of its infancy. It is almost impossible to imagine what the impact of IoT will be in the future. Alongside others, the International Data Corporation (IDC) foresees a future with up to 30 billion connected devices in 2020. The economic value has been estimated to be approximately $1.46 trillion in 2020. Others, such as Gartner, have estimated the number of connected devices being 20.8 billion and an even higher economic value set to $3 trillion in 2020. The fact that these number are so radically different from each other stresses obscurity regarding the future of IoT. IDC deployed an IoT decision making survey to calculate the potential increase of IoT devices. 73 percent of the respondents answered that they either had developed an IoT solution or would develop one in the next twelve months. (EY, 2016)

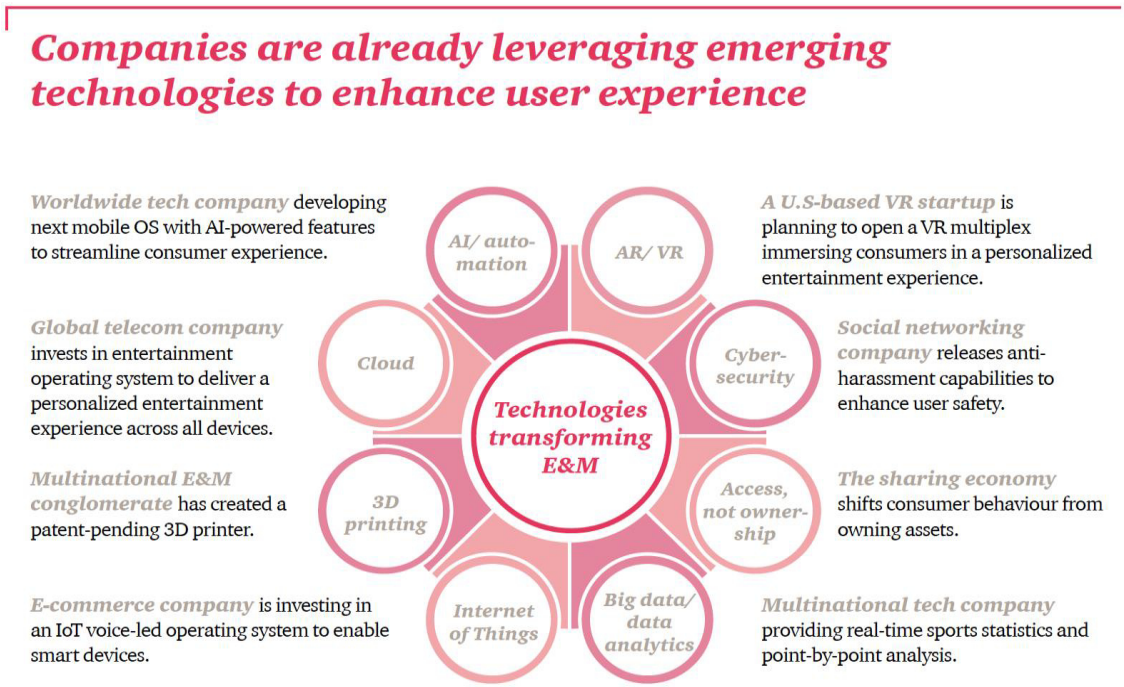

Figure 2: Technologies transforming E&M

(Nilsen & Sandvik, 2017, p. 6)

The lack of evidence and research regarding IoT slows down the IoT development and its further proliferation and implementation in the market, as the technical obstacles and the lack of knowledge about consumer preferences create a barrier for development. Therefore, there are still many undiscovered markets within IoT. (Trepkeviciute, 2017)

In the latest PwC report, the media industry is expecting many innovative technologies that enhance the user experience. These technologies will transform the industry. Some of these companies and technologies are mentioned and displayed in Figure 2. According to statistics from PwC, electronic home video is expected to grow, physical home video will decrease, whereas cinema is consistent regarding revenue from 2017 to 2021, as can be seen in Figure 3. (Nilsen & Sandvik, 2017)

Furthermore, PwC points out that artificial intelligence (AI), IoT, and virtual reality (VR) are going to be the leading emerging technologies, especially considering the large investments in these technologies in 2016 as one can see in Figure 4. (Nilsen & Sandvik, 2017)

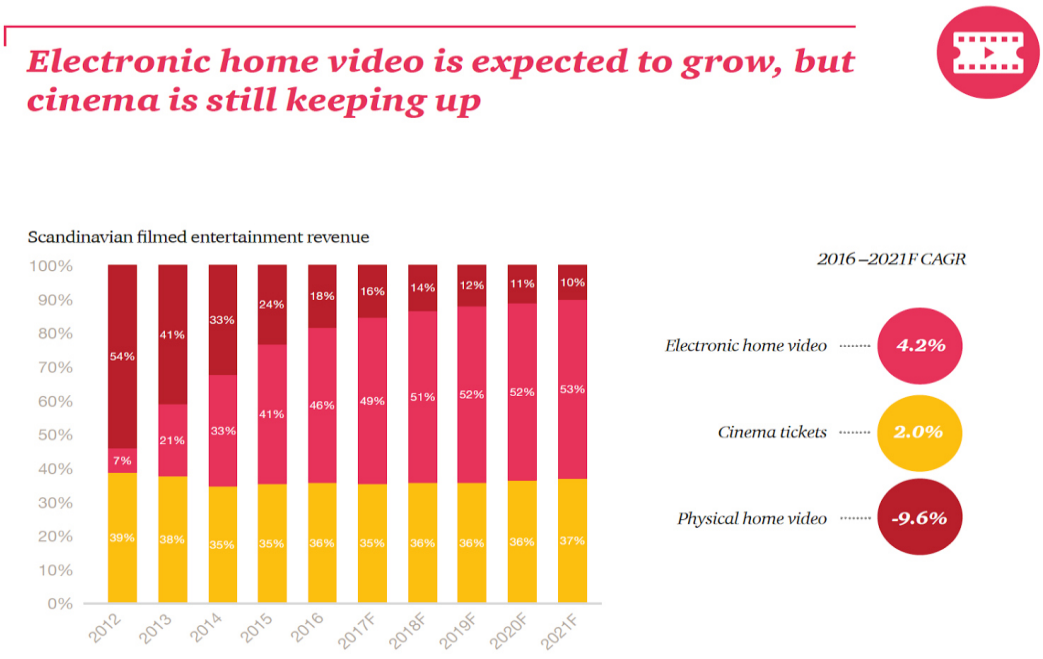

Figure 3: Growth of electronic home video vs. cinemas

(Nilsen & Sandvik, 2017, p. 21)

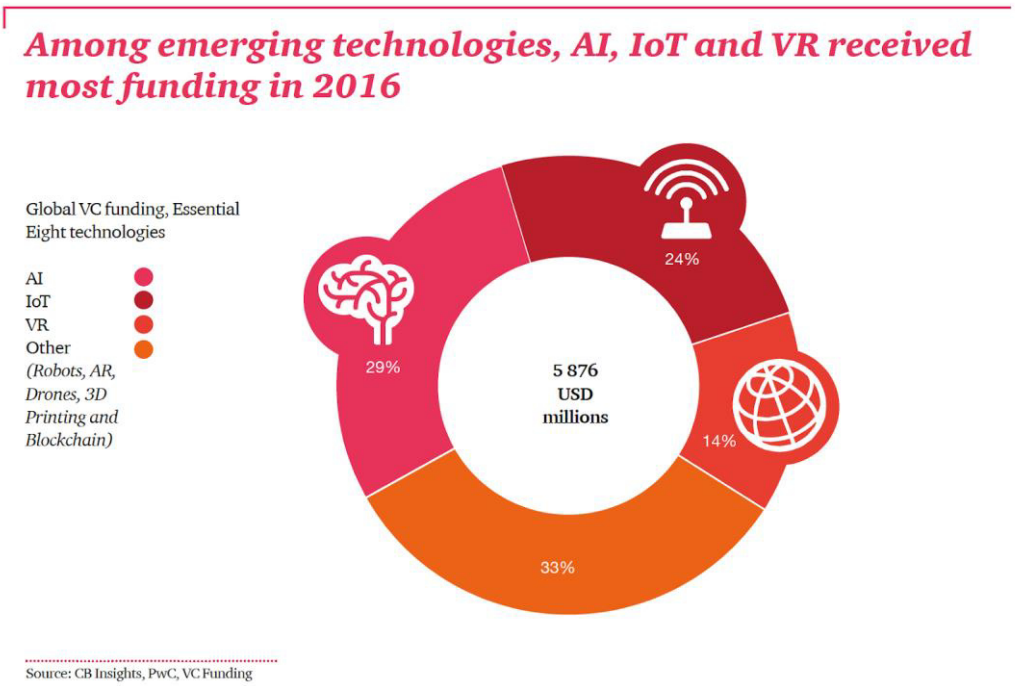

Figure 4: Funding for emerging technologies
(Nilsen & Sandvik, 2017, p. 24)

PwC elaborates that, compared to the rest of the world, Scandinavia is optimally positioned to create value from IoT. This is due to the interconnectivity and high developed fiber and internet structure, the widely spread 4G coverage and 5G coverage in Sweden, and the high number of connected devices the average citizen in the Scandinavian countries has. (Nilsen & Sandvik, 2017) This phenomenon is also displayed in Figure 5.

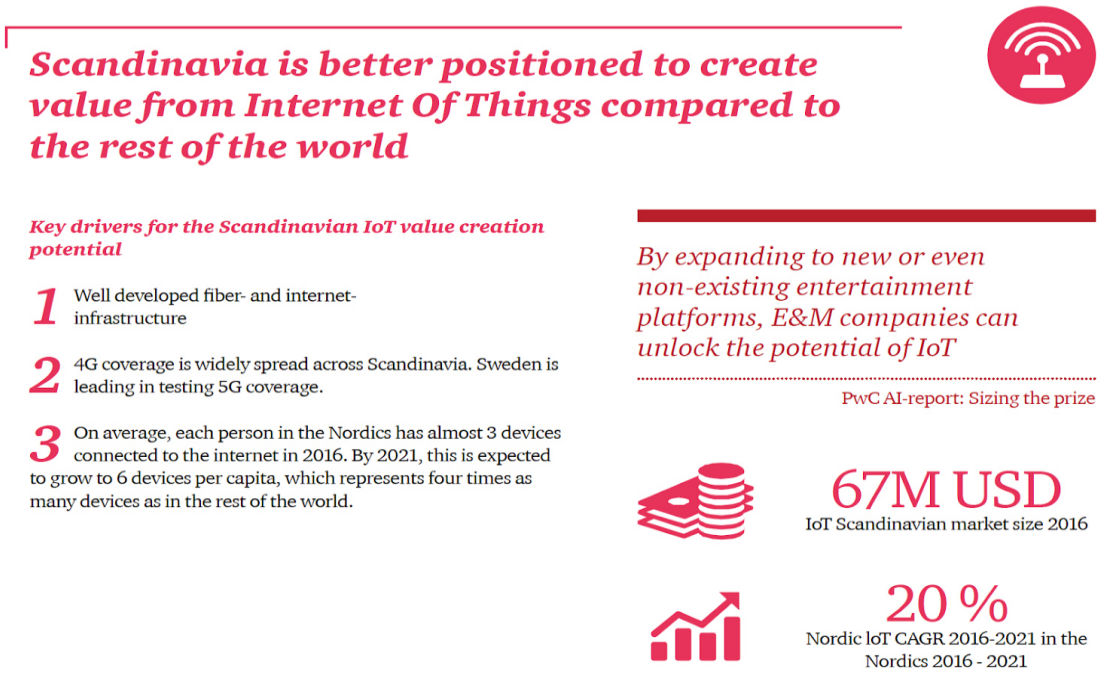

Figure 5: Scandinavia's position for value from IoT
(Nilsen & Sandvik, 2017, p. 24)

IoT offers many possibilities for objects or things that can be used to interact with and realize the task of communication, computation, and service "*such as radio frequency identification (RFID) tags, sensors, actuators, and mobile phones"* (Zhou and Chao, 2011, p. 35). For such a network, large data multimedia applications will be needed to handle the coming applications for "*video on demand (VoD), IPTV, and voice over IP (VoIP)"* (Zhou & Chao, 2011, p. 35).

In 2020, a large amount of data is expected to be generated by IoT solutions. Today, much information is transformed into knowledge and in the future, it is expected that the knowledge will lead to a knowledge society. Giesecke and Immonen (2010) presume that privacy rights are still a critical issue and pose as a social value by 2020. The generations have very different views on what is public and what is private, but generally people want to be able to keep control over the data they supply. This might pose a threat for personalization and the future control of media content. (Giesecke & Immonen, 2010)

In the 'map of the business drivers dimensions' (see Figure 6) by Giesecke and Immonen, one can see technological change versus meaning of change.

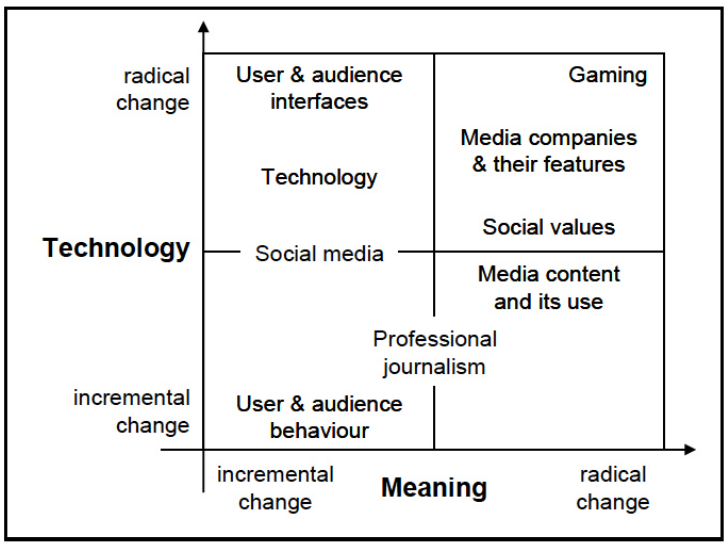

Figure 6: Map of business drivers dimensions
(Giesecke & Immonen, 2010, p. 5)

"*In the future, online economy is built on processing power, hard drive storage, and bandwidth"* (Giesecke & Immonen, 2010, p. 5). Due to the expectation of upcoming costs in the future, many of these futuristic models are based on a free economy, which means that the business models are established on abundance not considering the potential cost. There are three categories of these business concepts and models:

1. *"direct cross subsidies - offering a product or service for free as an inducement to pay for something else",*

2. *"three party markets - a third party pays for participating in a market created by free exchange",*
3. and *"Freemium' - offering a basic product/product for free but more value added component for a fee"*
   (Giesecke & Immonen, 2010, p. 5).

Each of these are the primary rules most future value propositions can choose from.

Businesses must change to adapt to the rapid changes in their audience. The users and audiences are becoming more mobile and the consummation of media has changed, as users want more personalized content dependent on the device. This puts higher pressure on the intelligent devices that need to have more functionalities in order to suffice the needs of the user. (Giesecke & Immonen, 2010)

Some media companies are very excited about venturing into developments of IoT solutions due to the many benefit of big data. However, in order to make these solutions they have to consider the users, because there has to be a value exchange in order for the users to share their data. In 2015, 15 percent of the consumer answered that they were "*familiar with the terms IoT and home automation*" (Trepkeviciute, 2017, p. 6). Although the consumers are aware of some IoT solutions, they need to see value and benefit in order to purchase the product. Most users do not need constant connectivity, and many seem to have the feeling that the value of IoT connected devices is unknown. Therefore, it is crucial for developers to put consumers' needs first and create services that are making their lives easier. (Trepkeviciute, 2017)

2.2 State of the Art Research

IoT has been a hot topic in many different industries. All possible application fields of the technology have not yet been uncovered completely. There are millions of devices that all generate enormous amounts of data. Many of these devices are seen to be part of a greater IoT solution. These devices send their data to clouds for storage, processing, and analysis. (Klein, 2017)

IoT has been estimated to have a high impact on multiple aspects of every day's life and the consumers' behavior. The effects will cover both domestic and professional fields for the users. According to the US National Intelligence Council (NIC) IoT can be found on the list of six 'disruptive civil technologies', that will have the strongest impact on US national power. ''*By 2025 Internet nodes may reside in everyday things – food packages, furniture, paper documents, and more*" (Atzori, Iera & Morabito, 2010, p. 2787). They furthermore also believe that the "*popular demand combined with technology advances could drive widespread diffusion of an Internet of Things (IoT) that could, like the present*

Internet, contribute invariably to economic development" (Atzori et al., 2010, p. 2787). NIC also fears "*to the extent that everyday objects become information security risks, the IoT could distribute those risks far more widely than the Internet has to date*" (Atzori et al., 2010, p. 2787).

Many initiatives of projects involving smarts cities have been launched over the past years. More smart solutions are very important for optimizing productivity, heightening operational efficiencies, and minimizing management costs. The consumers are to a higher degree equipping themselves and their homes with multiple IoT devices. Most modern houses and apartments come with smart objects such as thermostats, smarts alarms, and locks. A lot of the facility and maintenance management of a city can be optimized by using e.g. smart waste containers that can indicate when to be emptied. (Hammi, Khatoun, Zeadally, Fayad & Khoukhi, 2018)

IoT is so popular that many companies invest heavily in the technology. One example is Disney: they started their Magic Band project, which has been rolled out in 2014. They spent one billion dollars on installing sensors in the Disney park and RFID readers in all rooms at the Disney hotels. (Lorenz, 2016)
Also, Microsoft has recently announced that they are investing five billion dollars in IoT. "*Our goal is to give every customer the ability to transform their businesses, and the world at large, with connected solutions*" (White, 2018, para. 1).

2.3 IoT Case Studies

In the following chapter different case studies about IoT technologies will be presented in order to get a better overview of how these technologies are currently used by other companies, fuel ideas for IoT solutions in Scandinavian cinemas, and investigate which benefits could result from that.

2.3.1 Disney World

One of the most relevant cases is the IoT implementation at Disney World, which has already been mentioned previously. The concept simply evolved around creating *"more immersive, more seamless and more personal experiences for each and every guest"* while at the same time *"driving operational efficiency, transforming the customer experience, personalization through connected products, and interactivity across channels"* (Griffin-Smith, 2016, para. 2). According to Griffin-Smith (2016) starting this 'next generation experience project' through changing the customer experience while increasing the efficiency, has led to Disney World being able to create an on-demand technology and

generate an *"accuracy in managing labour resources"* and hereby improving it by 20 percent (Griffin-Smith, 2016, para. 4). With the data they can create forecast models about consumer habits. The main concept is that the customer does not have to stand in line or carry money anymore. They can simply buy Disney's MyMagic+, which is a high-tech wristband that personalizes the experience of going to Disney World. The guests can "*book ride times, restaurant reservations and shows in advance using the website. When they arrive at the park, alerts from the smartphone app remind them it's time to enjoy their selected activities. The mobile app allows guests to change reservations in real time as needed*" (Griffin-Smith, 2016, para. 7). Furthermore, the colorful silicone wristband serves as admission ticket and makes it possible to use it as a key to a hotel room or alternative payment method. The wristbands allow for tracking of real-time data and consumer behavior and make it easier to analyze purchasing habits. The wristbands have RFID and utilize a *"wireless tracking system that transfers data from minuscule tags attached to objects"* (Griffin-Smith, 2016, para. 10). In a system called MyMagic+, the data is then processed and visualized in an inbuilt Disney big data platform on Hadoop, Cassandra, and MongoDB. (Griffin-Smith, 2016)

2.3.2 Amazon Go

Another good example of an IoT solution implemented to improve consumer experience is the Amazon Go store. As with Disney World, Amazon Go stores strive to eliminate queues at the checkout. Multiple sensors and cameras control the purchasing. The customers can use their phones to finalize their purchase, which all the sensors and cameras in the supermarket have registered. The store uses a *"checkout-free shopping experience"* with the use of *"computer vision, sensor fusion, and deep learning"* (Millman, 2016, para. 3). The different sensors can automatically track and detect products when they are being removed from the shelves and initiate the purchasing process through a virtual cart. When the customer is done shopping they just leave the store, the products will be charged to their Amazon account, and a receipt is sent. The first store launched in Seattle in 2018. (Millman, 2016) There are physical employees in the store but no cashiers. The employees primarily help customers with finding items or fill up shelves. (Wingfield, 2018)

2.3.3 Hilton and Marriott Hotels

The hotel industry has made some experiments with the benefits of IoT to create the optimal environment for next-generation travelers. Samsung and Legrand teamed up to create a new hotel experience with the use of IoT. At one of the Marriot hotels in North Carolina, they have experimented with their guest rooms. The room incorporates several sensors, responsive IoT devices, and applications. The user can communicate with the

devices and thereby customize the experience. All IoT systems are powered by Samsung's ARTIK platform and SmartThings Cloud. Everything within the room – from the lighting to the voice-activated room controls – is creating a superior experience and higher proficiency for the guest with the help of ARTIK. (ARTIK Team, 2017)
As with the Marriott hotel, Hilton also investigated ways to innovate the consumer experience by using IoT. "*Hoteliers have to identify the right level of technology for their properties and they need to implement these, even if only at a basic ability to remotely control lighting and temperature, or the consumer is going to judge them as antiquated and irrelevant. The hoteliers that get this right will gain the loyalty of the next-generation traveler*" (Ting, 2017, para. 13). At the Hilton hotel, the consumers use an app to control the room's lighting, heating, ventilation, air conditioning, and entertainment options. (Ting, 2017)

2.3.4 IoT Hospitals

In the health sector, new ways in which IoT can improve hospitals' organizational operations and patient experience are being developed. Some hospitals are heavily investing in IoT. The main concept is to use IoT solutions to enable data gathering that can optimize the decision foundation for the hospital operators. The hope is that IoT will improve the *"quality of the care, time to service, and to provide care with less costs"* (Thompson, 2016, para. 17). As a first step, General Electric partnered with a New York hospital and implemented sensors to track and connect to the hospital beds. Through the sensors the hospital operators know, if a bed is free, which made finding an available room more effective and helped reducing time in emergency situations. The IoT solution can also be connected to the medical equipment, which additionally could make it possible for the operators to be aware of machinery breaking down. With Philips Healthcare an e-alert can be implemented while IoT hardware/software is monitoring the machines longevity. The e-alert can notify the personnel in case of abnormal behavior. Then it can send a text message to the repair operator, which makes it possible to fix the system before it is seriously damaged. (Thompson, 2016)

According to Kevin Patel (2016) there are many advantages of IoT driven hospitals: decreased costs, improved outcomes of treatment, improved disease management, reduced errors, enhanced patient experience, and enhanced management of drugs. However, the greatest risk of IoT is data security, especially in a hospital context and with a constantly increasing amount of data. Therefore, cyber security measures must be taken. (Patel, 2016)

2.3.5 Summary of IoT Case Studies

All these case studies provide a foundation for how other industries can approach IoT technology. Ideally, the Scandinavian cinemas can modify and combine the ideas and create solutions that fit their consumers' needs best. Most of the aforementioned examples evolve around an improved consumer experience and the creating of value-adding services.

2.4 State of the Art Cinemas

In Chapter 2.4, the current state of the art of cinemas including different screening technologies will be explained in further detail. Based on the evaluation of the current development, new concepts for the cinema of the future can evolve throughout the course of this thesis.

2.4.1 3D Cinema

Many consumers find three-dimensional (3D) cinema immersive and say it brings a realistic feeling to the cinematic experience. Scientists find that the 3D cinema experience is largely overlooked and degraded by the media. 3D cinema experiences have had a large box office success and huge commercial popularity in the beginning. The reason for the appeal of the 3D experience compared to other options is the non-representational sensory experience, which some think is a great storytelling method. Other methods of increasing the realism in the cinema are e.g. a higher frame rate, and captivating 3D sound systems. In newer days, the dominant popular technologies are 4D/5D experiences and augmented reality (AR) solutions that are made in order to detail the association with tactile experiences. There is an industrial change from non-sensory experiences to multi-sensory experiences in the cinematic industry. Since 2012, the 3D experience has been largely improved and there are multiple examples of 3D cinemas that have benefitted a lot from this technology in terms of box office revenues. In fact, in 2012 in Canada 17 percent of the total box office came from 3D cinemas and in UK and Ireland it was 18 percent. However, it can only be speculated how long the hype with 3D will continue, as the 3D technology is rather old and originates from the 19th century. (Jackman, 2015)

In cooperation with the Weizmann Institute of Science, the MIT Computer Science and Artificial Intelligence Lab created a 3D cinematic experience without the use of 3D glasses. Here, the cinemagoer can sit at any place in the cinema and get the full 3D experience. They created a technology that includes automultiscopic displays and enables 3D through *"multiple angular images of the same scene"* (Chowdhury, 2016, para.

5). The new 3D cinema uses standard seating with fixed seats on sloped rows – it is only the screen that appears differently. It has multiple layers of slits in front of the main screen that can filter all pixels and hereby give the perception of illusory depth. (Chowdhury, 2016)

2.4.2 4D Cinemas

For many years, four-dimensional (4D) cinemas have offered a new possibility for consumers to experience movies in an innovative way. The seats in 4D cinemas are equipped with mechanisms that make them move, special scents, and they even spray water into the face of the person who sits on them. According to Chahal (2016), Xbox was the first brand to advertise their new Cineworld-owned 4DX screens in the UK. (Chahal, 2016; Rear, 2017)

The South Korean CJ Global was the frontrunner in creating and developing the 4D motion widescreen cinema technology. They developed the technology by testing it on Asian and Hollywood films with local audiences. The environment full of special effects was used to create a 4D experience in cinemas. The 4D system transformed the audiences' relationship to the film and cinema experience through the *"conventional multiplex screening environment by simulating a range of real-time sensory effects"* (Yecies, 2016, p. 23). The environment is full of special effects and the seats can move *"(left/right, front/back, up/down), leg and back pulsation (known as ticklers), projected wind and mist blasts, fog, lightning, and scent discharge (e.g. aromas associated with mountains, flowers, the ocean, perfume, sweet food, coffee, gunpowder, and charcoal or burning)"* (Yecies, 2016, p. 23). In addition, augmented simulations have been added to simulate rainstorms, snow, and warm air blasts all of which follow the narrative of the screen. The 4D cinema creates *"affective modes and tactile engagement that destabilise the traditional primacy of ocular vision"* (Yecies, 2016, p. 23). CJ's 4DXPlex is expected to reach *"a total of 300 4DX screens by the end of 2016, with a peak target of 600 cinemas, thus enabling 10% of all global blockbuster audiences to view a film in this specific format"* (Yecies, 2016, p. 23). South Korea is the fastest growing cinema market in the world. The setup of 4D installation is, however, not cheap: *"exhibitors installing MX4D undertake approximately US$250,000 in construction costs, plus an additional US$750,000 for the outright purchase and installation of equipment, which is supported with a multi-year service contract at additional expense"* (Yecies, 2016, p. 26). Nevertheless, it is worth the expenses, as the *"4DX sessions and 4D screenings more generally are selling tickets, often more than doubling ticket sales for the same venue before its 4D conversion"* (Yecies, 2016, p. 26). (Yecies, 2016)

Nordisk Film has launched 4DX cinemas as well. They promise 18 different effects, such as wind, water, rain, fog, air blasts, smell, snow, soap bubbles, and tickling on the back. Through the use of a hydraulic system invented by the South Korean CJ 4DPlex, the seats in the cinema can move in all directions. Nordisk Film Cinema in Norway has opened the first 4DX cinema in Scandinavia. It has been an enormous success since the opening. In Oslo alone, they were able to double the number of cinemagoers compared to regular cinema. When looking at the whole world, there were 49.000 4DX seats in over 400 movie theaters in 50 different countries. (Nordisk Film, 2018c)

2.4.3 360-Degree

A new cinematic form that has emerged from handheld devices is the 360-degree movie, that was invented by Google. Here, the audience can look to all sides seeing real-life imagery of the movie. This can create a fully immersive space were the consumers feel as if they are a part of the story from a first-person perspective. Some cinemas use headsets to create a 360-degree environment, such as a VR headset. It is, however, very difficult to create a 360-degree movie where one can transport the audience to an alternative reality. Some believe that this technology must be interactive and create opportunities for the audience to alter the storyline in order to allow them to immerse fully in its content. The main concept is to create a personalized space where the story will be experienced differently depending on who is watching. (Wagner, 2015)

2.4.4 Other Cinematic Technologies

Over the years, many innovative technologies have been introduced to cinemas. Other innovations, such as AR, have also become more popular. AR first hit the market with the remarkable success of apps like Pokémon Go and Snapchat. The technology is, however, very costly and creating the whole setup is quite expensive. (Rear, 2017)
IMAX cinemas have been popular for years due to their big screens with high resolution (Microsoft Team, 2012). At IMAX cinemas, laser projections that are much better than traditional film projections are utilized. They create a better color definition and image quality and can be experienced at any IMAX theatre in the world. In addition, the IMAX lasers do not heat up so easily, as for example light bulbs do, so they are more cost and energy efficient. (Rear, 2017)

Today, many screens in cinemas are manufactured with micro LEDs instead of projectors. This is another way to display sharper imagery with a better quality to the audience. The reason for the change is also to have better thermal control and higher pixel densities and it furthermore allows for wrap-around immersive viewing such as the curved Cinerama. (Knight, 2018)

According to Graham (2016), China is building multiple cinemas. *"In the first nine months of this year, China added just over 7,500 new cinema screens, continuing a trend seen over the past few years. China has been building cinema screens at a rate of over 10 a day for the past five years, rising to 27 a day this year"* (Graham, 2016). Some think this growth is very fast but could be due to the general growth of the Chinese movie market that has generated a box office revenue of $121 million in total. In 2015, the box office revenue increased by more than $7 billion. The Chinese movie market is still considered smaller than the USA's. However, in 2016 it was expected that the revenue growth would increase by $9.9 billion in 2016 and continue to $11 billion in 2020. (Graham, 2016) There has, however, been no statistics confirming this expectation.

3 Methods

In this chapter, the methods used in this project will be explained to incorporate *"questionnaires, observation and interviews as well as both quantitative (statistical) and qualitative (non-statistical) analysis techniques"* (Saunders, Lewis & Thornhill, 2016, p. 4). As previously stated, this project explores ways to utilize digital technologies to improve the user experience, as well as gather data about users in Nordisk Film Cinemas for the purpose of making more personalized experiences and create value for Nordisk Film Cinema. The empirical methodology and analytical strategy will follow after the theory in Chapter 5.

3.1 Research Design

The research questions derived from research and deductive reasoning, as the authors wanted to *"test an existing theory using qualitative procedures"* (Saunders et al, 2016, p. 168). As a part of the theoretical journey, a vast amount of literature regarding the film industry and the specific organizational details about Nordisk Film and other media operators in the cinema market was reviewed before choosing them as our focus. For this project, the researchers created a multi-method research study by using multiple methods for gathering data – semi-structured interviews, a survey, and follow-up interviews in order to collect qualitative and quantitative data (Saunders et al, 2016). Due to the main focus on Nordisk Film Cinemas, the research strategy was designed as a single case study, which will be elaborated in the following section.

3.2 Case Study

One way to consider business strategies is to investigate a case. In this particular project, this consists of a combination of both technology and a specific company. As stated in Saunders et al., a case study is a qualified method for *"understanding the dynamics of the topic"* (Saunders et al., 2016, p. 184). For this project, an in-depth inquiry has been designed for the intent to consider future possibilities to innovate Danish cinemas – with particular focus on Nordisk Film Cinemas and how IoT solutions and digital alterations to their current mobile services can help facilitate that. Triangulation was achieved to *"combine data to ascertain if the findings from one method mutually corroborate the findings from the other method"* (Saunders et al., 2016, p. 173). A sequential multi-phase mixed method approach has been applied in this exploratory case study. The exploratory approach tries to uncover current happenings and hereby understand a topic of interest to clarify a phenomenon (Saunders et al., 2016). The type of case study is an embedded single case, as multiple units of analysis are investigated within Nordisk Film Cinemas

and its users. As some informants where external experts within IoT, sensors, and GDPR, it can also be argued that the case is holistic to a degree. The research relies on multiple actors, such as Nordisk Film employees, cinema users, and experts, who will be described in the following section.

3.3 Informants

As mentioned above, this section serves as a more detailed description of the multiple informants. All of them were chosen because of their direct involvement with Nordisk Film Cinema or because they were seen as helpful for creating a greater understanding and value for the future development of cinemas.

3.3.1 Dan Pappe Schönemann Hansen

Dan Pappe Schönemann Hansen is the current Nordic Consumer Insights Manager at Nordisk Film Distribution. Due to his expertise in qualitative testing and understanding the users in Nordisk Film, he provides unique insights into which data Nordisk Film gathers about their users and for which purposes this data is used. Dan has a Cand. Mag. in Media Science and worked in the media industry for many years. His primary role at Nordisk Film is to develop, buy, and market the right movies to the most valuable target group for the purpose of reaching as many people as possible with the right message at the right moment. He is a part of many studies about user tendencies and usability across the many platforms in Scandinavia. Dan is a part of the team that develops the segments based on the user behavior, opinions, and preferences. Much of what he is involved in involves qualitative or quantitative testing of target groups across titles and platforms through, surveys, focus groups, and other physical tests. The full interview with Dan Pappe Schönemann Hansen, further referred to as DSH, can be found in Appendix 2.

3.3.2 Stéphane Salzinger

Stéphane Salzinger is the current Director of Operations, Projects & Innovation of Nordisk Film Cinemas. He oversees all 22 Danish and 21 Norwegian cinemas. His responsibilities cover general IT operations and screen technologies. He oversees innovation projects, such as e-sport and VR, and business units responsible for GDPR. The full interview with Stéphane Salzinger, further referred to as SS, can be found in Appendix 4.

3.3.3 Per Lynggaard

Per Lynggaard is as Associate Professor at AAU Copenhagen in the department of communication, media, and information technologies. For many years, he has worked with

sensors, and sensor technologies. He teaches in multiple areas at AAU and at DTU: software defined radio, digital electronics, digital signal processing and advanced mathematics, satellite technology and communication, development of mobile applications, digital signal processing, object-oriented programming, development of ICT and media services, communication and broadcast networks, communication and media technologies, mICT – development of ICT and media services, and mICT – communication and broadcast networks. The full interview with Per Lynggaard, further referred to as PL, can be found in Appendix 9.

3.3.4 Kristina Schollert Jørgensen

Kristina Schollert Jørgensen is the Regional Manager at Nordisk Film Cinema. She holds half of the regional responsibility at Nordisk Film Cinema and is the manager of half of all the cinema managers at Nordisk Film Cinema. The full interview with Kristina Schollert Jørgensen, further referred to as KSJ, can be found in Appendix 6.

3.3.5 Samant Khajuria

Samant Khajuria is an external Associate Professor at AAU Copenhagen in the department of communication, media, and information technologies. Primarily, he is known to work with privacy, personal data, user perception, cybersecurity, and GDPR. The full interview with Samant Khajuria, further referred to as SK, can be found in Appendix 11.

3.3.6 Charlotte Arnø

Charlotte Arnø is responsible for Egmont's business consulting team with regards to upholding the GDPR law in all of Nordisk Film and the Egmont group. The full interview with Charlotte Arnø, further referred to as CA, can be found in Appendix 7.

3.4 Qualitative Interviews and Data

For this project, a sequential multiphase design mixed method (Saunders et al., 2016) was used. Initially, five interviews were conducted with both Nordisk Film Distribution, Nordisk Film Cinema, and external experts. These semi-structured interviews were followed by a mostly quantitative survey with qualitative elements, in which 152 cinemagoers participated. Lastly, nine structured follow-up interviews were conducted to get deeper insights into peoples' reasoning. All of this data can be classified as primary data.

3.4.1 Interviews

In this research study, the qualitative data collection was created to be used as primary data. Each interview functioned to obtain knowledge in a social correlation between interviewee and interviewers. The collection consists of five semi-structured face-to-face interviews and nine structured phone interviews. Three of the face-to-face interviews were conducted with Nordisk Film employees and two were conducted with external experts from AAU Copenhagen. The nine structured interviews were conducted with cinemagoers, who previously answered the survey. Initially, external experts from Telenor and TDC were contacted as well, as they have extensive knowledge of IoT systems and implementations. However, after several attempts of contacting them, they stated that they did not have the time for interviews. For that reason, the researchers decided to interview two AAU Copenhagen employees instead, who are experienced in the areas of IoT, sensors, and GDPR.

3.4.2 Semi-Structured Interviews

All interviews were based on a predetermined and structured set of questions. The five semi-structured interviews were guided by the social interaction with the interviewee and general influx of additional questions. Therefore, the interviews cannot be seen as fully structured interviews (Saunders et al., 2016). A semi-structured interview form was most suitable to give the interviewee the possibility to elaborate on important aspects. The semi-structured approach was chosen to create more in-depth interviews aimed at not only understanding the “what” and “how” of cinema operations, but also to elaborate on new projects, ideas, and innovations (Saunders et al., 2016). This allowed for input from several viewpoints from all five semi-structured interviews.

Each semi-structured interview had a different duration, because of the variation of questions, the engagement of the interviewee, and their availability. During these interviews, the researchers were well aware of biases and the effects this might have on the generalization of answers (Saunders et al., 2016). This is taken into consideration throughout the project. The quality of the produced interviews has been highly dependent on the interviewees’ knowledge about the subject. Therefore, the participants were asked for their reflections and personal thoughts, no answers were seen as right or wrong. All five semi-structured interviews were conducted as face-to-face interviews.

It can be seen as a strength that the researchers established the important contacts prior to the interviews (Saunders et al., 2016). However, it could have affected the interviewees behavior towards the researchers, as they might have felt pressured to participate in the interviews. If that was the case, it might have affected their way of responding to

questions, e.g. by answering what they thought the researchers would like to hear instead of their actual thoughts. To overcome this potential challenge, the researchers rooted their questions in theory and argued based on the concepts that inputs was needed for.

3.4.3 Structured Interviews

For the structured follow-up interviews with the cinemagoers, it was decided to conduct structured, short, and simple interviews with a low number of questions since a lot of data has already been gathered on the interviewees through their answers in the survey. These interviews were effective and short phone interviews. Because of the easy access this was found to be the most optimal solution and avoid time and logistics constraints for the interviewees (Saunders et al., 2016). One structured 'interview' was conducted by e-mail, because the interviewee did not have time for a physical or phone interview.

3.4.4 Credibility

Prior to the interviews, various relevant fields of research were considered, such as innovation, personalization, recommendation systems, IoT and other advanced technologies, mobile services, state of the art, media management, business models, and more. This was to gain a broad range of knowledge within these fields, in order to conduct valuable interviews with the different groups of interviewees (Saunders et al., 2016). This facilitated a higher credibility towards the interviewees and helped the researchers develop theory-based questions both before and during the interviews (Saunders et al., 2016). The researchers tried to create a peer-to-peer atmosphere, in which the answers reached a sufficient academic and professional level to be used for the project.
In general, the authors did not experience misunderstanding of questions, neither from the structured or semi-structured interviews. This might be, because many of the questions are subjective, asking about the interviewees personal opinion, but it could also be because of the time spend on creating the interview questions that ensured their easiness and that they were adapted to the knowledge of the interviewee (Saunders et al., 2016).

3.4.5 Interview Methods

All interviews were primarily conducted by only one of the researchers to ensure consistency in matter of questioning. By being two people at each interview, the researchers were able to ensure different viewpoints/observations of the interview and add additional questions, if some were unanswered in the process of interviewing. All interviews were recorded to ensure that the interviewees' tone of voice could be included in the work

(Saunders et al., 2016). After recording the interviews with a smartphone, the audio file was saved for later transcription. This process helped the researchers to fully focus on the interviewee, because the answers are available at all times, which helped with ensuring the data reliability. Contextual data, e.g. time and place of the interviews, was not noted, but the researchers kept a simple calendar with an overview of the interviews, dates, and time frames (Saunders et al., 2016).

Table 1: Interview overview

Interviewee	Date, Duration	Place	Comment
DSH	19.03.18, 00:49:45	Nordisk Film, Valby	In-person
SS	21.03.18, 00:48:02	Nordisk Film, Valby	In-person
PL	23.03.18, 00:59:27	AAU CH, Sydhavn	In-person
KSJ	24.03.18, 00:34:29	Nordisk Film, Valby	In-person
SK	01.05.18, 00:33:55	AAU CPH, Sydhavn	In-person
Kevin (KR)	25.04.18		Phone
Pernille M. (PM)	25.04.18		Phone
Siarhei (SP)	25.04.18		Phone
Pernille J. (PH)	25.04.18		Phone
Mike R. (MR)	26.04.18		Phone
Maria (MK)	26.04.18		Phone
Line (LH)	27.04.18		Phone
Anna (AN)	27.04.18		Phone
Madeline (MA)	30.04.18		Phone
CA	01.0.18 & 07.05.18		Phone/ e-mail

3.5 Quantitative Survey and Data

A random selection of respondents replied to the survey, which was comprised of quantitative Likert scale rankings from one to seven (Field & Hole, 2003), multiple choice, ordered ranking, together with close-ended questions, and qualitative open-ended questions. The respondents were asked about basic demographic and behavioral data in combination with self-report measure data, such as the Likert scale method to evaluate different conditions (Saunders et al., 2016). The point was to ask multiple questions with a qualitative nature to get a more in-depth understanding of the general usage and needs of the cinema user and then quantitative natured questions to evaluate likes and dislikes of potential alterations to the cinema environment.
The survey was distributed online through the researchers' social media feeds and the link to Google forms was shared multiple times. The submission of the survey answers was anonymous. A few volunteers were chosen to be interviewed post survey in order to establish a more in-depth understanding of their answers in the survey. Pilot tests of the survey were conducted prior to exposure to ensure high quality answers in the resulting data. The survey was distributed on Facebook and WhatsApp on the 12th of April 2018 and reposted multiple times until the 27th of April 2018. The complete questionnaire can be found in Appendix 12.

3.5.1 Sampling

The sampling for this survey was designed as a probability sampling. However, due to the survey being distributed on the researchers' social media accounts and their age group, the sampling could be argued to be non-probabilistic and the sample size being heterogeneous or a grounded theory population (Saunders et al., 2016). The sample was a random selection of respondents using the volunteer snowball selections process. As there was no available data regarding the specification of a target group, the sample had to a degree represent the population and be of an exploratory nature. Here, it was found to be a combination of heterogeneous or maximum variation sampling, as respondents had to be of diverse characteristics (Saunders et al., 2016).

3.5.2 Demographic Data

Demographic data was collected at the end of the survey to give an indication of the respondents' segment. The respondents were here asked about birth year, gender, nationality, and current educational level.

3.5.3 Behavioral Data

The respondents were also asked about behavioral data to give an assessment of how interested they were in cinema, movies, and changes to the cinema environment. This data was primarily gathered through close-ended questions, multiple choice, and ranked options. A few elaborated, open-ended, and in-depth questions were also asked to some of the respondents (depending on their previous answers).

3.5.4 Self-Report Measures

All respondents were to answer questions about how they feel in regard to specific aspects of the cinema experience and their answers relied on their subjective experience and feelings. These questions were comprised of a set of questions where the respondents had to respond according to a Likert scale. The Likert scale was an optimal way of getting an indication of the respondents' opinions (Field & Hole, 2003). The Likert scale gave the opportunity to *"give individuals more scope to express how they feel about something and are easily understood"* (Field & Hole, 2003, p. 46). By using Facebook and WhatsApp as the platform to distribute the survey, it created an opportunity for a deeper reflection from the respondents, as they might be sitting in the comfort of their homes. This might have created more time to reflect not being bound by time restrictions. It was anonymous, which was beneficial, if the respondents felt the topic was personal (Field & Hole, 2003). The questions were inspired by theories on mobile services, privacy, recommendations, preferences, accessibility, IoT etc. (see Appendix 12).

4 Theory

In the following sub-chapters, the theoretical foundation for the thesis at hand will be explained and put into context. At the end of the theory chapter, the analytical framework based on the theory will be described as well.

4.1 STOF Model

According to Grönroos (1992), there are four types of services: intangible or non-material services, inseparable services, heterogeneous services, and perishable services. Movie tickets belong to the latter category, as is it not possible to resell or transfer the tickets once the consumer went to the cinema. "*The offering itself and the resources needed to deliver the service are not wasted but have to be made operational in order to deliver the service again*" (Bouwman & Fielt, 2008, p. 16). However, the distinction between services (intangible) and products (tangible) is a bit blurry, which results in a debate about whether this distinction is still valuable (Bouwman & Fielt, 2008). In the case of cinema tickets for example, the service requires a product, the movie.

As the focus of innovations is shifting towards service-oriented innovations, many other stakeholders besides the research and development department (R&D) have to be taken into account. Combining the different resources in the strategically best way is an important part of the innovation journey. Especially when considering the concept of open innovation as described by Chesbrough (2003), Bouwman and Fielt come to the conclusion "*that service innovation is only possible in an open networked environment in which multiple actors collaborate in delivering innovative services, each contributing their own specific resources and capabilities*" (Bouwman & Fielt, 2008, p. 28). In order to involve all stakeholder successfully, the underlying business models need to be attractive and create value for all of them. One business model that supports this approach is the STOF business model, which will be explained in further detail in the following paragraphs.
One of the most commonly used definitions of a business model was framed by Osterwalder and Pigneur: "*a business model is nothing else than a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and robust revenue streams*" (Osterwalder & Pigneur, 2002, p. 2). Many other authors contributed their own definitions, but, more importantly, the different components of a business model are discussed controversially (Bouwman, Faber, Haaker, Kijl, & De Reuver, 2008a).

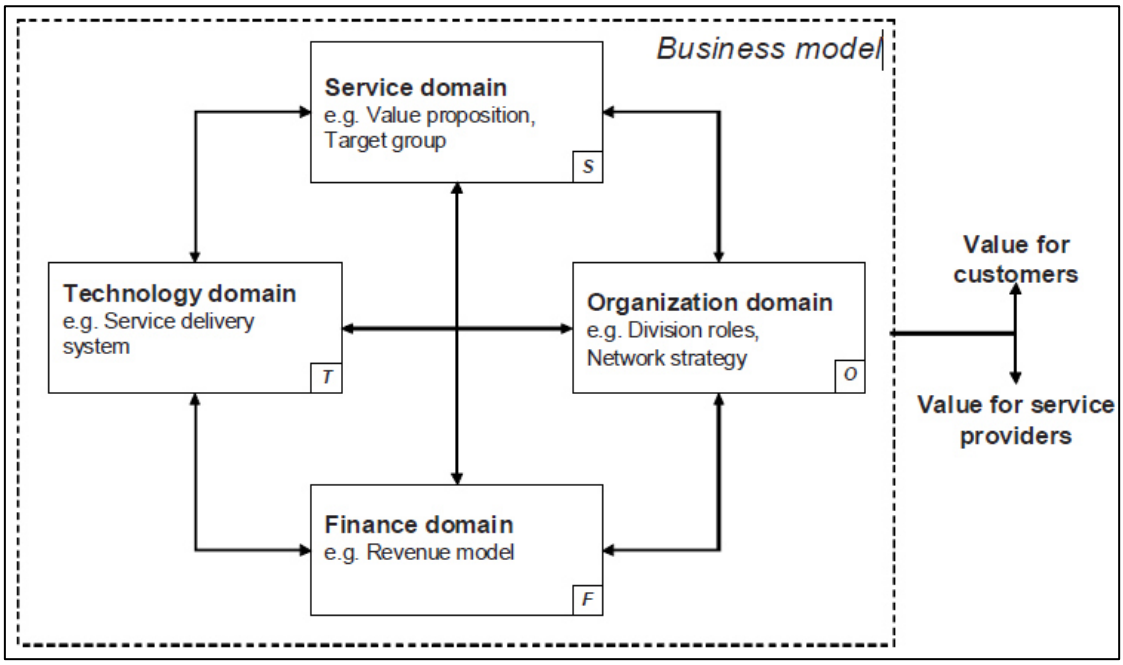

Figure 7: STOF business model domains
(Bouwman et al., 2008a, p. 36).

As described by Bouwman et al. (2008a), the STOF model tries to capture the most important components for value creation by focusing on four domains: service, technology, organization, and finance (see Figure 7). Analyzing the components and critical issues in all of these areas will provide a good overview of the business model and identify unresolved issues that need to be addressed in the near future. All four domains will now be explained in further detail.

4.1.1 Service Domain

The service domain is the starting point of the STOF business model and can be split into several sub-categories:

- customer value and integration,
- perceived value versus experienced value,
- value of mobile services (including personalization of mobile services and context-awareness),
- inhibitors of mobile service development (namely security and privacy concerns),
- individualization of mobile services (including market segmentation),
- and research in adoption and use of mobile services (mostly dependent on personal preferences or contextual parameters).

(Bouwman et al., 2008a).

As mentioned before, the central aspect of the STOF model is value creation. With regards to the service domain, four interrelated concepts are being taken into consideration: "*intended and delivered value on the part of the provider, and expected and perceived value on the part of the customer or end-user*" (Bouwman et al., 2008a, p. 42). This approach shows that there can be gaps between the different value perspectives, which can lead to different impressions of the exact same service or product. It should also be mentioned that the customer and the end user are not necessarily the same person, e.g. in a case where the decision makers in a company buy a product and all employees use it. (Bouwman et al., 2008a)

Following this approach, "*critical service design issues include value creating elements, customer retention, targeting and branding*" (De Reuver, Stein & Hampe, 2013, p. 63). The interaction between the different aspects of the service domain is displayed in Figure 8.

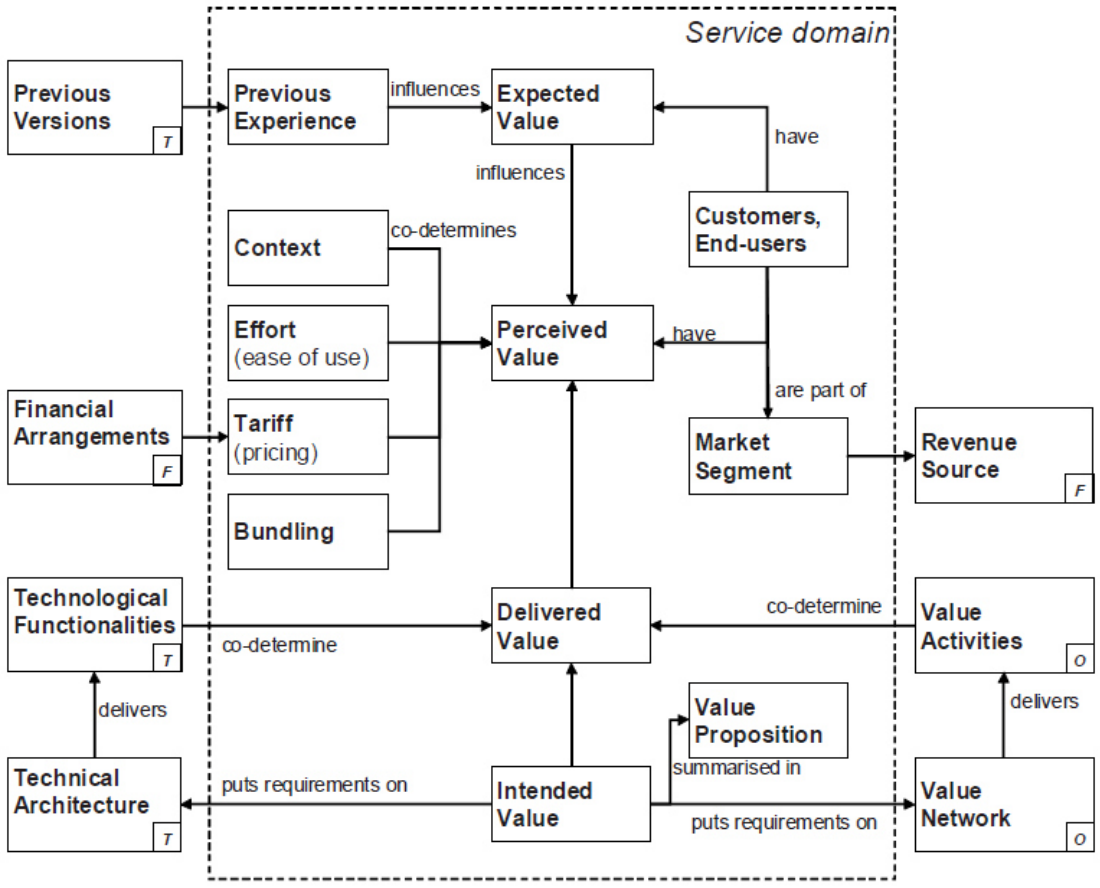

Figure 8: Descriptive model for the service domain
(Bouwman et al., 2008a, p. 45).

4.1.2 Technology Domain

Based on the requirements that result from the structural outcome of the service offering, the technical architecture can be specified. In short, the technology domain is "*a description of the technical functionality required to realize the service offering*" (De Reuver, Bouwman & Haaker, 2009, p. 5).

For any service application that is run over network in order to deliver value to the customer, the following architectural components should be considered:

- authentication (especially when using personalized, fee-based services, the secure authentication of the user needs to be assured),
- management of user profiles (gathering, storing, and maintaining user data), and
- security (this also included the consumers' perceived level of security).

(Bouwman et al., 2008a)

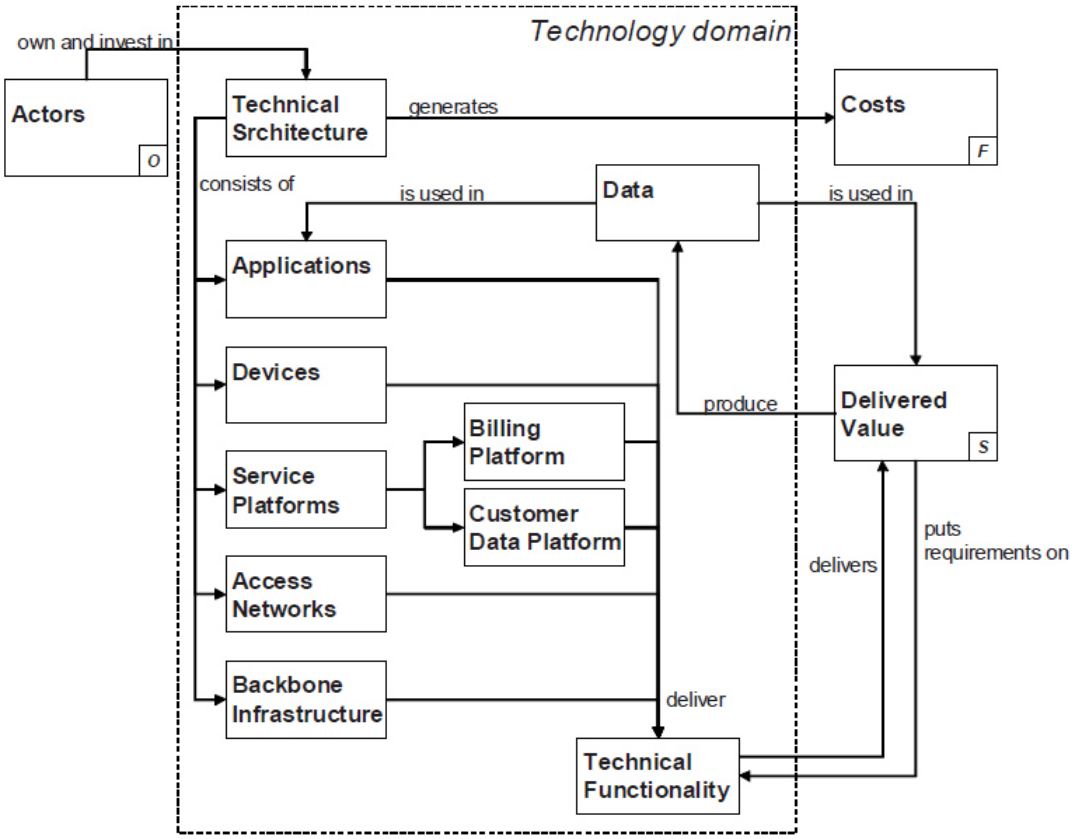

Figure 9: Descriptive model for the technology domain
(Bouwman et al., 2008a, p. 49).

Subsequently, the technology design evolves from the service design and entails the technical architecture, the backbone infrastructure, access networks, service platforms, devices, applications, data, and technical functionalities. Furthermore, the technology design is closely related to the organizational design, because the relationships with the

technology providers play a huge role in the distribution of costs, risks, and responsibilities. (Bouwman et al., 2008a)

The critical points, also called critical design issues, of the technology domain are security concerns, the quality of service (which is to a large part determined by performance of the technical infrastructure), system integration (which describes how well the new service is integrated into existing technological solutions), accessibility for the customers, and the management of user profiles. (Bouwman, Faber, Fielt, Haaker, & De Reuver, 2008b) The interaction between the different aspects of the service domain is displayed in Figure 9.

4.1.3 Organization Domain

In general, the organizational domain is "*a description of the structure of the multi-actor value network required to create and distribute the service offering and describe the focal firm's position within this value network*" (De Reuver et al., 2009, p. 5).

This statement clearly indicates the importance of establishing healthy relationships with external actors, because it is assumed that an organization cannot provide a valuable service to their customers without collaboration. At this stage it is indispensable to highlight that all actors in this network should gain value from the partnership, which is considered an important part of the business model and its value chain. (Bouwman et al., 2008a)

The organization domain and the connection between relevant topics is displayed in Figure 10. This includes the different actors, the value network, their interactions and relations, their strategies and goals, organizational arrangements on how to facilitate the collaboration, value activities that need to be performed to deliver the service, and resources and capabilities, which can be either financial, organizational, technical, or social. (Bouwman et al., 2008a)

Based on the organization domain, several critical design issues such as partner and resource selection, network openness (including its entrance barriers for new actors), network governance (which is often dominated by one player), and network complexity (both from a technological and relationship-focused perspective) derive. (Bouwman et al., 2008b)

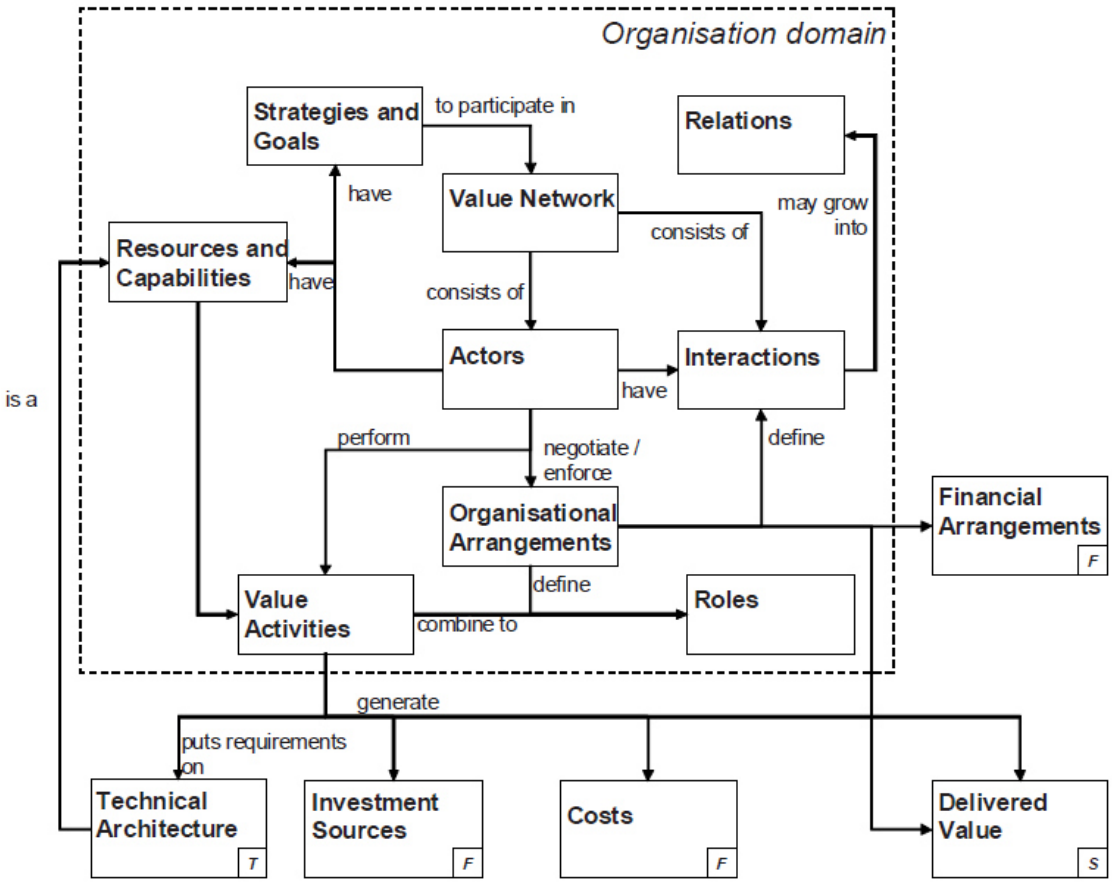

Figure 10: Descriptive model for the organization domain
(Bouwman et al., 2008a, p. 57).

4.1.4 Finance Domain

The finance domain is "*a description of the way a value network intends to generate revenues from a particular service offering and of the way risks, investments and revenues are divided among the various actors in a value network*" (De Reuver et al., 2009, p. 5).

The domain can be split into several subcategories:

- costs (including transaction costs, a usually quite high amount of fixed costs vs. variable costs),
- revenues, including "realizing cost reductions as well as long term advantages that stem from intangibles" (Bouwman et al., 2008a, p. 59),
- risks (including the likelihood and impact of the perceived risks), and
- pricing (in an extended notion this includes, besides the pricing strategy, the sacrifices users have to make in order to get access to the service).

(Bouwman et al., 2008a)

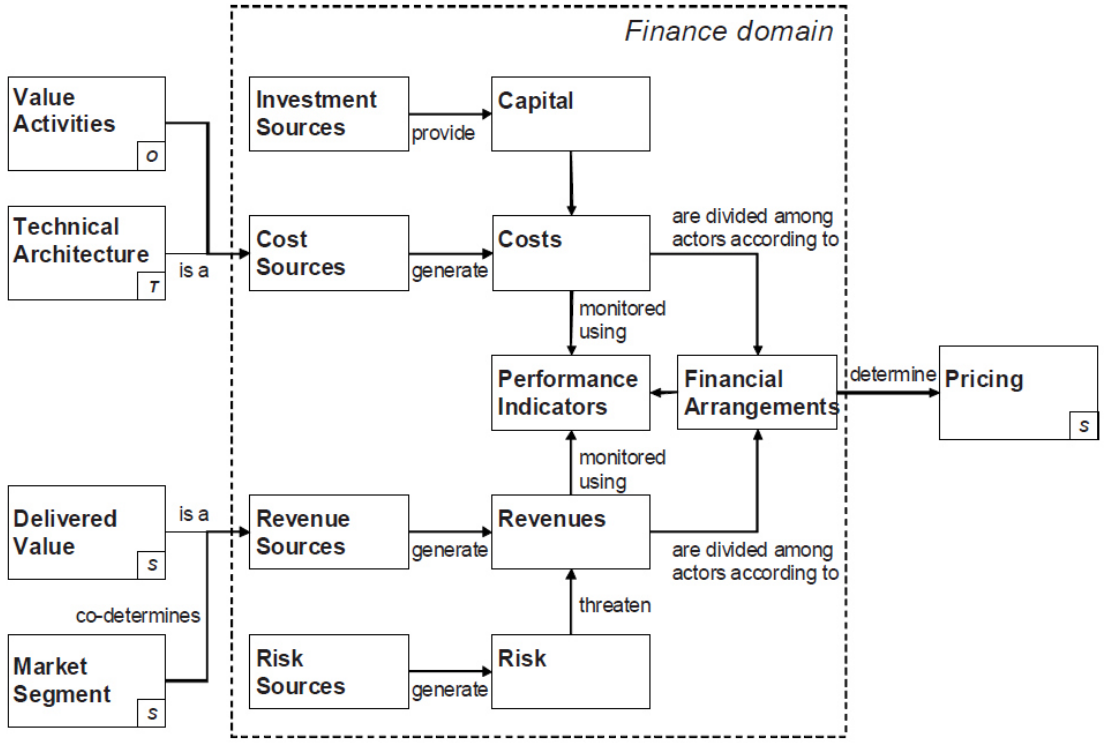

Figure 11: Descriptive model for the finance domain
(Bouwman et al., 2008a, p. 63).

The financial variables, namely investment sources, costs sources, performance indicators, revenue sources, risk sources, pricing, and financial arrangements build the design of the finance domain, which is shown in Figure 11.
Based on this design, several critical design issues can be identified for the finance domain: pricing, division of investment and risks between the partners in the value network, fair valuation of contributions and benefits including the intangible benefits, and the division of costs and revenues. (Bouwman et al., 2008b)

4.1.5 STOF Model Utilization

For the purpose of this thesis, the four STOF model domains backed up with additional content and information while linking these theories to the specific domain. However, the researches will not follow the structure exactly as presented – the model will serve as a backbone structure and analytical framework for compiling different theories into a consistent approach. Please see Figure 12 for an illustration of the approach.

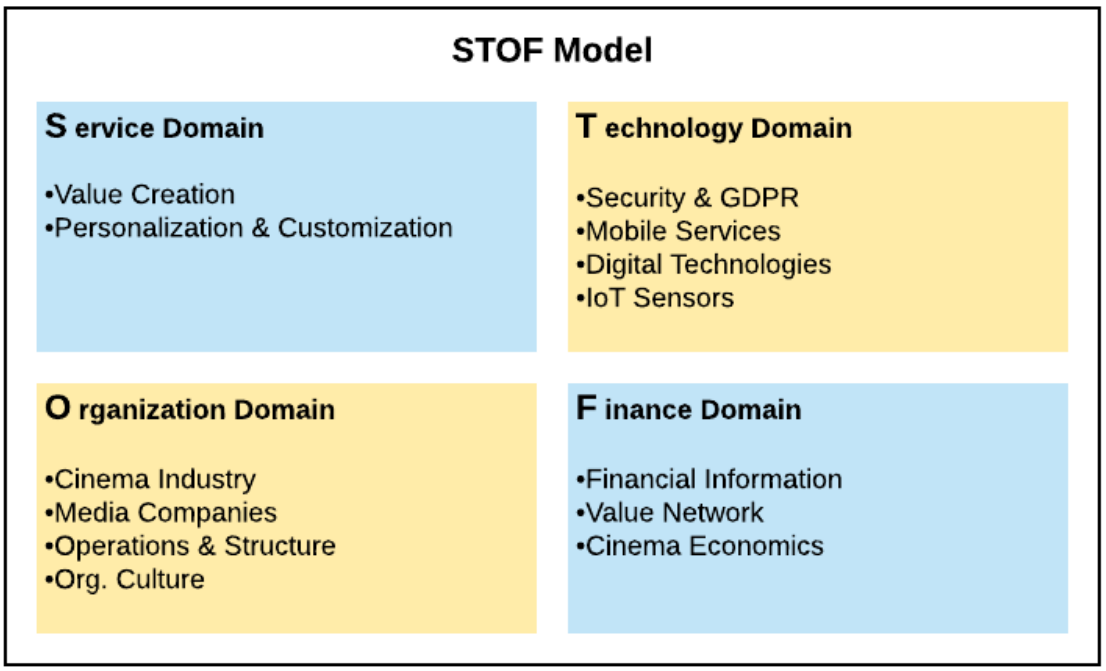

Figure 12: Extended STOF model

4.2 Extended STOF Model

As mentioned above, the following chapter will contain additional theories that can be linked to the different STOF model domains. Please note, that these theories are not part of the original business model but add value to the theoretical understanding and investigation for this thesis.

4.2.1 Service Domain – Extended

In the following domain, a description of value creation, personalization, and customization with regards to innovation strategies will be presented.
Responsiveness and recommendation can help facilitate a more personalized experience for the consumer. It will also be explained how service optimization can be achieved.

4.2.1.1 Value Creation

According to Prahalad (2004) managers struggle to look beyond the borders of their own industry when trying to investigate new opportunities. To create new value the managers must rethink the logic of their current business and be open to look beyond the borders of the business sphere. Value creation is usually an "*exchange of goods between the seller and buyer*" (Prahalad, 2004, p. 171). However, in some cases the value creation can also be a service. Prahalad (2004) believes that companies must challenge the dominant logic to discover the new opportunities for value creation, e.g. by understanding

and observing the current value that is embedded in the product or service the company produces. The dominant logic is the core of the company or its essence. Every operation within the company on every level is standardized around the dominant logic. It is the source of the company's past successes and is a point of view for what managers see as new opportunities and threats. Due to this, many find it difficult to let in a new logic to increase competition and value creation. The dominant logic in a firm can decrease the organization's ability to innovate itself and notice opportunities and threats. When newcomers challenge the industry by forming a new logic, the established industry leaders have a hard time to conform and understand the threat that the newcomers pose. But the dominant logic can also help organizations, as it helps them sustain organizational strategy and makes them resilient in a competitive environment. It is not an easy task to change an organization's dominant logic. Overall company acceptance is needed in order to facilitate such a change. (Prahalad, 2004)

Products and services have always been seen to be the main ingredient in consumer value. "*The interface between the company and the consumer is the locus of economic value extraction"* (Prahalad, 2004, p.172). The consumer depicts the demand of the product or service the organization can offer. Here, the consumer value is given from the organization to the consumer. The market sets the demand for the organization's offerings. This is the common depiction of a value chain system. However, new dominant logics have emerged. They are more focused on individual experiences: it is a different exchange based on co-creation of value, where the value is latched in the personalized experiences. (Prahalad, 2004). In Figure 13 one can see the difference between the two types of value creation.

Traditional Assumptions of Value Creation	New Assumptions of Experience-Based Value
1. Value is exchanged between the firm and a customer. Value is created by the firm.	1. Value is created at the point of exchange
2. Value is embedded in products and services (therefore innovation is about products and services).	2. Value is co-created by the consumer and the firm
3. Value chain represents the value creation process.	3. Value is embedded in experiences: products and services are carriers
4. Innovation is about technologies, products, and process.	4. Experience fulfillment webs are not a sequential and linear value chain
5. Customers have a "buy" or "not buy" choice and managers are there to persuade them.	5. Innovation is about experiences; technologies/products/processes are critical but not the goal
	6. Customers make the key decision and the associated tradeoffs

Figure 13: Competing frames of value creation
(Prahalad, 2004, p.173)

"Instead of focusing on benchmarking 'best practices', managers need to look at developing 'next practices', focus on experimentation. They must look beyond the borders of their industries and geographies to find new opportunities and harness the potential of new technologies to rethink the logic of the business. […] Best practices assume a small subset of people know how to do it best. 'Next practices' results from recognition that there may be newer approaches that haven't been tried yet. Effective strategy is not about 'extrapolating the past' but rather 'folding the future in'" (Prahalad, 2004, p. 176).

Organizations should be open to experiments, even on a small scale. So-called low-cost experimentations allow companies to learn fast from their experiences and move on to new experiments. These experiments can help organizations to move forward, be more agile, and act faster to changes. They can create and shape the future, detect and mold products and services, and exploit them before they become obsolete. By harvesting this discontinuity, the companies can learn while getting the most out of the products and services. Some call it disruption whenever a company experiences discontinuity. However, the "*word 'discontinuity' instead implies that the company can affect the future*" (Prahalad, 2004, p.176). (Prahalad, 2004)
In the context of Nordisk Film Cinema, the idea of looking beyond their own industry could be a good innovation strategy to create consumer value.

In 1995, Bower and Christensen asked a bold question: "w*hy is it that companies like these invest aggressively - and successfully in the technologies necessary to retain their current customers but then fail to make certain other technological investments that customers of the future will demand?"* (Bower and Christensen, 1995, p. 43). In companies the managers often see themselves as being in control of the company's decisions, but the consumers hold an elevated level of control as well, as they decide what a company invests in. A manager must always consider what the consumer wants and how big the needs of the market will be. Some companies solemnly follow the needs of the mainstream users losing sight of the modern technologies that enter their market. The technologies that can influence or harm the companies are not necessarily new to the market but pose an alternative way to do things. Bower and Christensen (1995) explain that the technologies often follow two important traits:

1. they will represent an alternative package of performance attributes, which at first will not be demanded or valued by the existing customers;
2. and "*the performance attributes that existing customers do value improve at such a rapid rate that the new technology can later invade those established markets*" (Bower & Christensen, 1995, p.44).

Nevertheless, by the time the second trait steps in, the mainstream consumer already requests the innovative technology – at this point it will be too late for the company to get on the disruptive wave and the early adopters will dominate the market. (Bower & Christensen, 1995) Based on this, Nordisk Film will have to consider that even though current consumers do not demand innovative technologies, this does not indicate that the future consumer will not demand it either. Therefore, it is recommendable for them to investing heavily in technologies and investigating new ways of driving their business.

4.2.1.2 Responsiveness and Personalization

Choi and Bargar (2017) studied multimodal dimensions of digital products and services and found two types of responsiveness. One is the action responsiveness that refers to the consumers' actions and the response to these actions – it is about improving the consumers' sensorimotor experience. The second is information responsiveness, which corresponds to the systems' general contextual informational data and personalization. This is about the consumers' enhanced cognitive experience. These distinctions explain the consumers' expectations of digital products and device services and determine the quality of the media experience. Consumer inputs are required to create and understand associated meaning and classify media content on applications. "*Netflix and Facebook curate, cleanse and recommend content at large scale by employing large teams for brute - force human analysis of content, including text analysis as well as digital media"* (Choi & Bargar, 2017, pp. 2-3). This is an example of how media companies utilize the consumers to customize and personalize their data, digital products, and services. It is a semantic classification that demands the need of dialog between the consumers and the developers or suppliers. Most recommendations systems require more than just machine recommendation, as consumer input is needed to create a sufficient and ideal automated media network. Otherwise, the system will not be able to create a personalized and responsive media service. By personalizing their digital products and services, providers can increase their credibility and become trusted media operators. Personalization can create greater consumer value and gives consumers easier access to entertainment products and services that they demand. The online personalization can take away the image of large-scale infrastructures and corporate persona organizations that many have and create a peer to peer presentation for the consumers. (Choi & Bargar, 2017)

It is a popular belief that personalization is a benefit for the consumers and over time it will make them more loyal to the operator through the exposure of personalized products and ideal use of personalized marketing. In this way the companies can increase their knowledge of consumer habits and interests. (Thurman, 2011)

It is important to consider the aforementioned with regards to personalizing the Nordisk Film app. Therefore, Nordisk Film Cinema should use their customers to customize and personalize their digital services.

4.2.1.3 Recommendation Systems

"A recommendation system is the system that has, as principal task, to choose certain objects that meet the users requirements" (Crespo et al., 2011, p. 1446). The main concept of a recommendation system is to make the user choose from and evaluate a series of objects which will generate recommendations where the system tries to predict the user's evaluation based of past evaluations. (Crespo et al., 2011)

Nowadays, many companies are using recommendation systems in order to give the consumers options to choose from. A common example is the Netflix recommender system which is very innovative for its time and uses multiple search and related algorithms to adapt to the potential user needs. They started out by looking at historical member engagement data and used this to find the midsection between internet and storytelling. It has been found that people are becoming worse at making choices, as there a too many options to choose from and they quickly lose focus on what they want. However, most people want broad selections with many smaller niche groups and interests. According to Netflix an average consumer "*loses interest after perhaps 60 to 90 seconds of choosing having reviewed 10 to 20 titles"* (Gomez-Uribe & Hunt, 2015, p. 2). This makes it crucial for companies, whose prime earnings come from product variety, to curate according to the consumers' needs. Due to the usage of the Netflix application, the company can know a lot of about their consumers' habits and time management. On the Netflix webpage a personalized video ranker (PVR) algorithm is used – it orders the video catalog by genre and other filters in a personal way for each customer profile. Another algorithm used is the 'Top N video ranker' that makes recommendations based on the top picks of the users, which create a selection of movies that most users like. The combination of the two algorithms creates a greater option for the users to identify movies they might like. Netflix also considers the time a day and time of year, creating predictions based on historical data for movies and videos that the users want to watch. Much of the episodic content is also ordered according to the 'continue watching ranker', giving the user the option to resume, review or rewatch their past selections. Another algorithm is the 'because you watched ranking', that creates recommendations based on users' past choices. There are also evidence selection algorithms that collect data about whether the consumers like the recommendation and rank the videos dependent on how well they fitted the users' needs. It then considers, if the past recommendations should be reshown and displayed again for the users. Lastly, there are search algorithms that collect play

data, search data, and metadata about the recommendations. All algorithms are dependent on statistical and machine learning techniques to be able to learn about the consumers. (Gomez-Uribe & Hunt, 2015)

Many people follow other people's recommendations, as they find it hard to choose themselves. Consumers want more options for self-curation and customization in devices and services. Recommendation systems can decrease the overload of information and curate the information for the specific field the user is looking for. The internet, computers, and databases create the options of choices from a larger pool of content. However, if it is not assorted, it is very difficult to find what one might need. (Crespo et al., 2011)

According to Crespo et al. (2011), there are two common types of algorithms that create the basis of any recommendation system:

1. "*based in the content: the system recommends similar objects to those the user has liked in the past*"
2. and "c*ollaborative: the system recommends the user objects that have been liked by users with similar likings*" (Crespo et al., 2011, p. 1446).

Even though there usually is not a very big selection of movies, users can find it hard to decide on one, as mentioned in the previous findings. Therefore, Nordisk Film should consider the implementation of a recommendation system to assist the cinemagoers. Thereby, they could also create a more customized service platform for the users.

4.2.1.4 Contextual data

Context is a crucial element of any application service, as it can characterize the situation the consumer is in. This information provides the interaction between the consumer and application, such as *"location, time, activities, and the preferences of each entity"* (Hong, Suh, Kim & Kim, 2009, p. 7448). Content awareness is the information about the contextual attributes, i.e. the consumers' current position, activities, and surrounding environment. It can help the service operator to understand the consumers' needs and demands depending on their surrounding environment. The services get customized to the consumer and offered accordingly depending on the context they are in. Therefore, more personal data is needed to create a personalized service. Consumers and their individual preferences differ greatly from each other, as their characteristics, such as gender and age, play a powerful role in what they need and want. (Hong et al., 2009)

A developer can know more about the consumers through sensor data, but to truly understand the consumers' activity, sensor data is too limited. The preferences of the consumers are not automatically extracted – they must be learned. Content-aware computing in personalized services underlies the following limitations:

1. "*first, the users have to input their preferences manually to receive the personalized services*";
2. "*the previous researches did not provide the personalized services extracting the users' preferences automatically*";
3. and "*it is difficult to provide new user with the personalized services due to the deficiency of their history or information*"
   (Hong et al., 2009, p. 7448).

Another study mentioned in Hong et al. (2009) uses decisions and context history to understand their consumer. In this study, the software would learn through the consumers' choices and actions. Context history is the collection of consumers' past context, such as locational data. This history can help applications understand the users better and create personalized, intelligent services. (Hong et al., 2009) "*Context history has been used for the prediction of future context, selection of devices and adaptation"* (Hong et al., 2009, p. 7450).

4.2.2 Technology Domain – Extended

In this chapter, some of the technology domain's elements will be discussed in further detail. First, the generic topics of security, including privacy and data security considerations, will be elaborated on. Afterwards, the reader will be presented with a selection of advanced/digital technologies that could be relevant in a cinema context with a special focus on IoT sensors. However, topics such as management of user profiles for mobile apps will be excluded, because Nordisk Film Cinema already offers an app and therefore it can be assumed that there is some type of management in place already. Also, authentication and payment methods will not be discussed in further detail, as Nordisk Film already has a system for this in place where cinemagoers can buy their tickets online. Last, the topic of artificial intelligence (AI) will be investigated, as AI-enabled platforms could provide smart solutions for processing vast amounts of data from multiple sources.

4.2.2.1 Security & GDPR

Mobile security has always been a critical issue that has been discussed controversially. Most apps and website collect and store massive amounts of data about their users without them noticing. The European General Data Protection Regulation (GDPR), made

by the European Parliament, the European Commission, and the Council of the European Union on the 27th of April 2016 and enforceable from the 25th of May 2018, will give users more control about their data. It applies to all companies processing data of European data subjects, no matter where the company is located. Subsequently, organizations in the entire world have to adapt to these changes and most likely change their data storage processes to avoid penalties. If a company does not obey the GDPR, it is possible that they must either pay 20 million Euros or four percent of their annual global turnover, whichever is the greater amount. (EU GDPR Portal, 2017)

The most significant components of the GDPR are the following (please also see Figure 14 for further key changes):

1. Conditions for Consent: terms and conditions are often difficult to understand. The GDPR determines that they must be presented in clear, plain language also offering an easy way to withdraw the consent.
2. Breach notification: organizations have 72 hours after detection to make data breaches public.
3. Right to access: data subjects have the right to access their data from the controller and receive concrete information about data processing and its purpose.
4. Right to be forgotten: data subjects can demand that all personal data is to be deleted and third-party companies are being stopped from using their data as well.
5. Data portability: data subjects have the right to transfer their data to another controller when they receive it in a digital, portable format.
6. Privacy by design: "*The controller shall implement appropriate technical and organisational measures for ensuring that, by default, only personal data which are necessary for each specific purpose of the processing are processed. That obligation applies to the amount of personal data collected, the extent of their processing, the period of their storage and their accessibility. In particular, such measures shall ensure that by default personal data are not made accessible without the individual's intervention to an indefinite number of natural persons*" (GDPR (EU) 2016/679, article 25, number 2). In other words, the data protection mechanism should already be included in the system.
7. Data protection officers: companies can make use of internal records instead of informing local departments of political affairs separately. To do so, specifically appointed data protection officers will report directly to the company's top management.

(GDPR (EU) 2016/679)

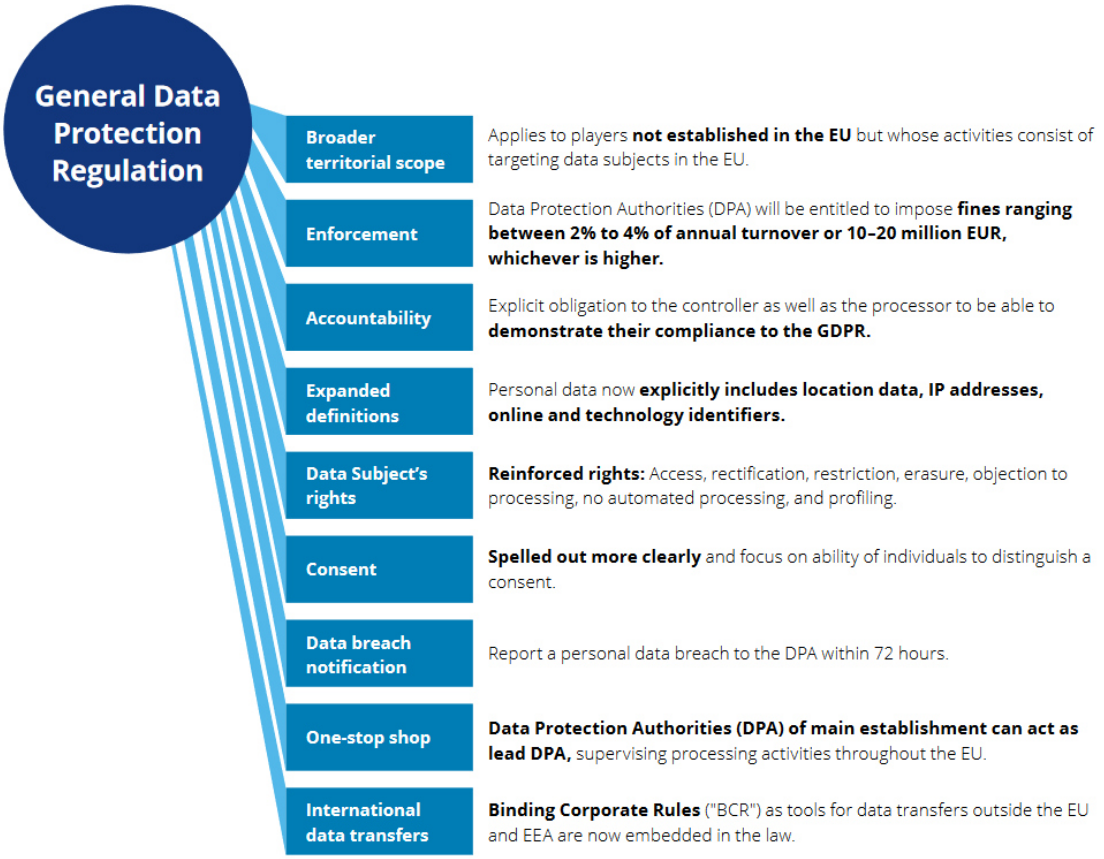

Figure 14: GDPR Key Changes
(Deloitte Risk Advisory, 2017, p. 9)

Subsequently and in the context of this thesis, special attention should be paid to the processing of user data, privacy rights and conformity with the GDPR when evaluating different digital concepts for the cinema of the future.

With regards to the generation of young adults, namely Generation Y or Millennials, who were born between roughly between 1982 and 2004 and grew up with the internet and different devices, it becomes clear that they generally do not trust in applications or mobile services by default. Privacy is an important issue for this generation and must be easy to understand and handle by its nature, which is not a given with IoT solutions at the moment. As a reason, they expect the privacy issue to be addressed, even though their personal efforts are not in line with their mindset, as they often give away their personal data freely without reading the terms and conditions first. (Sørensen, Williams, Khajuria & Skouby, 2017)

The following Generation Z has "*hardly yet entered as a decisive socio-economic group with own characteristics. Characterisations by consultancies and media analysts started out declaring that we have now a new group emerging, very different from Millennials, but in reality, vaguely differentiated as 'Millennials+', i.e. they are more always on; better*

multitaskers; more global" (Sørensen et al., 2017, p. 14). They favor visual communication through apps like Snapchat and Instagram and are less likely to meet their friends physically. (Sørensen et al., 2017)

4.2.2.2 Applications and Mobile Services

Nordisk Film already has an app that can be found in the Google Play Store and the Apple App Store (see screenshot of the app in Figure 15). Users can log in with their Nordisk Film account (but they do not need an account, if they do not want to) and have the option to search for cinemas and movies. Once a suitable cinema, movie, and time slot was found, the user will be redirected to the 'www.nfbio.dk' website to buy tickets. At the moment (as of 03/2018), there is no payment functionality available directly in the app. However, the user will receive a QR code ticket in the app that can be shown to Nordisk Film Cinema employees in the entrance area. Furthermore, the app offers additional functionalities that are connected to the user account, e.g. collecting bonus points.

"*To offer mobile services, several resources are needed. For instance, access is needed to the communication network used to transmit the services, as well as to the user handsets. In the case of information and entertainment services, value-adding content needs to be sourced, adapted and aggregated. Moreover, in most cases, IT-related resources of content adaptation platforms and applications running on the user device are needed to provide the service. Finally, access to users is required, including identification, authentication, positioning and billing*" (De Reuver, Bouwman & Haaker, 2009, p. 5).
This quote demonstrates the complexity of mobile service offerings. Despite this, mobile phones are nowadays becoming an integral part of peoples' lives. Subsequently, mobile phones create an optimal opportunity to sense the environment around the user and interact with other digital technologies such as sensors. The gathered data can be very helpful for companies in order to understand their customers' environment, behavior and needs. Many applications have access to location information directly through the phone, e.g. via the global positioning system (GPS). (Natarajasivan & Govindarajan, 2016)

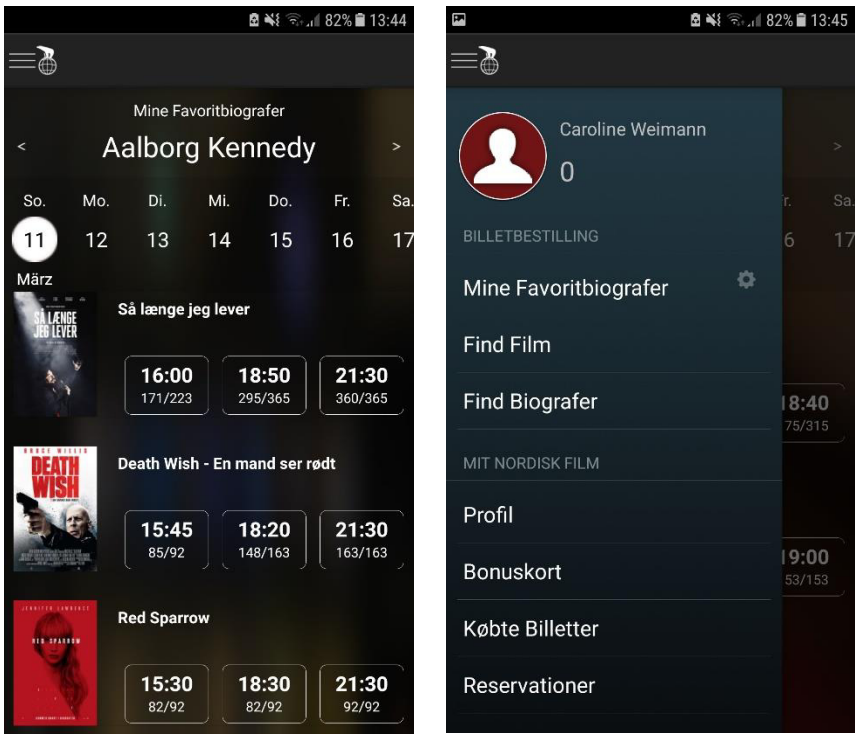

Figure 15: Screenshots of Nordisk Film app

4.2.2.3 GPS

GPS "*is composed of a series of satellites that can be used by various ground-based technologies to determine the location on a nearly ubiquitous scale. It is well accepted as a tool that can be coupled with any number of devices to determine location*" (Bricka, Baker, Simek & Wood, 2014, p. 4). Recently, an increasing amount of GPS data is collected passively through mobile phones by automating the data collection process. This way, an individual's routes and preferences, for example the time someone spends at a specific location, can be analyzed in detail. (Bricka et al., 2014)

Even though GPS offers many ways for marketers to raise the awareness for their products and services, one must be careful with messages that might be perceived as intrusive by the customer. A study shows that "*intrusiveness has an important negative effect on consumer attitudes towards the message. This […] shows that if consumers deem a message to be intrusive, they are likely to reject that message, due to limited control over timing and content*" (Gazley, Hunt & McLaren, 2015, p. 1698). To prevent this from happening, users should be given the option to deliberately opt-in or opt-out for such messages with various contents, which will also lead to a higher degree of personalization. This means both sides – company and customer – can profit from customized location-based marketing, if the right measurements are in place, e.g. through detailed privacy

settings inside the mobile application, and the customer is given control over the marketing messages he/she receives. Furthermore, it increases customer loyalty. (Gazley et al., 2015)

4.2.2.4 NFC

Another location-based mobile service is near field communication (NFC). It "*is a technology that enables a device to communicate with another at a maximum distance of around 20cm or less*" (Curran, Millar & Mc Garvey, 2012, p. 371). NFC can be integrated in handheld devices such as mobile phones to provide users access to a big variety of commercial purposes such as easier transactions, connecting two electronic devices, and the exchange of digital content. For example, many banks now offer contactless payment through NFC technology and most mobile phones have an NFC chip already included. (Curran et al., 2012) Figure 16 gives an overview of the different functionalities available through NFC in different contexts.

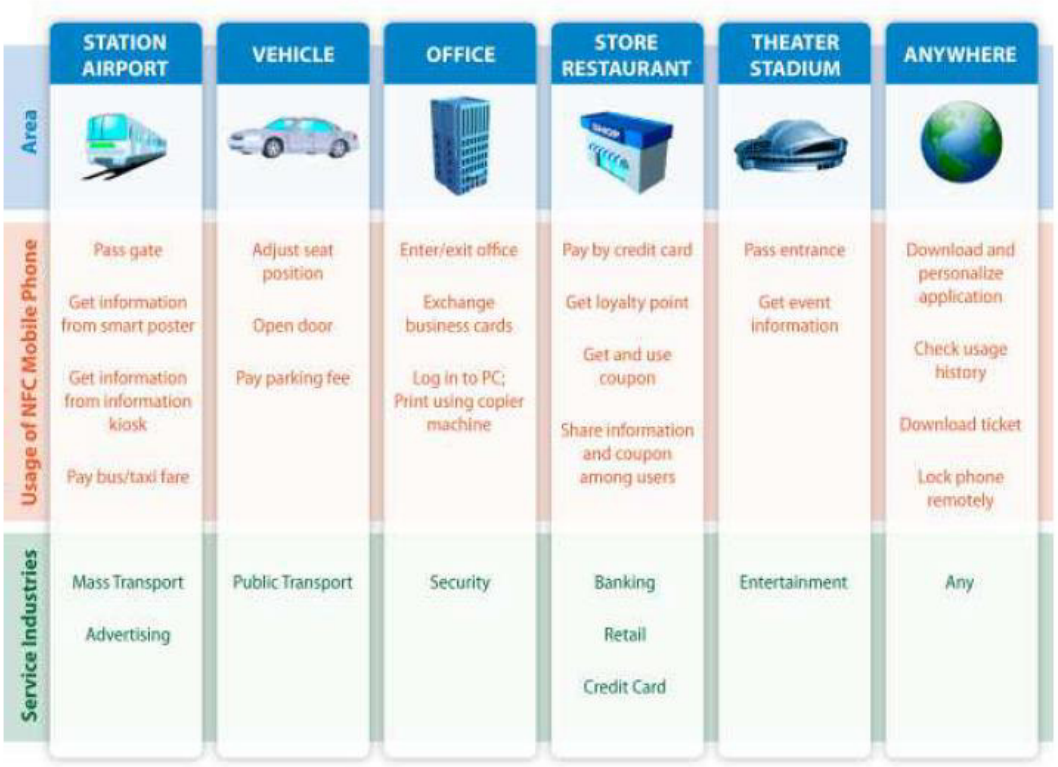

Figure 16: NFC functionalities
(Curran et al., 2012, p. 374)

4.2.2.5 Mobile Apps and Devices

In general, mobile apps are a very useful tool for companies to engage and connect with their customers. Hence, companies spend a lot of resources on the constant develop-

ment and improvement of better mobile service offerings. A study conducted by Accenture found that most executives strongly support the focus on mobile applications, think they drive their business towards digital, and consider them the "*dominant interface of the future*" (Accenture 2015, p. 3). However, most companies are still struggling with an effective design process, creation, and implementation of these apps. Moreover, security and privacy issues are the main concern for more than half of the executives. (Accenture, 2015)

The general trend perceived by executives is also congruent with user perceptions. The demand for mobile phones is constantly increasing: in 2017, 54 percent of the surveyed users stated that they intent to buy a new smartphone within the next twelve months. With the newest smartphones they can get access to the newest technological features and make better use of technologies such as AR and VR. Furthermore, more than half of the consumers put special emphasis on personalized offerings, even though these services require extensive access to their personal data. This trend seems to be consistent and many highly personalized services are seen as useful rather than 'creepy' and insecure. At the same time, consumers would prefer to be "*more engaged in managing their data*" (Accenture, 2017, p. 16) in order to protect their financial data and avoid identity theft, even though three out of four people state they do not feel confident doing so. This means that companies offering mobile services and devices should start supporting their customers more effectively with this task and raise more awareness and transparency in the field of data security. (Accenture, 2017)

4.2.2.6 Data

Nowadays, data is a very valuable good used by many companies in order to improve their services and get a better understanding of their customers. In the US, one company tries to make the best use of data they gather about cinemagoers. 'MoviePass' is an American start-up company that offers its users to watch one movie at the cinema each day for 9,95 Dollars a month. The number of users is constantly increasing and might reach five billion by the end of 2018. The founder, Mitch Lowe, claims data is the new oil and collects information about the cinemagoers' households, their behavioral patterns before and after the movie, and their demographics. MoviePass positions itself as the new Netflix of the movie industry and wants to revolutionize it. This approach is in line with Helios and Mathison Analytics, a data analytics company, buying a controlling share in MoviePass. It can be assumed (not shown) that they analyze the data and sell the results to cinemas, studios, and distributors, who can then use the data to improve their marketing, operations, and distribution. Furthermore, the data shows that many people only visit the cinema because of the MoviePass subscription, so they can also use the data to market themselves. (Schmieder, 2018; Sherry, 2018)

However, the company is not profitable (yet). Besides the revenue from selling user data, MoviePass makes big losses on the cinema tickets, as they have to pay the full price to the cinemas for every ticket. On average, a cinema ticket in the US costs between eight and nine Dollars, meaning MoviePass makes a loss as soon as a subscriber visits the cinema more than once per month. As a reason, the company aims at engaging in more partnerships, for example with the big US cinema chains. The problem is that most of them either offer their own subscription-based service or are not interested in developing a partnership, even though they profit massively from the sale of concessions. Also, it has been shown that MoviePass subscribers spend more money on concessions than the average cinemagoer, probably because they spend significantly less money on the cinema tickets. This means the cinema profits twice: first by the increased sell of concessions and second by receiving the full price for all tickets sold. Subsequently, MoviePass urges to cut some type of deal with the big cinema chains while gaining more customers at the same time in order to become more profitable. Furthermore, smaller studios are profiting from the MoviePass subscription service as well, because their movies now reach a broader range of viewers, if they do not directly compete with the highly advertised blockbusters anymore. (Schmieder, 2018; Sherry, 2018)

Nevertheless, MoviePass is far from being profitable at the moment: in 2017, the company faced losses of more than 150 billion Dollars. It is possible that some users abuse the subscription model by signing up for a short period of time only and trying to watch as many movies as possible in that period. Different pricing models could be a solution (e.g. for premium seats and 3D movies) or limiting the amount of films per month to four. However, it seems as if MoviePass currently concentrates on gaining more subscribers to increase their bargaining power towards the big cinema chains, so that they can no longer refuse to share their increased profits. Especially because MoviePass currently states they are not monetizing the user data in any way and use it solely for the purpose of increasing the user experience. (Schmieder, 2018; Sherry, 2018)

4.2.2.7 IoT Sensors

In a modern world where it is difficult to see the boundaries between the digital and physical world, the Internet of Things market is expected to grow exponentially, as illustrated in Figure 17 (see also previous chapters on IoT and its growth potential). However, "*people are already starting to reject intrusive digital technologies and kick against digital saturation*" (Fjord, 2018, p. 7). There is a trend towards a more personal approach when it comes to services and products in general with the need to create more meaningful experiences. At the same time, another major technology trend becomes visible: "*until recently, speaker/microphone, camera, screen and sensors were found together in PCs and mobile phones. Now, they are being pulled apart – the equivalent of dismantling a*

Swiss Army knife, separating its various tools and embedding each into a diverse array of other places" (Fjord, 2018, p. 6). This development leads to the emergence of various sensor technologies and allows companies to focus more on service design aspects while the technological components fade from the spotlight. Consumers have the option to use the tools separately then. (Fjord, 2018)

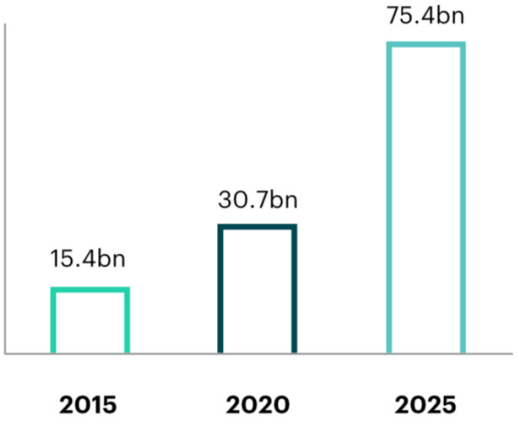

Figure 17: Global IoT devices
(Fjord, 2018, p. 6)

In Figure 18 the different IoT sensors and actuators are shown, which underlines the emergence of sensor technologies for different areas. As described in Chapter 2.3.2, Amazon Go supermarkets also make use of various sensing technologies and QR code scanners to make grocery shopping more seamless for their customers. This clearly aligns with Fjord's (2018) notion on the importance of service design matters. In the course of this thesis it will be discussed, whether the use of similar technologies would be suitable for cinemas. For this sake, a few IoT sensors will be explained in further detail in the following paragraphs.

The list results from an extensive online search for sensors and/or actuators that could theoretically be used in a cinema (this list is not a representative overview of all sensor types on the market, as only the most relevant ones have been selected):

1. Example for a seat sensor system: BeBop Sensors produces sensors for the automotive industry that can determine the weight of a passenger and enable/disable airbags accordingly (BeBop Sensors, 2018). A similar sensor could, for example, be used to indicate the occupancy of a cinema seat and activate other sensing mechanisms accordingly.
2. Example for a smart chair with several functionalities: THK offers a smart acryl chair with simple design in which a body motion sensor is installed. This sensor not only measures how much a person sitting on the chair moves, but also reads the surrounding environment and is able to measure a person's respiratory rate, heart rate, and stress level. The resulting data is accessible through a cloud network. (THK Co., Ltd., 2018)

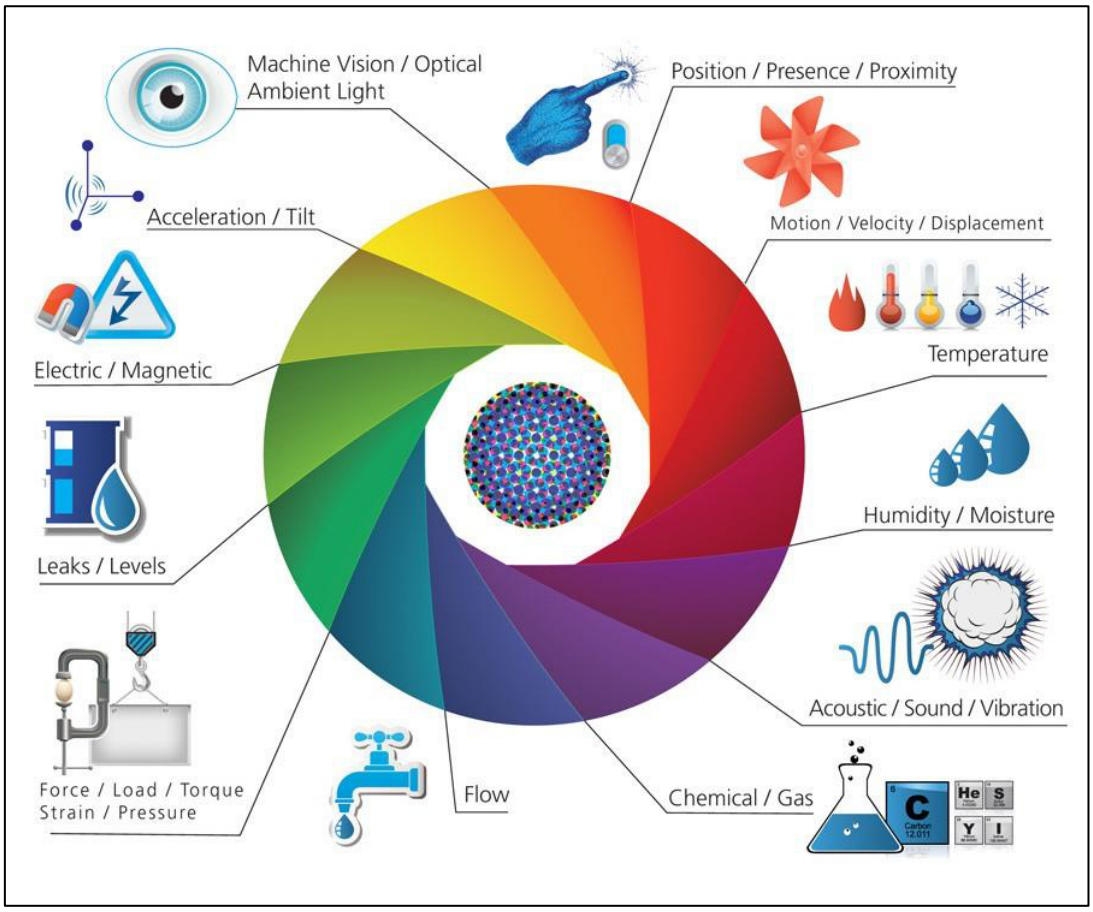

Figure 18: IoT sensors and actuators
(Postscapes, 2018, para. 1)

3. Example for emotion detection: Microsoft Azure offers an Emotion API that can analyze peoples' facial expressions in photos and videos. "*The emotions detected are anger, contempt, disgust, fear, happiness, neutral, sadness, and surprise. These emotions are understood to be cross-culturally and universally communicated with particular facial expressions*" (Microsoft, 2018, para. 1). The video analysis functionality in particular could be useful in a cinema context, as you can track a crowd's (or single person's) response to the presented content. (Microsoft, 2018) Of course, the use of the Emotion API is only possible when using Microsoft Azure and it is questionable, if it could be used in a dark cinema hall.

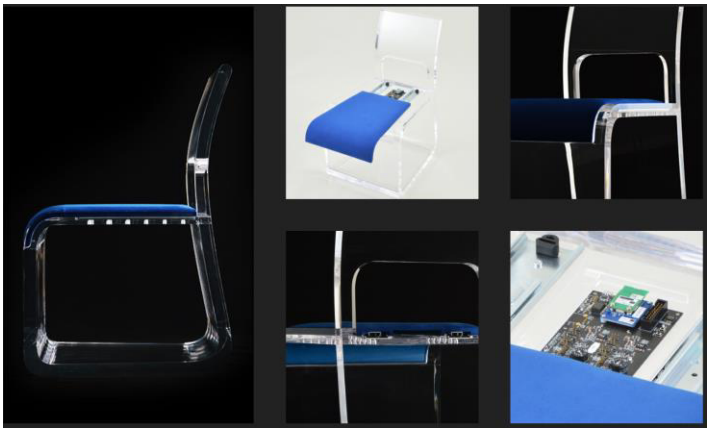

Figure 19: Argus Chair
(THK Co., Ltd., 2018, para. 10)

4.2.2.8 Excursus: Automotive Sensors

Similar to the second example from above, the THK smart acryl chair, many technology companies and car manufacturers work on smart seats for the automotive industry. Measuring the driver's health in order to keep all passengers safe has become a very important topic during the past years, especially since self-driving cars are not the standard (yet). Subsequently, several seats that have an integrated electrocardiogram (ECG) are being developed. (Pai, 2014)

When thinking about sensors that can be integrated into a seat, certain criteria need to be fulfilled. The sensor should be slightly flexible/stretchable and not too thick, because it needs to adapt to the seat and the person sitting on it. If it is too thick, the person would feel uncomfortable and there is a high possibility the forces could not be measured correctly. (Ashruf, 2002)

In 2016, Singh, Sarkar, and Anoop conducted a study with non-contact ECG electrodes that were built into the seat and seatbelt of an automotive vehicle. The researchers aimed at reducing the number of car accidents and fatalities associated with these accidents by monitoring the driver in real-time. (Singh, Sarkar & Anoop, 2016) "*The signals from the different electrodes are interfaced to simple analog and digital signal processing units through a switching logic. The frequency domain-based digital processing and the switching logic ensures that best quality ECG signal is selected for heart rate (HR) estimation*" (Singh et al., 2016, p. 1). After testing, they discovered that the low-cost system with integrated Wi-Fi module was able to reach an accuracy of 2bpm and was well suited for reliably monitoring a person's fatigue. (Singh et al., 2016)

These examples are proof that it is possible to build IoT sensors into a seat to monitor peoples' vital functions. In theory, these technologies could be used in a cinema context as well, even though this would probably require the seats to be rebuild completely.

4.2.2.9 Service Platforms and AI

Automation and AI are playing an increasingly important role in today's technological world. "*The goal of AI is to develop machines that behave as though they were intelligent*" (Ertel, 2017, p. 1). There are numerous services, applications and purposes that result from AI technology and create great value for companies and individuals. "*AI is a collection of advanced technologies that allows machines to sense, comprehend, act, and learn*" (Accenture, 2018, p. 22). These advanced technologies include Machine Learning and Deep Learning amongst many others. (Accenture, 2018)

Other than 'normal' analytics programs, AI can come to unexpected outcomes and reach unexpected solutions, as it has the ability to learn and improve itself. Similar to a human's education, AI can not only learn how to do one very specific thing but learns how to

approach and solve problems in a general context. Starting with immense amounts of training data, the AI becomes smarter over time – advanced versions are even able to train themselves without knowing the rules beforehand, as demonstrated by Google DeepMind. (Accenture, 2018) "*AlphaGo Zero had become the world's best Go player, beating one of its own AI predecessors 100 games to none – the same predecessor that had previously beat the world's most formidable human Go player*" (Accenture, 2018, p. 24).

The industry leaders in the AI field are Google, Facebook, Apple (Siri), Amazon (Alexa), IBM (Watson), and Microsoft, all offering their own AI products and platforms as a service (Tilley, 2018). Many businesses make use of these products to help them understand their consumers better, provide them with more personalized content, and create more revenue – a trend that is very important for today's entertainment and media industry (Nilsen & Sandvik, 2017).

Also, among consumers AI is widely accepted, as many interact daily with features such as digital voice assistants and AI-driven chatbots from service providers. Especially the younger generations value the benefits of AI: it is always available, faster, communicates in a politer way (than human service personnel, for example), and is perceived as being less biased. (Accenture, 2017)

In a cinema context, especially AI-generated product recommendations, video-ads, newsletters, and film scorings (as shown in Figure 20) could be of interest.

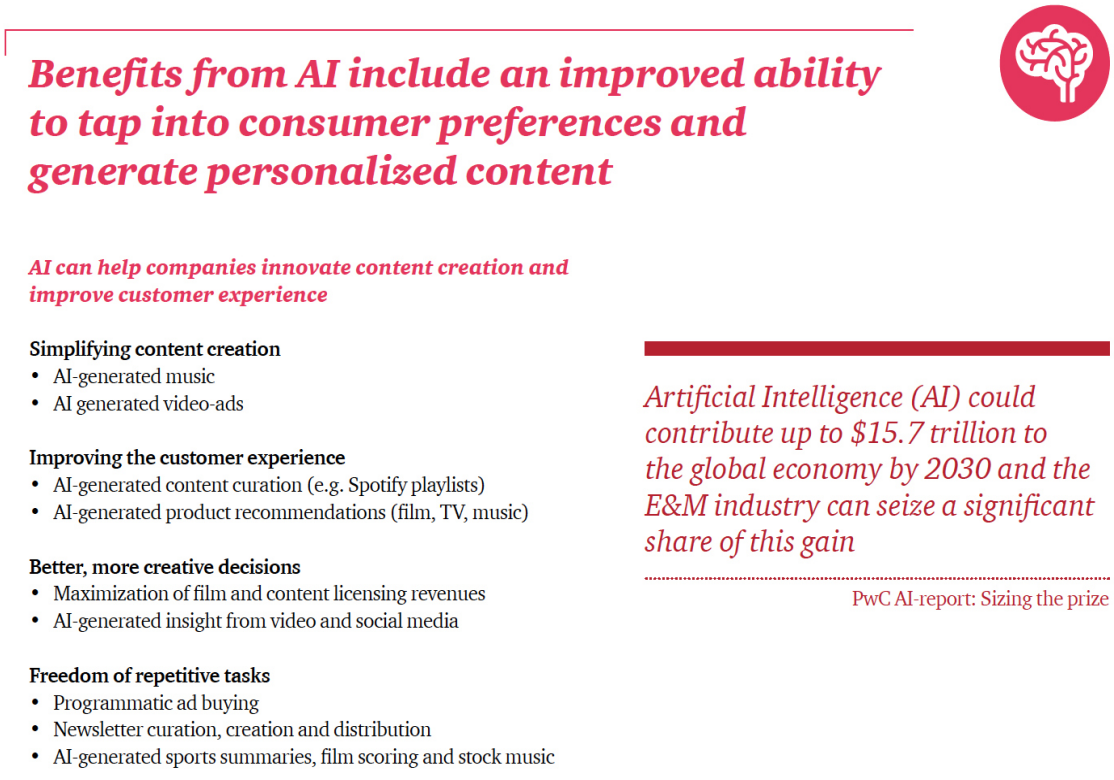

Figure 20: AI benefits
(Nilsen & Sandvik, 2017, p.25)

4.2.3 Organization Domain – Extended

In the extended organization domain, an overview of the cinema and media industry will be given in hindsight to organizational cultures and structures. This will be followed by an explanation of media organizations' operations in Denmark, including their several operational channels. Lastly, organizational culture and change management considerations will be explained to provide an optimal foundation for possible future innovations in Nordisk Film Cinema.

4.2.3.1 Cinema Industry

According to Palacio and Türschmann (2014), cinemas have always been considered both a national and international expression of culture. Since 1945 the cinema industry has been considered stable regarding film consumption. However, the cinema has been largely dominated by American movies compared to national or European movies. The Scandinavian market and film culture is known for the strong cooperative relationship between the three countries Denmark, Norway, and Sweden. All three countries have the same film policies and similar structure of film production and distribution organizations. They also have transnational distribution between the three countries. Scandinavian films have not been very popular outside Scandinavia; however, the television dramas received a lot of attraction from both Scandinavian and international audiences. (Palacio & Türschmann, 2014)

In this context, a disruptive strategy can be defined as "*the capacity to reconceive the existing industry model in ways that create new value for customers, wrong-foot competitors, and produce new wealth for all stakeholders*" (Hamel, 1998, p. 8). That suggests that the cinema industry should consider new value creations to stay relevant to the consumers and thereby innovate and disrupt their business model. (Hamel, 1998)
As stated by Westenberg (2016), "*all you can do is improve. Constantly improve. And the one, single way to do that is to set whatever you're working on loose, gather feedback and try again. You repeat this process every time you make something, and sooner or later, you're going to get better*" (Westenberg, 2016, para. 12).
Many industries have experienced a 'complete change in the rule of the game' often by technological developments changing the interaction with the consumers. In the course of cinema evolution, new emerging technologies have been introduced, such a digital cinema, 3D cinema, and a completely new way of watching movies on portable devices. "*The core of the disruption is not always rooted in the product or service itself but also in the way a firm is organized to create value*" (Roy, 2014, p. 91). Innovation is seen to be

an "*essential source of competition between firms and the only source of major performance improvement*" (Roy, 2014, p. 91). Strategic value innovation is about the organization's capacity to transform their industry model and develop new value for the consumers, challenge their competitors and generate new revenue for the stakeholders. (Roy, 2014)

"*Bringing a new value proposition to customers can be a powerful way to increase the industry's demand and create new growth perspectives*. […] T*he emergence of an alternative point of view within an established firm represents a major challenge due to competitive myopia and inability to disrupt the status quo"* (Roy, 2014, p. 92).

4.2.3.2 Media Companies

Many of the established media companies often feel challenged by changes or new value creations that other companies within the industry or neighboring industries adapted their content production to. The media industry has always been known to be uncertain, as changes from all industries can easily affect the revenue streams and resources. Free digital content alternatives are challenging the regular high-quality content the film media companies create. (Bechmann, 2012)

In modern days, there are multiple ways to produce and distribute content for film and media companies. Due to the increasing amount of technological options and digital platforms, the value chain of the common film media companies has completely transformed. The marked place, however, becomes increasingly complex and uncertain, as managers and players are trying to fit into the transformed industry. Much content today is user-generated, and user-focused. The circulation of content is instantaneous, and the access has become mobile. (Finney, 2014) "*Whilst the traditional film format is anticipated to remain dominant at the cinema exhibition stage, creative skills and business entrepreneurs are currently adapting to a wider range of new media bases, platforms and delivery devices as the 'pull' digital entertainment economy increasingly commands both reach and economic scale*" (Finney, 2014, p. 3).

Although there are many challenges in the media industry, there are still the main content providers and distributors, they account for most of the proportion of sales and distribution of foreign language films, and the whole "*sector dominates 'world cinema' and the production and distribution of local-language films, the popularity and profitability of which is growing in certain key territories and in particular Western Europe*" (DeFillippi & Wikström, 2014, p. 4). During the digital era, many costs associated with film creation and distribution decreased. The talent and entrepreneur ecology within the media industry is very fragmented, non-vertically structured, and flexible. There is room for innovation and inspiration in markets for new digital entertainment inputs. (Finney, 2014)

The audiences' demands, and general productions methods of media companies are changing. *"Power relations between the actors involved in the value chain are changing; and increasing concentration makes the market even more competitive for small independent players*" (von Rimscha et al. 2014, p. 66).
This means that many companies strategically restructure their operations internally. The market is becoming increasingly uncertain and complex. Many organizations seek strategies towards cross-media were the organizations will operate in multiple markets and on multiple platforms, such as film production and cinema. The managers need to become more flexible and innovative in their approach to new value creations and take risks. (von Rimscha et al., 2014)
The audience has expectations towards accessing media more rapidly now than previously. They are used to multiple platforms and devices with a broad range of options. The media organizations should take advantage of that and invest in new opportunities regarding products and service range. (von Rimscha et al., 2014)

4.2.3.3 Operations and Organizational Structure

In the Danish film and media industry there often is talk about the 'Danish film cluster' which is primarily centered around the Copenhagen area. It is a system of coordination and cooperation between the many film companies in Copenhagen. The Danish film industry is in contrary to its small size known to have the largest share in home markets in Europe. It is also called the Danish model as it describes the system of which all Danish film companies finance and create movies, as the funding from one company is not sufficient to finance and produce a whole movie. The Danish model consists of the National Film School, the Danish Broadcasting Corporation (DR), the Ministry of Cultural Affairs, and the Danish Film Institute (DFI). The Film companies are Nordisk Film, Zentropa, and other smaller film companies. As the media companies in general fight against many competitors in both local and global markets, this cluster of Danish film companies and organizations helps the Danish film companies sustain revenue flows. Many of these companies are not able to make high returns on investments regarding movie production and therefore have great fluctuations in the general revenue streams. 60 percent of the companies are financed through channels other than movie production. The bigger organizations support the production companies financially and the production companies collaboratively produce the content so that they can share the expenses and earnings. The DFI supports a certain amount of production dependent on a quota for the main reason of:

1. "*financing films*",
2. "*promoting Danish films at home and abroad*",
3. and "*spotting and financing new talents*"
   (Vang & Jakobsen, 2013, p. 12).

Almost no production company can produce content without this system. However, some survive with the use of alternative activity. (Vang & Jakobsen, 2013) Figure 21 provides an overview of the Danish model.

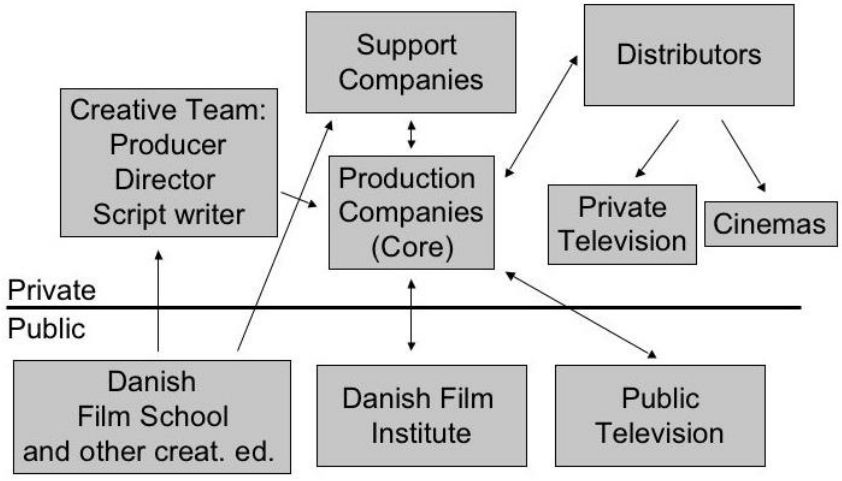

Figure 21: Danish film industry – institutional overview
(Vang & Jakobsen, 2013, p. 11).

In the article by De Propris (2013), the concept of rebalancing economy is mentioned as an operational strategy by media companies in order to survive in an uncertain market. These media companies often invest in multiple activities within the creative industries, as spillovers between the different activities often fuel innovation and development. De Propris also claims that knowledge intensive business services within the media sector often perform better than other creative companies. Due to media companies' several channels of operation, they become more resistant to fluctuations in the market and are better at adapting to changes. (De Propris, 2013)

In the case of Nordisk Film, it could be argued that much of their success is due to their multiple channels of alternating activities, as each sub firm is separated from the core company, but they are all supplying the same total income. Nordisk Film Cinema is only one of many channels.

4.2.3.4 Organizational Culture and Change Management

Jones, Jimmieson, and Griffiths (2005) state that *"reshaping capabilities would lead to change implementation success"* (Jones, Jimmieson & Griffiths, 2005, p. 361), if the employees of an organization or company are change ready. Many organizations fail when trying to change, due to the lack of effort targeted towards handling change resistance. The more open the employees are to change and the readier they are to be affected by such change, the greater the chance of success. In the study it was found that the more the employees could clearly see the benefits and value for the end user, the more likely they would be ready for a new implementation or product/service development. If a company is open in its organizational culture and values high employee morale, it can foster development and innovation through positive reinforcement. The company should focus on creating an atmosphere of adaptability and change readiness. By setting long-term goals, the company can promote efficiency and productivity. (Jones et al., 2005)

An organization such a Nordisk Film could easily have multiple organizational cultures, due to the multiple sub-firms that all serve different purposes. For that reason, finding the organizational direction is very important to create a culture that welcomes change.
A strong culture is defined by enhancement of organizational performance. The employees should be driven by goals in order to incite innovative thinking that can inspire and ignite the organization. The employees should be guided and shaped in their behavior based on reward systems and cooperation between employees across divisions to increase idea generation and productivity. It is the management's fundamental responsibility to utilize the entire organization's potential by executing new business strategies and motivating people to think innovatively. In doing so, the organization can become better at adapting to change and innovating their current business strategy. (Chatman & Cha, 2003)

However, if managers are resistant towards change, it can affect the managerial behavior which in turn can have repercussions for the organization's change process, such as a renewal of the resource base. In order to stay competitive, the resources of the company have to be evaluated, for example according to the VRIN principle of valuable, rare, inimitable and non-substitutable resources, as this combination is predominant for a superior organizational performance and a great advantage. Dynamic capabilities are equally important in order for companies to be able to modify, mold, extend, and create resources. (Ambrosini, Bowman & Collier, 2009)
If these change enhancers are not followed by an organization in a change process, it could be crucial for the survival of the organization. (Ambrosini et al., 2009)

4.2.4 Finance Domain – Extended

In this chapter, further insights into the financials of Nordisk Film Cinema, its value network, and cinema economics in general will be provided. It is to say, however, that there is no detailed financial report including operating costs etc. for the cinema division publicly available – the accessed financial report mostly contains information about Egmont in general. Therefore, the information provided can be perceived as incomplete.

4.2.4.1 Financial Information

As Denmark's and Norway's biggest cinema chain, there are 43 Nordisk Film Cinemas in total, of which 22 are located in Denmark and 21 in Norway. Every year, around ten million people visit one of the 220 cinema halls in whole Scandinavia, all equipped with modern technology. However, it is not all about the movie: Nordisk Film Cinemas also offer other experiences by transforming some of their cinema halls into theatres and concert halls. For example, they cooperate with the Metropolitan Opera to show their operas in a cinema hall in Scandinavia. Furthermore, there are special occasions where sports events are shown, or galas take place in one of the cinemas. (Nordisk Film, 2018a)
According to the Danish Film Institute, 12,4 million tickets were sold in Denmark in 2017 – this number does include ticket sales from other cinemas. On average, a ticket costs 87 DKK. This price, of course, differs depending on the choice of seats and format such as 3D, which is more expensive. (Danish Film Institute, 2018)
Egmont's financial report 2017 states that "*Nordisk Film sold 5.3 million cinema tickets in Denmark and 3.7 million cinema tickets in Norway*" (Egmont, 2017, p. 10). Moreover, it mentions that two of the Danish cinemas were recently opened and the first cinema in Sweden is currently under construction. In Norway, the first 4DX cinema screen was introduced in 2017. (Egmont, 2017)

Unfortunately, there is no detailed financial information about Nordisk Film Cinemas available, because they are a part of Nordisk Film, which belongs to Egmont. However, the following details about Nordisk Film in general can be found in Egmont's report:

- *"Revenue in 2017: EUR 498 million (2016: EUR 530 million)*
- *Operating profit in 2017: EUR 17 million (2016: EUR 32 million)*
- *Employees in 2017: 1,017 (2016: 978)"*
  (Egmont, 2017, p. 9)

The report further elaborates that the revenue for the cinemas was impacted by a weaker film title line-up, because some important film premieres were postponed to the next fiscal year. In addition, there was an issue with advertising campaigns from Dansk

Reklame Film – due to incorrect data in their IT system, they could not deliver specifically targeted ads to the consumers. (Egmont, 2017)

As shown in Figures 22 and 23, the revenue in the Danish overall cinema market is constantly increasing, but at a lower rate than before, which leads to a decrease of revenue growth. According to calculations, this trend will become even more dominant in the future – a possible risk for the Danish cinema market. (Statista, 2017)

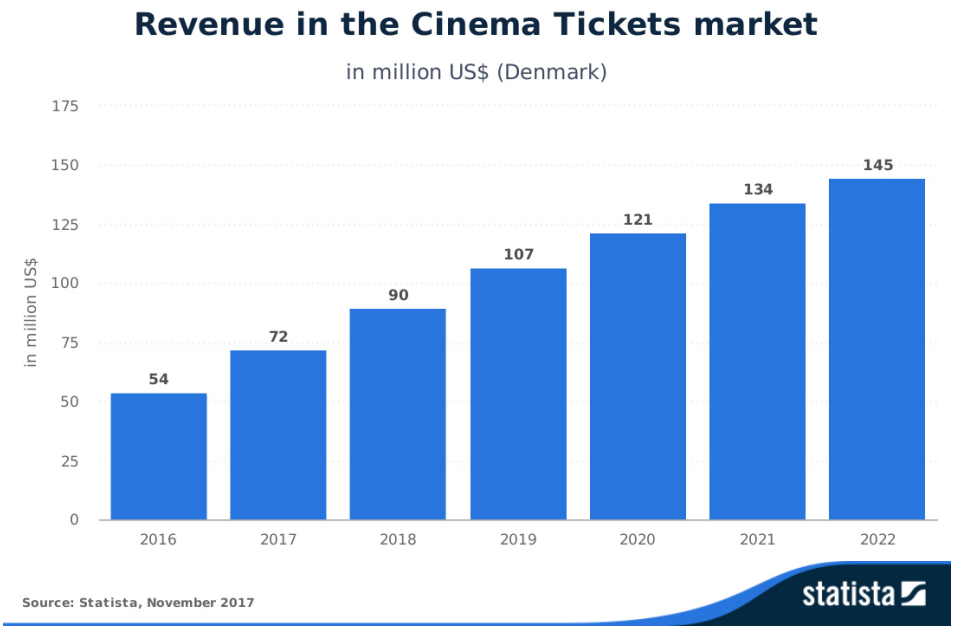

Figure 22: Revenue in the cinema tickets market
(Statista, 2017, para. 4)

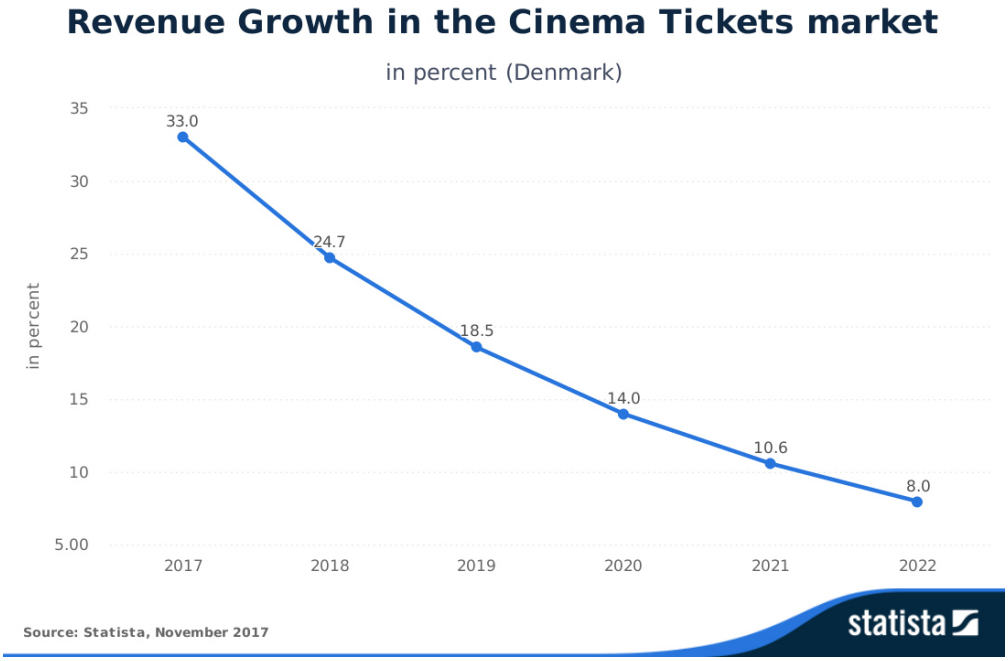

Figure 23: Revenue growth in the cinema tickets market
(Statista, 2017, para. 4)

4.2.4.2 Value Network

As described in chapter 4.2.3.3, the Nordic Film Cinemas are also part of a national value network, the Danish model, even though they do not play a major role in it, as they are only participating in the distribution activities. Besides that, Nordisk Film Cinemas are working with several other companies, for example in the fields of advertising and ticket sales, as can be seen in Figure 24.

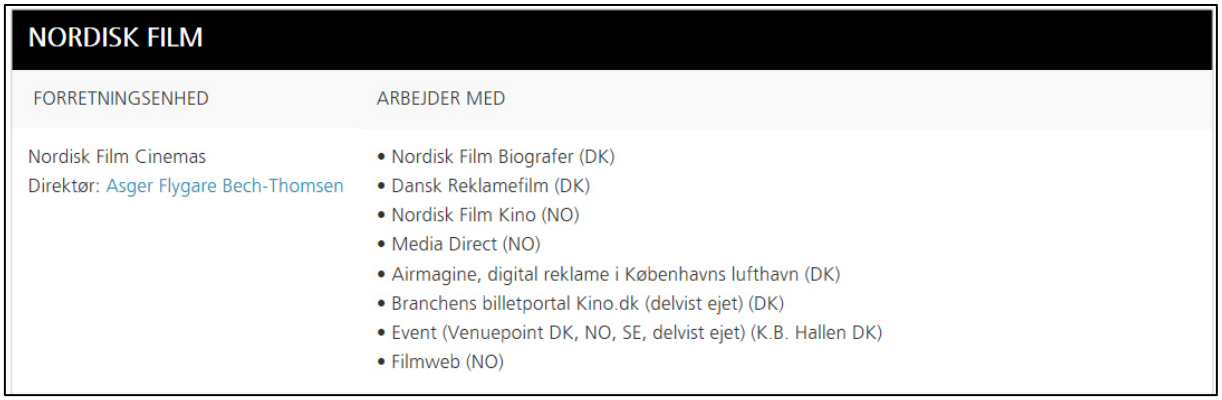

Figure 24: Nordisk Film Cinemas' value network
(Nordisk Film, 2018b, para. 3)

4.2.4.3 Cinema Economics

An astounding fact about cinemas is that all movie tickets (except for special formats like 3D, of course) cost the same, whether it is a Blockbuster with a broad audience or a niche film with a much smaller audience. When comparing this pricing system to concerts for example, where tickets for world known stars are much more expensive than for local artists, the difference becomes quite clear. There is, however, a differential pricing system for adults and children/elderly in place. In addition to that, the prices for concessions such as popcorn are very high. This is, because cinemas have an incentive to lower the prices for movie tickets and increase the prices for concessions with higher margins at the same time. Cinemas "*often bid for movies in terms of the percentage of their box-office receipts. Theaters regularly bid 70% of their box-office receipts – with their bids sometimes reaching 95% of their box-office receipts – for the rights to show a movie*" (McKenzie, 2008, p. 91). Given the high uncertainty of the movie market, it can be a safer option for cinemas to not pay a fixed amount of money for the movie rights, as it cannot be predicted, if the movie will be successful or not. Subsequently, movie producers/distributors and cinemas are constantly negotiating the terms and it is in the producers' and distributors' interest to increase the ticket prices while lowering the concession prices. For the cinemas' profitability, however, it is crucial to make as many profits with concessions as possible, which is why they would rather lower the ticket prices to attract more people who would then buy popcorn. Also, children usually consume more concessions

than adults – McKenzie argues that this compensates for their lower ticket prices. Furthermore, one must take all additional costs a cinema operator faces into account, for example labor costs, cleaning, raw material for concessions, electricity, costs related to the building etc. When adding these costs to the calculation, the profits cinemas make with selling concessions decrease dramatically. (McKenzie, 2008)

4.3 General Analytical Framework

The general analytical framework is displayed in Figure 25. For the data analysis and discussion, the different theoretical parts (namely: extended STOF model, technological trends in the media industry, state of the art of cinemas, and state of the art research) will be combined into a coding scheme. The qualitative interviews will then be analyzed according to this scheme. After matching this data with the quantitative survey results, the researchers will come to a conclusion that takes all areas into account. The analytical procedure will be explained in further detail in the following chapter.

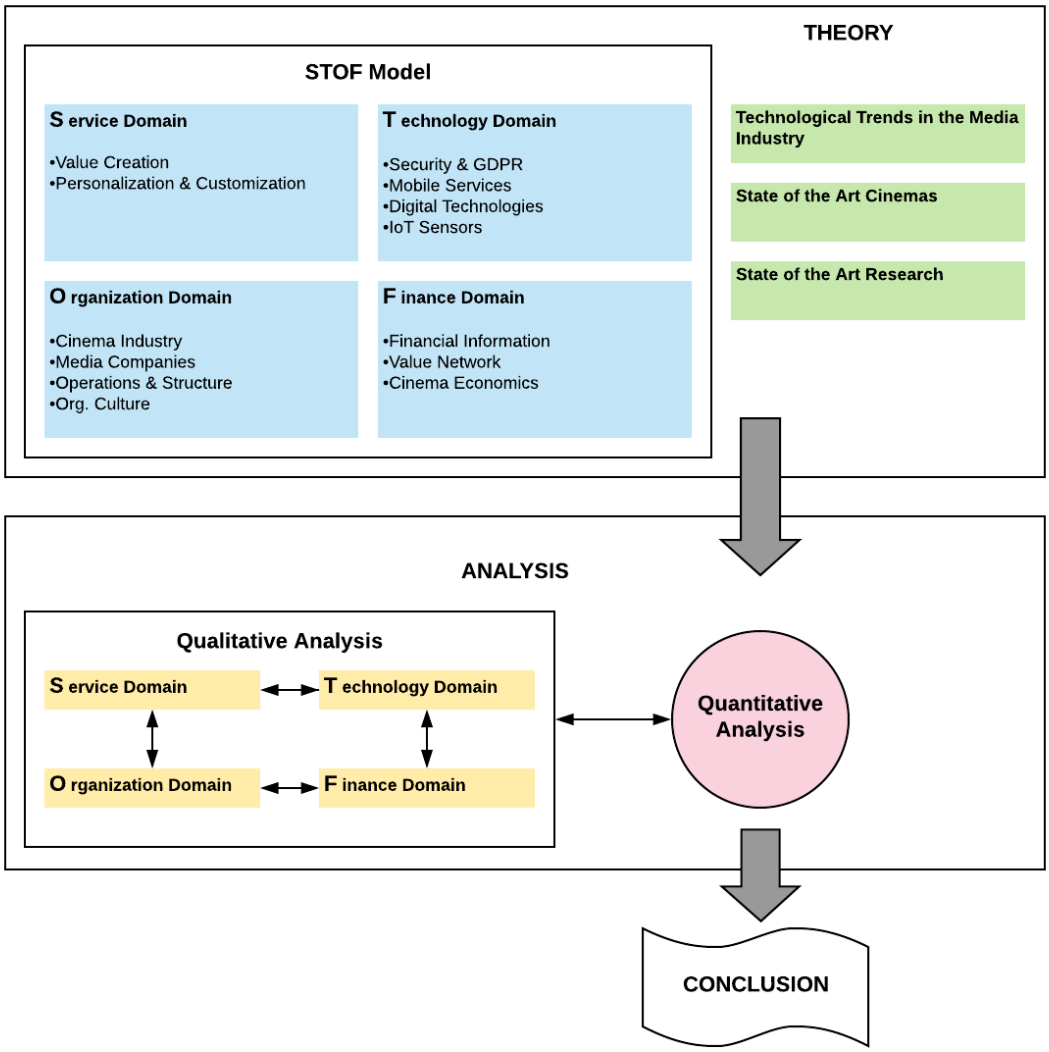

Figure 25: Analytical framework

5 Empirical Methodology

Chapter 5 will start by presenting two different scenarios for the cinema of the future. Then, the data processing and analytical strategy will be explained in more detail. This includes the transcription of the interviews, the qualitative and quantitative data analysis, and secondary data. Furthermore, considerations on reliability, validity, and possible limitations will be taken into account.

5.1 Scenarios for the Cinema of the Future

The following scenarios show what the cinema of the future could look like. The scenarios will be used to evaluate how Nordisk Film Cinema can improve the conditions for the consumer while making their operations more efficient. The researchers presented the scenarios to the interviewees in order to get their feedback and create a better understanding and inspiration regarding the innovative ideas. Please note that that they can be partially or fully combined to create full value for all actors involved.

5.1.1 Scenario 1: Personalized Experience

Her phone buzzes and Anna gets a notification on her phone that there's a new movie in the cinemas that she might like. She taps on the notification, the Nordisk Film app opens up, and she can see an overview of the schedule for all cinemas near her. The app's suggestion is based on Anna's previous behavior – which movies has she seen already and what are her preferred movies and series on e.g. Netflix? When tapping the 'Share' button, Anna can invite friends to watch the new movie with her. If she already has company or wants to go alone, she can book the ticket with only a few clicks in the app. The payment process happens automatically, and Nordisk Film will deduct the amount from her bank account. If Anna (and her companions) wants popcorn or other snacks, she has the option to order it directly through the app as well.
At the day of the movie, Anna will get a new notification on her phone where she has to confirm that she still wants to see the movie. If not, she can select another day and/or another movie. But assumedly, Anna still wants to see the movie and she confirms this with one click. When she is on the way to the cinema, the app can track her distance from the cinema to calculate her time of arrival. This way, the people preparing popcorn and snacks will receive Anna's order and prepare it for her just in time. By the time Anna enters the cinema, her snacks are ready to be picked up. She scans the QR code on her phone to enter through the automated gates.

In the cinema hall, Anna watches the trailers for new movies that will soon be released. Whenever she likes a movie, she opens the Nordisk Film app, activates the record function, points her phone at the screen and adds the movie to her wish list. Closely before that movie is released, Anna will get a new notification on her phone. Furthermore, she has access to detailed information about the movies, including the one she will be watching soon, on her phone in the Nordisk Film app.

5.1.2 Scenario 2: IoT Sensors

Some of the best seats in modern Nordisk Film Cinema halls are equipped with several types of sensors that gather data about the viewers' reactions to the movie. Only several rows in the specific cinema halls are equipped with these sensors, so that viewers can chose to take one of the special seats or stick to the 'traditional' ones. When consumers purchase a cinema ticket and select a seat in one of these rows, they are informed about the sensors and agree to the terms and conditions regarding the usage of their data. To increase consumers' acceptance in the pilot phase, Nordisk Film Cinemas offer great discounts on the tickets, give them away for free or offer free snacks and drinks in addition. Each of the seats is equipped with the following:

- a presence sensor that detects whether a person sits on the seat or not (other sensors are activated accordingly),
- a motion sensor that measures how much the viewer moves during the movie,
- a humidity/heat/moisture sensor that measures the amount of perspiration,
- a sensor that detects the viewer's heart rate,
- an acoustic sensor that detects if the viewer is laughing, sighing, screaming, talking etc., and
- a facial camera built into the back of the seat in front of the viewer that can detect emotions, gender, age, attention etc.

The data from all sensors is being compiled and analyzed with the help of an IoT platform and cinema-specific algorithms. The results can help to improve the viewers' cinema experience in the future. Furthermore, Nordisk Film Distribution can gain valuable insights into viewers' behavior during the movie: which scenes were most interesting and how did they react to special effects? What was the emotional response to this movie? These findings could improve the content production.
The data might be backed up with a short survey that could be sent out to the viewers after the movie. The answers could give further insights into their thoughts and reasons for their behavior and therefore help interpret the sensor data.

5.2 Transcription and Analytical Strategy

All interviews were transcribed to get a better understanding and overview of the interviews' content. The researcher transcribed all interviews themselves, which might have affected the transcription by their own personal experience at the interview. However, it creates a great familiarity with the transcription (Saunders et al., 2016). Because the responsibility of transcription was divided equally among the two researchers, they also read through each other's work and took notes for the particularly interesting points. Both researchers were present during all interviews (besides the structured phone interviews), so they were both very familiar with the content. When transcribing the interviews, respect was paid to the ethics of the transcribing process, meaning that the transcript was made readable compared to a direct oral transcript. Transcription is often based on the wording and language, including cut off sentences, pauses for thoughts, and such. This is seen to be a normal construct of language, but it can affect the transcripts and make them incomprehensible, plus the interviewee might appear unintelligent. Whenever interview quotations are being used in this thesis, words and phrases that interrupt the sentence's meaning have been excluded.

5.3 Qualitative Data Analysis

The following two sub-chapters will provide more information about the qualitative data analysis for the survey and the interviews.

5.3.1 Qualitative Data Survey

The survey included a few qualitative, open-ended questions. To analyze these qualitative questions from the survey, a method of traditional, open, and axial coding was applied through an inductive and deductive method using pattern matching and themes (Saunders et al., 2016).
The data was organized and afterwards coded while all main concepts, themes, events, and specific codes or markers were identified within the survey responses (Saunders et al., 2016). After coding the data, it was further organized into sub-categories. At the end, the codes were interpreted by mainly concluding and summarizing the qualitative questions while comparing them to the theory (Saunders et al., 2016). The codes can be found in Appendix 13.

5.3.2 Qualitative Data Interviews

All interviews questions are grounded in theory. Therefore, a deductive approach was used first and foremost. During the interviews some inductive questions were added, and

modifications were made to the initial questions (Saunders et al., 2016). All data from the collected interviews was evaluated after the transcriptions.
Coding labels were created using a deductive and inductive approach, primarily inspired by grounded theory. Afterwards, patterns and themes were found through thematic analysis (Saunders et al., 2016). The actual coding took place using traditional, open, and axial coding (Saunders et al., 2016). Template analysis was also applied to an extent, as themes arrived during the process of coding (Saunders et al., 2016). Furthermore, analytic induction was used when evaluating the expert interviews in the hope that they could contribute with ideas of improvement to the concept of the cinema of the future.

5.4 Quantitative Data Analysis

The following two sub-chapters will provide more information about the quantitative data analysis of the interview data.

5.4.1 Questionnaire Subjective Closed-Ended Measurements

Some of the questions in the survey were composed of close-ended questions. These were primarily the behavioral questions. For the written analysis, they are mostly displayed in pie-charts and explained in Chapter 6.5; some of the charts cn also be found in Appendix 14.

5.4.2 Data Analysis

The data collected from the Likert scales can be classified as ordinal data. Therefore, mean, median, standard deviation, skew, count, significance of skew, and coefficient values were calculated from the results. A normality test called Kolmogorov-Smirnov test has been applied to verify whether the data is normal or non-normal. By doing so it is determined whether data should be treated as parametric or non-parametric (Field & Hole, 2003). Quartiles have also been calculated to see how spread the values are and how much they differ from each other (Field & Hole, 2003). In addition, the Spearman's correlation has been applied to see if there is a correlation or answering tendency (Field & Hole, 2003; Statistics Solutions, 2018). The spearman's rank correlation coefficient (Spearman's rho) is a non-parametric measure for the strength of association between two ranked variables. In this particular dataset this could be a comparison of the satisfaction levels or satisfaction vs. dissatisfaction levels. Spearman's correlation coefficient is reliant on the common increase of the two compared variables (positive) or an increase of the dependent and a decrease of the independent variable (negative) (Statistics Solutions, 2018). If the coefficient is found to be equal to zero, it can be concluded that

there is no tendency for the dependent variable to increase or decrease when the independent variable increases. If the two variables are perfectly monotonically related, the magnitude of the coefficient will increase (Statistics Solutions, 2018).

5.4.3 Secondary Data

In order to gain a better understanding of the Danish media and cinema industry and investigate why Danish cinemas should incorporate new technologies, secondary data was added as a part of the method. The secondary data was comprised of statistics from Danmarks Statistic and many different consultancies along with several media publications about the changes within creative industries. All secondary data sources helped locate new data through references, which created a thorough understanding of the lack of previous work within this research field (Saunders et al., 2016). The secondary data used in this project is documented and survey based, since we have included numeric and text-based data (Saunders et al., 2016).

5.4.4 Reliability and Validity

During the course of the project, the researchers tried to be as objective and critical as possible, especially when evaluating literature. Multiple iterations of the literature have consistently taken place to create a reliable theory chapter. Every contact with both informants and respondents has been conducted professionally and without any inappropriate comments. All questions, both for the interview and the survey, were formulated as neutrally and objectively as possible to allow for subjective answers. The critical incidence technique has been applied to increase the amount of detail in the subjects' answers. The use of open and closed questions was applied. To an extent probing questions have also been present. Furthermore, attentive listening was deployed at all interviews, as two researchers were present at interviews at all times. (Saunders et al., 2016)
All informants were aware of being recorded and none felt reluctant to answer.
The survey was thoroughly pilot tested prior to release. However, few reliability issues might have been present to some extent, as some respondents could have misinterpreted questions. Internal consistency was present to ensure more reliability of the survey; however, no alternative form of the survey was applied. (Saunders et al., 2016)

5.4.5 Errors and Biases

In the gathering of answers from the interviewees and the survey answers, few errors and biases were present. One might be the fact that the shared link to the survey was posted online, which created an uncertainty that the participants distributed the survey in their own feed and this might have impacted and created new respondents. *"For such*

samples the problems of bias are huge, as respondents are most likely to identify other potential respondents who are similar to themselves, resulting in a homogeneous sample" (Saunders et al., 2016, p. 303). The fact that some might have seen the survey but did not want to fill it out, suggest another bias. The people who did not participate, create a participation bias, as peoples' reluctance to participate in a survey can be considered a bias (Saunders et al., 2016). The same bias was present when futilely trying to get in contact with possible interviewees (Sanders et al., 2016). Furthermore, the representability bias should also be considered, as some informants and respondents might have misrepresented themselves. Theory suggest that online survey respondents are inclined to give shorter answers, because there are no follow-up questions – in the case of an in-person interview, however, follow-up questions are very likely to occur during the dialogue (Field & Hole, 2003). Also, when filling out surveys online, the respondents can become more extreme in their answers than they would in a face-to-face situation (Field & Hole, 2003).

Additionally, some participant errors might have been present, as informants and respondents did not care and rushed through the questions or the survey (Saunders et al., 2016). The limited number of questions is also a bias, because informants or respondents tend to remember their previous answers (Field & Hole, 2003).

For the interpretation of answers, a researcher error and bias might also be present. This is due to misinterpretation and coloring of the researchers' own subjective assessment of the situation. During interviews, the interviewer bias and interviewee and response bias was present, since some questions could have seemed leading or misleading by the interviewer or the interviewees had a predetermined perception of the interviewer which affected their responses. (Saunders et al., 2016)

5.4.6 Delimitations and Critical Review

Initially, interviews with Telenor's Head of Development, VP Technology and TDC's CTO were going to take place. However, due to time constraints and scheduling issues, it was not possible to arrange an interview. The lawyer in charge of the GDPR implementation at Nordisk Film was also contacted, but because of her busy schedule an interview was not possible. If more informants relevant for the case could have been found for interviews, it would have increased the strength of the project. The lack of these three interviews could have affected the project, as it cannot be ensured that the number of interviews and survey answers is a full representative collection of qualitative data.

In retrospect it can be noted, that if more effort had been invested in finding a larger, more influential media company, which would benefit more from personalization and data analysis, this project could have been more successful in its nature.

6 Data Analysis and Discussion

In Chapter 6 and its sub-chapters, all empirical data will be analyzed and discussed/evaluated according to the analytical framework (see Figure 25). The researchers decided to combine these two steps to avoid extensive repetition.

6.1 Evaluation with a Focus on the Service Domain

In the following paragraphs the qualitative interview responses will be analyzed with a special focus on the service domain.

6.1.1 Personalization and Customization

As part of the interviews, it was important to explore whether the interviewees considered personalization for the existing and future cinema products and services. When being asked, informant SS immediately discarded the question and said that personalizing the cinema is too difficult. However, when specifically talking about digital services, such as the webpage and application, he found that personalization is considered to some extent. Especially regarding user platforms, SS explains: *"we have a great potential to push more personalized recommendations"* (Informant SS, Appendix 4). However, SS elaborates that the ticketing system has recently been changed, which affected the marketing campaign tool. For that reason, they do not have an effective system for personalization in place as of now. Nordisk Film Cinema is currently being consulted by an agency that investigates ways to make personalized recommendations more targeted towards individual users and not only segments, he concludes. SS continues that the goal is to develop this system based on personal transaction histories and create marketing that is customized for each consumer. This will be the focus for Q1 next year.

To a degree one could argue that Nordisk Film Cinema is limited in their approach to innovation, as they do not value all the potential benefits of exploring personalization. This could be due to their dominant logic (Prahalad, 2004; see Chapter 4.2.1.1) which makes them focus primarily on the products and services they already have, because they worked well for so many years. Another issue is that Nordisk Film Cinema outsources most of the marketing and therefore does not see the need of actively selling their products themselves, as most of their products are pertained and not produced in-house. In fact, the movies are not even considered their main product – they see the experience of going to the cinema as their product/service.

The only point SS brings up regarding how technology can generate value, is only focused on the organization and not on the user. It seems as if they are still very focused

on best practices when it comes to innovation strategies and do not challenge themselves with possibilities outside their own industry (Prahalad, 2004; see Chapter 4.2.1.1). One could speculate, if Nordisk Film Cinema is even thinking about major future innovations for their products/services when they focus primarily on smaller, incremental innovations that benefit current customers instead of thinking of the long-term advantages that technological investment might offer (Bower and Christensen, 1995).

SS also believes that the staff interaction is important in the cinemas, as it should not become a 'cold' experience. Therefore, he does not believe in a completely automated system. One could speculate whether this is due to his personal opinion or if it is based on data. More and more services are becoming less about the social interaction and more about the experience the consumer pays for. By eliminating the need to have contact with the staff, the experience could become more seamless, quick, and easy. However, the survey also proved that the consumers still want to be in contact with the staff. Nevertheless, all consumers have their own individual preferences which can differ greatly from each other (Hong et al., 2009; see Chapter 4.2.1.4). This makes it very hard to decide on anything concrete, because their future needs can only be anticipated.

Informant DSH seems more enthusiastic about personalization. He thinks that most of the data they have today is not extensive enough, as it primarily is data the users provide themselves. He thinks the main issue is that they do not gather as much data about the users as other platforms: cinemas do not ask for much data. In Nordisk Film Distribution they do talk a lot with the consumers, DSH explains, but it is a struggle, as they only sell consumer experiences which are very difficult to personalize. Marketing and communication, by contrast, are easier to personalize. This is already done, states DSH: *"we are really trying to make communication and marketing that feels personal to the consumers and their needs"*; but it is not easy to target the audience in the right way: *"they don't care, they would like to know it is on the cinema and you can bring your friends and by the way there is a discount this weekend"* (Informant DSH, Appendix 2). For this reason, most of the marketing and communication is focused primarily on home entertainment, as this is deemed to be more effective. Like DSH, PL finds that if the cinemas could get more detailed profiles of their consumers, it would be a fantastic way to create more personalized marketing. DSH also states that they would like to have more data about the users, such as consumer preferences and market data about genres, actors, concepts etc. Having more details about the performances of previous movies and what the audience liked and disliked would be very helpful, too. However, this information is indeed gathered sometimes. DSH emphasizes the difficulty of knowing which audience will be attracted by which movie – one of the main concerns of his job. In Nordisk Film

Distribution they use a lot of time trying to understand what went wrong if a movie did not perform as well as expected.
With more data, cinemas could create more personalized products such as recommendation systems, which can lead to more loyal consumers and are an ideal approach to more personalized marketing (Thurman, 2011). But to make an efficient recommendation system, the consumers' input is needed (Choi & Bargar, 2017). It can hereby be argued that in order to create more personalized products and services, Nordisk Film Cinema should consider new and more efficient methods for generating personal user data. This could also eliminate the need for extensive content curation. One could, however, investigate if the data could be gained through in-app rating systems similar to Netflix's approach (Gomez-Uribe & Hunt, 2015) instead of using sensor data. Historical data about user preferences should be possible to receive rather easily through the service system they already have. Their current platform could then probably be slightly optimized to gain more contextual data about the users and thus knowledge about their preferences (Hong et al., 2009).

In addition, informant DSH thinks that installing sensors to measure peoples' arousal while in the cinema hall could be a great way to find a benchmark for what works and what does not. Most movies are considered unique and therefore it is difficult to find a perfect method for editing them. Furthermore, it would not be possible to change the movies that have already been released. For segmentation purposes it would be beneficial to know, whether the audience is engaged or not. DSH thinks that in fact using arousal sensors could be a great way to do test screenings. Any kind of feedback they can get from audiences would be of value, he explains. It is, however, a problem that the gathered data would be monopolized by Nordisk Film Cinema and that his department in Distribution would not be able to access it directly. The more Distribution can get to know about the consumer journey, the more value DSH anticipates.
Given the benefits of the data they could get from tracking, the concept of measuring the cinemagoers' arousal would be a wonderful way to understand the users' preferences better. However, most theories point towards getting the same benefit from e.g. surveying the users (Gomez-Uribe & Hunt, 2015; Crespo et al., 2011). It can be speculated, if the users' answers could be trusted, as they tend to be more extreme in their answers when filling out the survey online e.g. on a mobile device (Field & Hole, 2003). It could be further discussed, if the sensor-based data would be more useful during the movie creation and editing phase.

DSH explains that Nordisk Film Distribution is constantly interested in learning more about the consumers, and how the market develops. "How many people watch movies?

Who watches movies? And why? […] What kind of movies do people watch and for which reasons?" (Informant DSH, Appendix 2). For this reason, segmentations are created to group the markets in order to understand the consumers better. It would otherwise be too difficult to launch a movie, if one does not know the target segment, DSH concludes. This data could be something Nordisk Film Cinema could supply, especially if they considered new ways of getting more specific data on users' preferences.

6.1.2 Recommendation Systems

SS thinks that getting more knowledge about how to curate would be of great value. Most streaming services offer recommendation solutions, however, in the cinema it is not that easy, as they mostly have on average of then different movies being shown a week. It cannot be compared to streaming services such as Netflix and HBO, which have extensive lists of movies that make it hard for the consumer to choose. Curating is the best way, SS thinks, as the movies have to match the seasons, holidays etc. At the moment, they do not even curate based on countries or specific regions. All movies are released at the same time; there can be slight differences, but mostly it is the same, SS states.
Although SS has a valid point regarding the content curation, it does not mean that creating recommender systems for advertising would not be beneficial for the company. Furthermore, even the fact that Nordisk Film Cinema does not curate differently dependent on where in the country the movies are shown, makes it seem as if they are not familiar with differences in consumer preferences dependent on geographical specifications. Here, contextual data would be of value, as the users would provide more detailed data about location, time, activities, and preferences (Hong et al., 2009). The data they can gather about users' habits would also be very beneficial, because they would be able to track the users' actions and thereby differentiate the content more accurately (Gomez-Uribe & Hunt, 2015).

Informant PL believes that recommendation systems might work for suggesting movies whenever consumers pass a cinema. However, it might be difficult to detect the users in that exact moment. He concludes that this could probably done with a mobile phone app. The app could also motivate users to evaluate movies, which would generate more data about the users' preferences. Based on their profiles, an in-app recommendation system could be developed, PL speculates. The more data one can generate about the individual user, the higher the chance of being able to create good recommendation systems.
The concepts suggested by PL actually prove that surveys could be a good way to know more about users' needs. This is has already worked for Netflix (Gomez-Uribe & Hunt, 2015) and it is known that people tend to rely on other peoples' recommendations (Crespo et al., 2011).

6.1.3 Consumer Value Propositions

Previously, Nordisk Film Cinema tried to use beacons for proximity marketing), but it did not work as well as expected. Due to this, SS states that this tool is not very effective (yet). Although it has proven to be ineffective for Nordisk Film Cinema a while ago, it could easily have changed over the past years, as tracking systems have become more advanced. Also, it very much depends on how Nordisk Film used this marketing tool. If the system would be combined with more contextual data about the users, the system could take previous behavior into account (Hong et al., 2009).

Informant PL thinks that the more information a user can get through the application, the higher the value, e.g. giving the user the option to learn more about the cast of a movie, where it was lensed, and who the director is. He thinks this type of information could potentially come in a feed on a consumer's phone or smart watch and improve the overall consumer experience.
Giving the user more additional benefits from the application makes them more likely to use it. This could serve as being an incentive to rate movies like suggested by the theory in Chapter 4.2.1.2 (Gomez-Uribe & Hunt, 2015; Crespo et al., 2011; Choi & Bargar, 2017).

Informant KSJ believes that the younger generations expect easily accessible products. If the cinemas do not follow current trends, the younger users will find other ways to spend their time on. They have, however, not yet seen a strong decrease in the younger generations' interest in going to the cinema. She also explains that Nordisk Film Cinema recently found a report showing that most young people like to be completely offline while in the cinema. It is more socially accepted to be offline in the cinema compared to other social events, KSJ believes. *"I think that many young people think it is stressful to always be online"* (Informant KSJ, Appendix 6). KSJ further insists that it is actually healthy to have some time where one is disconnected to the world, as more and more things are becoming interconnected and it is expected that everyone should be available all the time.
Giesecke and Immonen (2010) also argue for a similar point: they found users do not crave constant connectivity. In fact, if the users did not see an immediate value or benefit of the connectivity, they would prefer not using the device. This is not surprising, as users generally do not want to be observed or tracked constantly, at least not knowingly.

6.1.4 Consumer Insights and Demand

In a recent report made by Nordisk Film Cinema and Red Associates, they found that most young people face difficulties with making decisions, SS explains. She thinks this is because no one wants to be in charge of the group, because they have a very democratic way for acting where no one takes the lead. Some might therefore have difficulties with choosing a movie, SS fears.
This statement proposes that recommender systems could be of great help for younger users and future generations (Choi & Barger, 2017). However, the result from the report also suggests that the age of the younger generation could play a role in their lack of decisiveness, as younger people could be less used to making decisions because they have simply less experience with taking responsibility.

Over the years, multiple threats have surfaced and challenged the cinema market. However, none of them have ever replaced or substituted the cinematic experience, SS argues. *"I think it's a social thing to go out to the cinema, people want to go out together and not necessarily always sit on the couch and see movies. Even if you can get home cinemas, it is still something unique and if you compare cinemas to other ways of going out in town it is still the cheapest evening in town you can get*" (Informant SS, Appendix 4). SS also strongly believes that cinemas are still relevant and will continue to grow and expand.
The fact that he believes so strongly in the concept of cinema suggests that they do feel in fact a bit threatened by other forms of experience media. Nonetheless, cinema tickets sales have not changed significantly in the past years and the cinema is seemingly stable (Statistics Norway, 2017).

Many experts fear the changes in consummation of movies, but overall it is not about the movie themselves, KSJ believes, it is about the experience: *"I think that people need to be together and not only go online and have each a separate life. […] I watch a movie in another way when I watch it at home on a mobile platform or on the television, then I do when I go to the cinema"* (Informant KSJ, Appendix 6). Consumers tend to forfeit focus when watching a movie at home, KSJ elaborates. There are simply too many distractions, but when one goes to the cinema, it is more of a social experience she states. "*You will always have a need for social activities and to be with your friends around something […] and I think everybody has a good feeling about going to the movie theater*" (Informant KSJ, Appendix 6). She further thinks the cinema resembles a nostalgic experience for some, as they recall how they went to the cinema as children and this will not change. "In the 80's, when the video machine came into the households everybody said 'oh, now the cinema will die', but it actually didn't" (Informant KSJ, Appendix 6). KSJ concludes by

saying that the future of the cinemas is still strong, and the consumers will still want to experience it with each other.
In general, DSH, KSJ, and SS all seem to share the believe that cinemas will continue to stay relevant as a social activity one can enjoy with friends. Considering the statistics and the survey results, it seems people still find the cinema very relevant in general and tickets sales have not significantly decreased over the years. Also, cinemas have been very good at innovating themselves, as explained in Chapter 2.4.

DSH explains that statistics show that approximately 80 percent of all people in the Nordic countries go to the cinema at least once a year. Nordic Film Cinema reaches a large share of the population and the tendency is very stable, DSH continues. Compared to earlier on, consumer habits did not change much. Many other entertainment options have challenged the cinemas, but none of them managed to increase its popularity (i.e. DVD's, computer games, and Netflix). "*Even the in the past five to ten years it's only fluctuations. We don't see any major trends towards cinemas being less interesting or popular*" (Informant DSH, Appendix 2). So, like KSJ and SS, DSH is also a strong believer in cinemas' consistent popularity, which has now been proven many times.

Overall, Danish consumers have become more accustomed to digital products and services. Denmark is very digital compared to other countries, KSJ finds. The Danes are very used to buy products online and, in many instances, prefer that type of transaction, she elaborates. Digitalization is a constant development and it is very important to be on the forefront of development in all aspects, KSJ conclude. She fears that if their platforms are not easy to use, the consumer satisfaction will dwell and a company such as Nordisk Film Cinema could easily lose control.
It is probably true that the consumers who find the platforms' usability poor, would prefer to not use them. However, if Nordisk Film Cinema will continue to make smaller, incremental changes and innovations, hopefully users will not find the platform so insufficient it would stop them from enjoying the cinema experience.

Furthermore, informant DSH explains that his primary responsibility is to figure out how a product can best enter the market. This includes all aspects of marketing and digital campaigns. It is based on evaluating previous movies and testing new ones to *"market the movie correctly to the right audiences in all of the Nordic countries"* (Informant DSH, Appendix 2). His activities also expand to knowing which moves are worth investing in, DSH elaborates. Therefore, they do multiple tests and focus groups studies for all Nordic countries.

This suggests that Nordisk Film already has internal divisions, such as Nordisk Film Distribution, that could supply more knowledge about consumer preferences. This intel could be a great resource they should consider sharing, as this could help all divisions to innovate and explore new opportunities.

Generally, people go to the cinema for many different reason, DSH explains. Most go to the cinema to be entertained and get out of the house, he speculates. It is an uncomplicated way to get out and easily planned. A family would usually go to the cinema a few times a year; for some it is about the cultural experience or watching the latest movies and Oscar nominees first. Informant DSH also think it is very cheap compared to other entertainment options and a fantastic way to spend time with friends. However, some only care about the cinema atmosphere, value big screens, loud sound, and good seats he concludes. This can also be found as a result in the survey data, but more than half of the respondents do not agree with the prices being so cheap (please see Chapter 6.6.4 for detailed information).

6.2 Evaluation with a Focus on the Technology Domain

In the following paragraphs, the qualitative interview responses will be analyzed with a special focus on the technology domain.

6.2.1 IoT in General

Informant PL defines IoT as any small device with computer power. He states that three different criteria need to be fulfilled for ‘real’ IoT. First, the device should be able to sense its context in some way, for example the temperature or light level. Second, the device should be able to process the conducted data in a meaningful way, which is why it should come with some type of analytics tool or machine learning ability. Third, the device should be able to communicate with a wireless network. Furthermore, he continues by saying that the IoT sensors/devices should be ‘smart’ and capable of learning by themselves, not only the connected platform for data analytics. Subsequently, the ‘real’ Internet of Things consisting of a smart distributed network does not fully exist yet according to PL’s definition or at least just in very few places. Additionally, he states that most IoT projects and propositions fail, because there are not many beneficial use cases and services to be built on top of the network, even though the development is driven by 5G. The most common and successful utilization of IoT technologies outside industrial IoT seems to be in a smart city and smart home environment; at least PL is not aware of any media companies developing a viable IoT business case.

This is in line with the findings presented in Chapter 2.1: the biggest challenges are technical obstacles and the lack of knowledge about consumer preferences that create a barrier for development (Trepkeviciute, 2017; Mills et al., 2016). This lack of knowledge can be directly linked to the absence of valuable IoT use cases – if Nordisk Film does not know what the consumers want, they cannot create a business case and explore the market further without taking too many risks.

PL also touches on another big problem with IoT: currently, there is not enough processing power available on mobile devices that uses very little energy and would not require the IoT operator to constantly change the devices' batteries. Especially in a smart home context one cannot expect the house owner to put that much effort into battery and device maintenance. Also, the amount of data being sent by a large number of IoT devices can lead to miscommunication between the devices and a general data overload. Therefore, one has to develop a resourceful system that determines how many data points are being measured and communicated at a time – a technical problem that has not been solved yet according to PL. Even with a resourceful system for data elicitation, the challenge is to build services that offer additional value for the user. It must be of so much value that maintenance and infrastructure (e.g. servers including their software etc. or cloud provider) are justified and the investment and ongoing costs are covered. However, PL is convinced that these IoT technologies will be more widespread and available in the future.
In the context of this thesis, PL's expert view already reveals the main challenge for the implementation of IoT solutions in Nordisk Film Cinemas: even if a viable business case had been found, the design, implementation, and execution would require a lot of additional resources. It would be a safer option for Nordisk Film Cinema to wait a few more years until IoT is not at the top of Gartner's hype curve and then make use of improved technologies and better knowledge and best practices from the E&M industry.

6.2.2 IoT in Nordisk Film

Currently, Nordisk Film is not using IoT technologies in a cinema context, as stated by informants KSJ, DSH, and SS. When elaborating further, the informants, however, disagree with each other in some points. SS and KSJ think IoT sensors that are integrated in the cinema seats would not be useful and they do not consider the resulting data valuable in any way. Informant DSH on the other hand sees immense potential in data about peoples' arousal. Nordisk Film Distribution engaged in an exploratory study using 'finger clips' for Galvanic skin response tests to measure viewers' arousal while watching trailers and even a whole movie (before it was released in the cinemas), informant DSH

explains. In addition, they were asked which trailers they can remember – this was directly after all trailers were shown and before the full movie started. To the researchers' surprise, many people were unable to remember some of the trailers they saw just a few minutes ago. After comparing their arousal curves with their ability to remember a specific trailer, they found that neither too high nor too low arousal during a trailer were beneficial – a mixture with peaks at the beginning and the end was seen to work best. According to DSH there is, however, no clear benchmark for the best arousal curves that would lead to the highest ticket sales, which complicates the data analysis.
Even though SS and KSJ disagree with DSH by stating that they do not think IoT technologies could be useful for tracking peoples' response and arousal level during a movie, they do think that IoT would be extremely useful for facility management purposes. SS is investigating this topic in collaboration with IBM further at the moment (April 18) to identify use cases. "*That could be about forecasting the right amount of popcorn, cleaning and emptying dustbins, regulating the temperature and ventilation in all rooms– all cases where you can save expenditures at a large scale in Nordisk Film cinemas*" (Informant SS, Appendix 4). Informant KSJ agrees with this statement. The appropriate utilization, implementation procedure, and costs are not clear though, as it has to be measure against a concrete business case first. Only if the return on investment is very likely, Nordisk Film Cinema would start by implementing IoT for facility management in a single cinema as a kind of prototype before expanding it to all cinemas.

In general, all Nordisk Film informants (SS, DSH, and KSJ) do agree that having more data about user segments would be very beneficial; knowing who is in the cinema at what time could lead to more targeted advertisements. SS states that "*a lot of companies are working on that right now, trying to aggregate data from different shops or chains like us and then sell that data to advertisers. The advertisers can then adjust their ads accordingly. But that is a trend that is more connected to the traffic on the Wi-Fi than to the data you can collect in cinema*" (Informant SS, Appendix 4).

These statements show that the opinions about IoT solutions and their usability for Nordisk Film Cinema differ widely, probably also because the informants come from different parts of Nordisk Film and have different targets and focus points. While DSH is more interested in the consumers' perspective (as also explained in Chapter 6.1 and its sub-chapters), KSJ and SS focus on the operational aspects and both groups think that IoT (or other advanced technologies) could in theory be useful for their area. It furthermore seems as if none of them have deeper knowledge about IoT, even though they have heard of it before.

Since no examples for IoT solutions in a cinema context can be found in the literature, there is no possibility to measure the informants' statements against proven theories. There is, however, proof that smart waste containers and similar solutions are important for productivity optimization (Hammi et al., 2018). Also, the general environment in Scandinavia is beneficial for IoT development (Nilsen & Sandvik, 2017) and in areas other than cinemas the use of IoT leads to increased revenues (EY, 2016). (See Chapter 2.1 for more information).

From this perspective it can therefore be argued that Nordisk Film Cinema should investigate those topics further and also consider cases like Disney's Magic Band (Lorenz, 2016), and the different seats that have already been developed and are capable of measuring peoples' arousal to some extent (Pai, 2014; THK Co., Ltd., 2018; Singh et al., 2016).

Since other considerations also need to be taken into account, the discussion of the usefulness of IoT in cinemas will be continued throughout the whole analysis.

6.2.3 Mobile Services and App

SS states that the most critical point when designing mobile services and the 'NF Biograf' app is to keep it intuitive, fast, and easy to use for the customers. There is a lot of competition in the market, so it is essential for the customers to get immediate access once they have decided to visit the cinema. Looking at the business side of it, the seamless integration with other systems is very important, especially considering the complexity of cinema ticket pricing and administration.

Currently, Nordisk Film is working on improving their mobile app and adding additional functionalities, as elaborated on by KSJ. They are working on implementing a split payment model, which will be especially interesting for the younger generation, because they are not fond of advancing money for their friends when buying cinema tickets as a group. In general, Nordisk Film Cinema seems to focus on their ticketing system (including a system where one can buy vouchers in the supermarket and then use them when booking tickets online through the website) and all further advancements or pending on that. In the future they do, however, consider a click and collect functionality for the app with which cinemagoers can preorder their concessions and then collect it directly without waiting in line. Besides that, KSJ mentions they are constantly considering other innovation activities, also because several companies are contacting them to talk about their products, but they are not (yet) taking any action on these opportunities at the moment. Nevertheless, KSJ acknowledges the importance of digitization and mobile services – in a country like Denmark, which is very digital compared to other European countries, digital services are playing a major role and many peoples heavily rely on them in their everyday lives. SS states something very similar by saying that the cinema is

already a 100 percent digital, also because all movies are delivered in a digital format instead of film reels and the whole business relies heavily on digital technologies.
Informant PL agrees with KSJ regarding the useful of a click and collect system. He furthermore thinks that smartwatches could be used in this scenario, both for payment and other services, such as guiding the cinemagoers to their seats (or the nearest toilet) in the dark cinema hall. These options will be discussed in further detail in the next section.
SS's comment about fully digital cinemas can be criticized, because when thinking about digital businesses nowadays, a cinema that is still characterized by its facilities (at least from the user perspective) would probably not come to mind. In general, cinemas have a long history and tradition, in which the concept did not change that much (see Chapter 2.4 and following sub-chapters). Subsequently, it is possible that Nordisk Film Cinema employees overemphasizes the changes towards digital while the concept stayed almost the same from the users' perspective. Research has also found that businesses must change to adapt to the rapid changes of their audience, who is becoming more mobile and whose media consumption changes rapidly (Lugmayr & Grueblbauer, 2017; Giesecke & Immonen, 2010). Therefore, it can be argued that Nordisk Film Cinema is not putting enough effort into their mobile service offerings, as they are changing at a much slower pace than their customers. This discrepancy could lead to a heavy decrease of ticket sales amongst the younger generations in the future.

6.2.4 Other Technologies

In addition to mobile services that are directly linked to the app or website, Nordisk Film is also exploring other technologies to be used in cinemas. KSJ, for example, talks about a VR center at the cinema in Lyngby, which was opened end of April 2018. She underlines the importance of enjoyable content for VR experiences; a criterion that makes it easier for Nordisk Film cinemas to outcompete other VR centers, as they have a unique selling point by offering movie content. SS agrees to the rise of VR in cinemas (and e.g. eSports and additional streaming technologies that offer better imagery and sound experiences) and also mentions that another VR center will open in Norway shortly. One employee from the IT department is already working full time on exploring/implementing such technologies and integrating them with the existent IT infrastructure.

When being asked about the cinema of the future, the informants' answers differ widely. KSJ thinks that the cinema will not change dramatically in the next years, but screening technologies like IMAX, 4DX, and VR will probably become more prominent. She argues that moving quickly regarding these technologies will be important for cinemas in order to distinguish the experience significantly from home entertainment options. Additionally,

informant KSJ puts emphasis on technologies that could lower operational costs or ticket prices, such as scanners in the entrance area that could substitute personnel. However, she also states – just like SS, who fully agrees with KSJ in that point – that the human dimension should not be disregarded: cinemas should not be automated fully, as the atmosphere could become 'cold' and uncomforting when guests would only interact with machines instead of staff. This statement will later on be compared to the survey data where people were asked about the importance of personal contact with cinema staff.
In some areas, however, SS sees further potential: the AI department is working on an algorithm that could assist young cinemagoers (Generation Z) with making a decision on which movie they want to watch, because research shows youngster have great difficulties deciding on a movie and none of the group members want to step up and make a decision. This phenomenon goes hand in hand with the split payment option, as mentioned above.

Other than KSJ and SS, informant PL has more drastic ideas for the cinema of the future. He thinks AR glasses could be used to display additional content during a movie, e.g. information about the actors and scenes or even personalized advertisements, if the individual cinemagoer is interested in it, of course. Generally speaking, PL seems to be fond of using wearables to track people or measure their arousal during a movie. He also mentions smart clothes, which he thinks will become more popular in the near future; they could provide information about, for example, the wearers' perspiration levels. Furthermore, he highlights the usefulness of smart wristbands that could be used for location tracking, measuring a person's heart frequency, and contactless payment. Not only could wristbands be handed out in the cinema directly, but in PL's opinion, one should also consider the cinemagoers' own smart watches they are already wearing. These devices constantly track parameters such as blood pressure and heart rate already, which is why he thinks that cinemas should explore options to access and use this data. PL adds that in the case customers do not own a smart watch, their smart phones could fulfill a similar purpose when kept close to the body, as they have an integrated accelerometer which can track how much a person moves in the cinema seat. Cinemas could benefit from both options, because they do not have to buy the devices themselves. Furthermore, the cinemagoers could benefit, if the app would be expanded by a few functionalities, so that people could order concessions and pick them up during the break. Additionally, smart watches could help guiding people through the dark cinema hall and to the nearest toilet and the cinema app could provide the viewers with more detailed information about the movie. PL further elaborates that it would be important to have the users' identity in order to evaluate the gathered data accordingly. The app would allow for a profiling option, because users need to register when downloading it – in addition the customers should

be asked about their preferences and whether they like a movie, the concessions, and the facilities or not. As an incentive they could be offered free popcorn for their next visit. On this basis, especially with the movie ratings, the cinemas could develop a recommendation system that combines users' expressed preferences with measurements, such as heart rate and perspiration values. However, PL argues that building sensors into the cinema seat might not be the best option, because it will not be possible to gather precise data – he says there would be too much 'noise' or the seats would need to be rebuilt completely (including the use of a complex software to analyze the data). Especially detecting a person's hear rate could be difficult, if the seats are directly connected with each other, as they currently are in cinemas. In general, it can be noted that informant PL does not think having multiple sensors into the cinema seats would be beneficial but instead recommends using existent devices (mobile phones and smart watches) to track the users and therefore achieve the same outcome with a much simpler solution.
Regarding screening technologies, PL emphasizes that integrating speakers in the cinema seats could be nice option for creating a fuller '3D sound'.

First of all, the big differences in the informants' ideas for the cinema of the future can again be explained with their different backgrounds. Nordisk Film employees are more likely to have organizational restrictions and complications in mind, whereas the external expert suggests more radical changes that he finds personally interesting as a customer. However, this leads directly to the critical point: many advanced technologies are costly and difficult to implement, e.g. AR and 360-degree movie experiences (Wagner, 2015; Rear, 2017)
Second of all, mobile services and AI-enabled technologies offer a lot of value for both consumers and companies and should therefore be an integral part of current business models, if the company wants to stay relevant in the future (Natarajasivan & Govindarajan, 2016; Accenture, 2017; Nilsen & Sandvik, 2017). That leads directly to the last note: mobile phones create an optimal opportunity to sense the environment around the user and interact with other digital technologies such as sensors (Natarajasivan & Govindarajan, 2016). Therefore, PL's suggestion to use existent devices such as phones and smart watches is highly recommendable in a cinema context and would also mean fewer expenses and infrastructural changes for the business. It can be assumed that this approach would technically lead to a similar outcome as integrating IoT sensors in the seats but in a more cost-efficient way. Nevertheless, the usefulness of the data that could potentially be gathered can be questioned and Nordisk Film Cinema does not seem to be interested in it.

6.2.5 GDPR and Security

As explained in Chapter 4.2.2.1, GDPR and data security are very important in today's digital and connected world and the enforcement of the GDPR might lead to changes in consumer behavior. KSJ thinks that it will make people more aware of data privacy and they are less willing to share their data. Informant SK does not agree with her though. He talks about a phenomenon called 'privacy paradox', which describes the discrepancy between peoples' perceptions and actions. Most do not understand what GDPR means, but still talk about privacy a lot – at the same time they are not willing to put any effort in keeping their own data private and would even act in a contradictory manner (e.g. when downloading an app that demands access to a lot of data that it does not need to fulfill its function). However, the younger generations are becoming more aware of privacy concerns in general according to SK, which might lead to a trend of more privacy-oriented architecture in the future. Informant SK also contributed to a scientific article, which is explained further in Chapter 4.2.2.1 (Sørensen et al., 2017).

In the case of Nordisk Film, sharing data across the different divisions is not simple, because they are different legal entities and therefore not allowed to freely exchange data with each other unless the data subjects gave their clear permission, as confirmed by informants SS and CA. Notwithstanding, this does not necessarily apply to aggregated data that can be used for statistical purposes where the information cannot be traced back to the individual, SS says. Informant CA agrees with him in regard to sharing data across the divisions that cannot be traced back to the individual cinemagoer. Nevertheless, there is no regular exchange between Nordisk Film Cinema and other Nordisk Film divisions about data sensitive topics according to SS.

There is, however, the possibility to aggregate and exchange more user data, if the specific contracts and consent forms explicitly state how the data is shared and processed between controllers and processors, they all sign a contract, and the data subjects agree to this kind of use of their data. Informant SK further explains that this is a complicated endeavor, because often many different parties for different areas of expertise (e.g. AI and data visualization) are involved in the data processing and any failure to comply with the rules of the GDPR could result in high penalties.
Informant SK further elaborates on additional difficulties regarding the new regulation. One could assume that if the data subject does not agree to the processing of its data, that person can no longer use the services that come with it. But in theory this is a fallacy, because the controllers are not supposed to limit their service offerings to people who agree to the use of their data. Furthermore, the execution of the 'right to be forgotten' is problematic, because most companies have numerous legacy systems where it is in fact

impossible to delete all the data, SK explains. Only rethinking enterprise architectures could offer a solution for this problem.

In the case of having sensors in the seat in Nordisk Film Cinema halls, SK emphasizes that the infrastructure should be built in a way that the data cannot be linked to an individual, even if some demographic data is needed for the analysis. As soon as cinemas are dealing with non-personally identifiable information though, the rules of the GDPR do not apply.

The aforementioned findings suggest that the implementation of any system that monitors the behavior/arousal etc. levels of personally identifiable individuals would require extensive investments in both enterprise architecture and data privacy and is only realizable, if the users give their consent. Nevertheless, it is theoretically possible, even though the utilization of existent devices and maybe the extension of app rights seems to be more suitable. This also applies to sharing the data across Nordisk Film's division – however, due to the current restructuration that is already taking place to become GDPR compliant, further changes to the current set-up are not highly recommendable. Those changes should be postponed to after the successful execution (most likely end of 2018); and attention should be paid to actively raising awareness regarding data security on the customer side (Accenture, 2017).

6.2.6 Data Usage, Intelligence, and Analytics

DSH states that companies, such as iTunes, Blockbuster, and ViaPlay are interested in collaborating in general and would probably also be willing to share their data with Nordisk Film. Netflix, on the other side, is a 'closed book'. He further elaborates that Nordisk Film Distribution would also be very interested in receiving more data from the cinema division and would even be willing to pay for more insights about the consumers and being able to map their journey (information about who responded to which type of advertisement or why they went to the cinema included). At the moment, they only have data the consumers reveal themselves, e.g. when signing up for a personalized account. This includes their preferences, which could then be combined with generic data about movie performance and customer segments and is mostly used for marketing purposes. This is verified by informant SS from Nordisk Film Cinema, who states that they know a lot about those consumers who identify themselves when booking a ticket and also track their behavior over time. KSJ agrees and says that Nordisk Film Cinema currently has a very good overview over their loyalty club members, which movies they view, and which concessions they buy in the cinema. If they do not book via the app or with their account though, they cannot get any detailed information about the consumers. Therefore, SS explains, they have been focusing on receiving more data and gaining loyal customers over the past years, hired marketing experts, and a Nordic commercial director. These

efforts have, however, no consequence on local cinemas, because the data is processed in the headquarter and cinema employees cannot access all of it.
Also, in the literature there is no question that having more data on cinemagoers would be beneficial to better understand their customers' environment, behavior and needs (Natarajasivan & Govindarajan, 2016). Such endeavors should first be evaluated critically though to avoid that the data cannot be translated into viable business cases as in the case of MoviePass (Schmieder, 2018; Sherry, 2018).
As mentioned in Chapter 4.2.2.3, tailored, location-based marketing the consumer has a saying in increases customer loyalty (Gazley et al., 2015). Therefore, Nordisk Film Cinema should definitely continue their efforts regarding the acquisition of more behavioral customer data. This does not necessarily include peoples' behavior and arousal during a movie – it can be seriously questioned, if this would lead to a positive output for either cinemas or cinemagoers.

6.2.7 Technical infrastructure

Informant SS clarifies that the IT infrastructure in cinemas has been quite stable over the past years. The single big change was the implementation of an enterprise system in Denmark and Norway, called 'Vista' – a change that affected the core of their business and operations, because the system is also responsible for (online) ticket sales and many other functions that are directly related to all daily operations. Vista also schedules all movies and then pushes the schedules to the local cinemas, which are not directly involved in the program planning. In the second half of 2018 it is planned, however, to implement a new system for program planning that will optimize the screen utilization in order to prolong a movie's life cycle and generate more revenue from concession sales by avoiding long queues.
Besides Vista, cinemas do not have that much technical infrastructure according to SS. All central servers are hosted externally as a cloud solution and in addition cinemas all have their local servers, ensuring that all transactions function properly even if the cloud servers are not accessible. So, they could theoretically work offline at each location for a while.
The set-up of the technical infrastructure suggest that the implementation of additional cloud-based technologies could be relatively simple, especially if they could be connected to Vista via an API or the like when needed.

6.3 Evaluation with a Focus on the Organization Domain

In the following paragraphs the qualitative interview responses will be analyzed with a special focus on the organization domain.

6.3.1 Innovation and Change Readiness

Informant SS is very certain that the cinema will continue its stable course. No great innovations in operations have happened over that last couple of years; except for the ticketing system in Denmark and Norway (see Chapter 6.2.7 for further details). This system is also used by all other Nordisk Film divisions to *"manage prices, vouchers, gift cards, loyalty memberships, programming, and concession items*", SS explains (Informant SS, Appendix 4).

The cinema industry is known to be extremely stable to compared to many other creative industries. It could be argued that some of its success is rooted in the simplicity of the value chain, as their true product is an intangible experience. The structure of Nordisk Film is also very unique, because the company consist of seven smaller divisions that all contribute to the same total income. As Nordisk Film Cinema is one of these, they are extremely secure compared to other film and media companies within the same industry. However, in order to stay in the forefront of market and industry development the company should always look for new innovations and change management initiatives (Hamel, 1998; Westenberg 2016; Roy, 2014).

In Chapter 4.2.3.4 it was found that the managers are very influential when it comes to change. If they are not change ready, it can also make the employees less open to change. SS thinking that no great innovations have taken place could suggest that he is dissatisfied with the company's innovation and change strategies or that he is just not aware of what innovation and change implies.

Every innovation or change they consider in Nordisk Film Cinema is measured against a business case, SS explains. This is so *"we know exactly why we do it, and how it can get return on investment"* (Informant SS, Appendix 4). Therefore, if they consider any type of new technology, they have to know whether it can optimize operations and operational expenditures.

In a company, such as Nordisk Film Cinema, they have to be very aware of change and change management in general. The employees and managers should be change ready and able to handle potential resistance from other employees or the consumers (Jones et al., 2015). As mentioned, informant SS is aware of setting long-term goals and considering new investments, if they seem to be profitable in the long run. If employees can see the long-term benefits and value of products, it is more likely they are worth pursuing.

Informant DSH is more positive towards new technologies, as he thinks that Nordisk Film in general often considers new technology; in fact, they test new things all the time. "*Nordisk Film in not afraid of investing in small companies in that field or area. Not necessarily to gain high yield or expecting to become the new Facebook or anything. Just to*

have an investment in the field, just to see how: does this develop? How do people in the industry work? What is this? It could be whatever you see around you. […] I think I must really give credit to the management that they are brave enough to put significant sums in the areas that we don't know a lot about and that we need to see: is it going to develop? It might fold, it might be nothing, but it could also be a lot. There's people also always very open for new ideas" (Informant DHS, Appendix 2).

DSH's quotes suggest a very strong culture in Nordisk Film, as they promote employee involvement and incite innovative thinking that can inspire and ignite the organization. It is the organization's responsibility to utilize its whole potential and execute business strategies accordingly (Chatman & Cha, 2003). In this case, it can be speculated, if this is a credible representation of the organization, as this is only stated by one of the three informants – especially since it is the one who works for Nordisk Film Distribution, which operates separately from the cinemas. However, it speaks for the organization, at least from DSH's perspective, doing everything to make the employees feel ready for change.

Informant KSJ also agrees with Nordisk Film and Nordisk Film Cinema being very change ready and innovative. "*All the time we are pushing the buttons in order to make it more and more and more convenient*" (Informant KSJ, Appendix 6). If a company just does the same as their competitors, it can only be mainstream or status quo, KSJ explains. "*It is like going backwards, because everybody else is moving forward. […] In order to stay relevant, we have to do it all the time, because you cannot just say that we do it every half a year, because it has to be a process, and it has to be something that you think about and you do every day*" (Informant KSJ, Appendix 6). It has to be a daily, iterative initiative and one has to keep considering new things and new ways of operating, KSJ concludes.

Adaptability is also known to be an important skill for every organization. As found in Chapter 4.2.3.4, reshaping capabilities can lead to successful change implementations based on the employees' perception of change readiness. KSJ gives a clear example of believing that what Nordisk Film Cinema is doing is change management and innovation. Nevertheless, one could argue that it might not be as highly innovative and change ready as other companies within the same industry might be. Although the Danish market is less uncertain due to the 'Danish model' (see Chapter 4.2.3.3), it is still heavily influenced by the global market, especially considering the changes in the consumer behavior.

When trying new things, Nordisk Film Cinema has to be careful though, informant SS believes. It can generate much friction, if the consumers do not like the changes. It can also be difficult for the operators at the local cinemas to control. It has to be intuitive and easy to operate, if it is too difficult people easily give up, SS explains.

His statement is more realistic compared to the change readiness statements presented by informants KSJ and DSH. It seems they either have a naïve view on how change and innovations are practiced at Nordisk Film Cinema, or that SS is more pessimistic. Although SS is correct in arguing that cinemas should be careful about what they experiment with, it still remains a good strategy to test new things, especially if he can motivate his employees to be a part of the change process (Jones et al., 2005).

In Nordisk Film Cinema operations, they spend a lot of time on considering and testing innovative ideas and activities. They must think about everything from technology, the cinema environment, the general atmosphere, to the service provided by the staff. They constantly must keep in mind how to change and how to implement their plans. Most of what they do, KSJ explains, is to create concrete plans about how to create it and how to market it in the right way.
Throughout the entire interview with KSJ, she has been extremely positive towards Nordisk Film Cinema's ability to renew itself. However, repeatedly she and her co-worker SS only refer to innovations and change processes that primarily focus on the organization and not the consumers, even though she states continuously to have the consumer's needs in mind. Even though Nordisk Film Cinema might be very change ready, they seem to refuse considering the consumer value and benefits to a satisfying extent. That might be due to them not seeing their product/service being the movies, but only the experience (Jones et al., 2005).

6.3.2 Organizational Structure

According to SS Nordisk Film is a hierarchical, traditionally structured organization in which all Nordic leaders operate from the same location in the Nordisk Film headquarter in Copenhagen. Informant SS holds a central position on a management level and controls several departments. Besides the top management they have multiple local operations and directors of cinemas in both Norway and Denmark, SS explains. The general operation of the cinema is franchise-driven, as they all have the same brand, product, price structure, IT-systems etc. Every decision can be characterized as top down management, SS elaborates.
Like many other media businesses most media companies follow a somewhat hierarchical structure, as explained in Chapters 4.2.3.1 and 4.2.3.2. The uniqueness of Nordisk Film Cinema is that they not only take in the Nordisk Film mother company, but also in adjacent activities.

Most cinema staff members are part-time employees with a few local full-time employees such as cinema manager, and – dependent on the cinema's size – a service manager,

operator, and controller. The number of full-time employees is also heavily dependent on the cinema's location according to SS. Due to this structure, one could wonder, if part-time employees care about innovations and change to the same extent at the management. Their responsibility and service are not at the same level of commitment as with full-time employees (Chatman & Cha, 2003). That could be seen as a risk resulting from their organizational structure.

Nordisk Film is comprised of seven smaller sub firms: Nordisk Film Cinema, Nordisk Film Production, Nordisk Film Distribution, Nordisk Film Shortcut, Nordisk Film Interactive, GoGift.com, and partial ownership of smaller film production companies. Nordisk Film Cinema is, besides Production, the most recognized entity, DSH explains. The primary responsibility of Nordisk Film Distribution is the distribution and launch of all Nordisk Film movies and those movies they acquire the rights to. This correlates very well with the theory presented by De Propris (2013) and Vang and Jakobsen (2013) that explains that most organizations within the media industry tend to pursue many activities to create spillovers between the sub firms and fuel innovation and development.

Cinemas still hold the monopoly on release dates. Although other players in the market have made a few trials with releasing online at the same time, it still does not seem to catch the interest of the audience. This might also be due to the lack of quality in the movies, SS speculates. Over time this could easily change. It could be expected that in the future these release windows will include online platforms such as iTunes and Netflix, putting more pressure on the cinemas, as they might no longer hold a monopoly on the content release. According to Finney (2014) the circulation and distribution of content gets always challenged when new formats and methods are being invented. It theory it is only a question of time before the online release dates will be at the same time as the cinema releases, since bigger corporations like Netflix already have that feature for their home-produced content.

6.3.3 Current Innovation Initiatives: Exploration

As a part of the cinema operations, Nordisk Film Cinema holds the responsibility for all advertisement on the screens, which is also a part of the IT department. When reorganizing their IT, they also worked on a few new initiatives such as e-Sport and VR, SS explains.
VR or 360-degree cinemas have existed for quite a while now (Wagner, 2015; Chapter 2.4.3). Nordisk Film Cinema, however, perceives this innovation as new. This should be questioned, especially since the first time the VR concept was in 2016 in Amsterdam

(Rear, 2017). In the Danish market, VR is considered relatively new, but not new to the world. Therefore, this innovation can only be considered incremental.

Although Nordisk Film Cinema is a stable business, they must consider new incremental innovations that could make the business more profitable on a constant basis. 4DX is a technology SS puts high value on. It is very popular in Oslo where the first 4DX has opened, SS explains. There is another one in Aarhus and a new 4DX will soon open in Lyngby. *"That is definitely innovation, it is also a big investment; these projects are quite expensive, and we are the only ones doing in Denmark and in Norway who do it. We are opening VR lounges, one in Lyngby and one in Oslo in April/May, that is also innovation. We have experimented a lot with e-Sports, doing viewing parties, and showing e-Sport competitions now in cinemas, that is also something new. So, in that sense we try big things, like 4DX or premium screens like 'Supreme' in Lyngby, which are huge investments"* (Informant SS, Appendix 4).
SS continues by saying that they have also investigated more risky things to figure out if that was a good fit for Nordisk Film Cinema, but it can easily become too risky.
KSJ is equally excited about the 4DX implementation in Lyngby: it is "*something different and something that makes the client choose us instead of some of our competitors*" (Informant KSJ, Appendix 6).
Another innovation they are currently testing is a VR center inside of cinemas, KSJ explains. VR has become increasingly popular and more and more VR centers opening in larger cities. KSJ believes that content diversity is very important in this context to connect with the users.
All Nordisk Film employees seem to think that 4D is a very radical innovation. 4DX, however, was invented by the South Korean company CJ Global and celebrated a huge success in most of Asia (Yecies, 2016). Therefore, one can conclude that in Denmark and Norway this cinema experience can be considered an innovation people have not seen or experienced yet.

6.3.4 Possible Future Innovation Initiatives

Generally, Nordisk Film is very open to new concepts, but informant SS believes that the old concepts are still extremely relevant as well. *"I think we will still have cinemas everywhere with rooms as we know them or screens as we know them. I think we might see more concepts like 4DX, which we are rolling out now, or luxury rooms with recliner seats where you can lay down more or less in your seat"* (Informant SS, Appendix 4).
In Asia, dining in the cinema hall has become a very popular feature and SS seems to be curious to see, whether it becomes a trend in Denmark. Cultural differences could be a hindrance, SS fears, but also thinks diversified content could become a trend. eSports

have been a huge success and more alternative concepts like opera and concerts are also being shown in the cinema.
Since many of the surveyed participants mentioned they would like more food options in the cinema, the idea of creating a dining experience could definitely be a good idea for exclusive showings. Many participants also mentioned the better comfort in cinemas, which 'Supreme' could deliver (see Chapters 6.6.4 and 6.6.5).

Furthermore, DSH thinks that in the future biometric testing could be a way to screen test the movies before they hit the market. In Nordisk Film Distribution, they have already tested this and know a lot more about what the results can be used for. Supposedly, in a year or two, he believes they might start using it as a regular measure for movie and trailer production. "*We would be able to act on it and edit the movie slightly better"* (Informant DSH, Appendix 2). This could tell, whether the trailers have the expected effect, DSH thinks.
Considering his statement, some kind of monitoring in the production pre-process for movies and trailers could be extremely valuable in the future.

KSJ primarily thinks that the future of the cinema will include more concepts like IMAX, 4DX, and VR. She expects that Nordisk Film Cinemas will be first movers in the market regarding the latest technologies. Furthermore, she thinks that the concept of staff controlling the cinemagoers' tickets might decline over time. *"When you go to football matches or a concert, for example, you often go through automated scanners where you put only your code to the scanner. There is nobody there controlling your ticket, you just walk in"* (Informant KSJ, Appendix 6).
One of the things she would like to improve further is the in-store environment in order to make people feel more comfortable and she thinks there will be a higher need for it in the future.
This concept should be considered for the cinema of the future. Many of the participants suggested that they would like to have both options: automated scanners and check-out and staff.

KSJ believes Nordisk Film Cinema to be a first mover that always acts first on new technologies and puts most focus on the consumers' needs. This statement can be discussed, as they are clearly not considered first movers. However, they might the be first in the Nordics to engage in new initiatives.

6.4 Evaluation with a Focus on the Finance Domain

In the following paragraphs the qualitative interview responses will be analyzed with a special focus on the finance domain. As explained in chapter 4.2.4 and the following sub-chapters, cinema economics are quite complex and the cinemas' box office revenues are highly dependent on the ongoing negotiations between the content owners/distributors and the cinemas. This also applies to movies that are (at least partly) produced by Nordisk Film Production and then sold to Nordisk Film Cinema, as confirmed by informant DSH – Nordisk Film Cinema is not favored in any way over other cinema chains. SS further elaborates on the complexity of the cinema ticket pricing system: the prices highly differ depending on the time of the day and the type of movie. In addition, gift cards and vouchers have to be taken into account and there are special events (e.g. Biografklubben and Telia Tirsdag) that can complicate the payment process, especially if a group of people with different requirements wants to book tickets online. He furthermore states that the cinema division does not receive any funding, like Nordisk Film Production, for example (see chapter 4.2.3.3 for more information about the Danish model).
Nonetheless, the cinemas do collaborate with external parties, e.g. Starbucks, explains KSJ. They sell Starbucks coffee in their concession stores, because the brand is very popular and has a strong value – this conveys a feeling of good quality to the cinemagoers. Informant SS adds that they also outsource most of their technical development, because they are not many developers employed by Nordisk Film Cinema. Additionally, their pricing and ticketing system is also being delivered by an external vendor, as already mentioned in Chapter 6.2. Another collaboration that is worth mentioning is the international union of cinemas 'UNIC', where all cinemas are trying to solve problems they all face.
When looking at the financial aspect of the implementation of advanced digital technologies, one needs to consider the costs and expected return on investment. Informant SS confirms this: "*we measure every single investment against a business case, so we know exactly why we do it and how big the return on investment will be. So, if we go into IoT, because it could optimize operations and operational expenditures, we need to be certain it gets verified. Typically, we would start with a prototype and expand it to the rest of the cinema chain, if it works well*" (Informant SS, Appendix 4).

6.4.1 Market Risks

Despite the complexity and financial considerations regarding innovative technologies, informant DSH underlines the importance of staying innovative and constantly monitoring the needs and trends in the market, especially for the younger generations. He says: "*I think you can never take it for granted that new generations will adopt the behavior of*

the older generations. So far, we did well, and we do have a lot of products aimed at the youth, but you have to make sure that we are not losing people to Snapchat, Facebook, and Netflix or virtual reality in your own home. Of course, cinemas are competing with any other experience. It could be a net café, it could be playing live role game in the forest – everything is a competition" (Informant DSH, Appendix 2). Informant SS agrees with DSH.

Another financial risk that is linked to technology is the enforcement of GDPR. Of course, companies face high penalties when not being compliant, but it is also a long road to becoming compliant, as explained by informant SK. "*There is a monetary impact meaning that you have to change your systems and the older the company is, the more difficult it can be. Because they run legacy systems and do not necessary have the databases and servers, which are very clean and clear. So first they need to sanitize their data and put it in a proper structure – this process takes a lot of time and resources*" (Informant SK, Appendix 11).

According to KSJ it can also impact the economics negatively, if the movies being released throughout the year are not particularly successful and people rather watch them at home. Nevertheless, she states that ticket sales are usually quite stable, and she does not see any major financial risks for cinemas in the nearer future.

Informant SS, however, does not agree with the absence of risks. First of all, he thinks that 'bad' movie releases have a big financial impact, because people usually do not go to another movie instead just to go to the cinema at all. This is especially threatening, as the cinemas have no impact on the quality of movies. After all, SS states that the revenue is increasing by around two percent each year, which he thinks is a good and steady outcome. "*One thing that is more interesting is the difference between the growth in revenue and the growth or decrease in tickets admissions. Personally, I find that a bit more worrying. Of cause, growth in revenue is great and that can be fueled by increased the ticket prices and increasing revenues from special formats like 3D, but we need to be careful. There are not any big trends in terms of admissions going down too much, but it really depends on the segments, as it is decreasing for some of the younger segments*" (Informant SS, Appendix 4).

Furthermore, SS sees the window structure for movie releases as a critical point. "*When a movie comes out, it first comes to the cinema; that's the first window. Then it goes into exclusive satellite and cable channels, then into premium viewing, then into transaction viewing and so on. […] The one thing that really threatens us is, if the window structure gets erased and movies are being made available on all platforms from day one*" (Informant SS, Appendix 4). And even though competitors like Netflix did not yet manage

to produce high quality movies, they are starting to disrupt the window structure by directly releasing the movies on their own platform while other big production companies start focusing more on the Asian market and therefore fail to meet the taste of European customers.

Above findings indicate that there is indeed the need to change the concept of cinemas, at least to some extent. The cinema experience should differ so much from home entertainment and other alternatives that especially the younger generations are willing to pay for it and adopt their parents' behavior of going to the cinema regularly. The raise of Netflix and its home-made productions puts further pressure on the cinema market, which is again a call for innovation in the future. The profits from concession sales will not be able to compensate for a decrease in ticket sales (McKenzie, 2008), should they decrease further in the younger segments.

6.4.2 Competition in the Market

Informant KSJ talks about an imbalance in the industry, because small cinemas often receive funding or indirect subsidies from the municipality to enrich and uphold the city's cultural diversity. For big cinema chains like Nordisk Film that is seen as a competitive disadvantage, because nowadays all cinemas receive the latest movies at the same time, whereas many years ago movies would be first shown in the big cinemas only. Therefore, small and big cinema chains did not directly compete with each other and the governmental grants did not influence Nordisk Film.

SS explains Nordisk Film Cinema's strategy regarding competition: "*we try to differentiate on several fronts, but it is mostly about location. Having the right locations and having the right coverage in regard to population. We are also building new cinemas all the time to make sure no one else is coming. So, last year we opened two new cinemas in Denmark: one in Waves, which is a shopping center south of Copenhagen and one in Køge. The year before we opened one in Frederikssund, […] and we have plans to open new cinemas all the time. So, that is one way of fighting the competition, to control them, and to be close to the pockets of the population*" (Informant SS, Appendix 4). To monitor this development, they are tracking their market share, which currently is around 44 percent in Denmark and around 30 to 35 in Norway, on a weekly basis.

These statements further underline the importance of knowing more about the consumers to accommodate for their future needs to create a cinema experience that clearly contrasts with other experiences. Nordisk Film Cinema seems to have a good foundation for that, as they seem to be more proficient in the way they are doing business compared to smaller cinemas that mostly rely on external funding and grants.

6.5 Evaluation of the Survey – Quantitative

The following sections will elaborate on the quantitative survey results.

6.5.1 Demographic and Subjective Measures

In the period from the 12th to the 27th of April 2018, 152 respondents answered a survey that was distributed online through social media. The majority of the survey population is between 25 and 34 years old (see Appendix 14), probably due to the age of the researchers: one could assume that most of their social media contacts will be within the same age range. It could also be argued that most social media users are primarily younger. The full demographic data is visually represented in Appendix 14.

The majority of the 152 participants is female: 67 percent are female, and 30 percent are male.

The researchers are Danish and German and therefore the majority is either Danish (50 percent) or German (29 percent), the rest comes from various other countries: American, Romanian, Finnish, Greek, Spanish, Venezuelan, Australian, Austrian, Belarus, Bulgarian, Canadian, Colombian, Croatian, Dutch, English, French, Italian, Lithuanian, Slovak, Swedish, and Thai (Appendix 14).

Hereafter, they were asked about their educational level. Again, most hold a Bachelor's (42 percent) or Master's degrees (33 percent) (Appendix 14). This can be found to be a bit abnormal, as the public mostly does not have longer educations. However, this can be ascribed to the researchers' demographics once again.

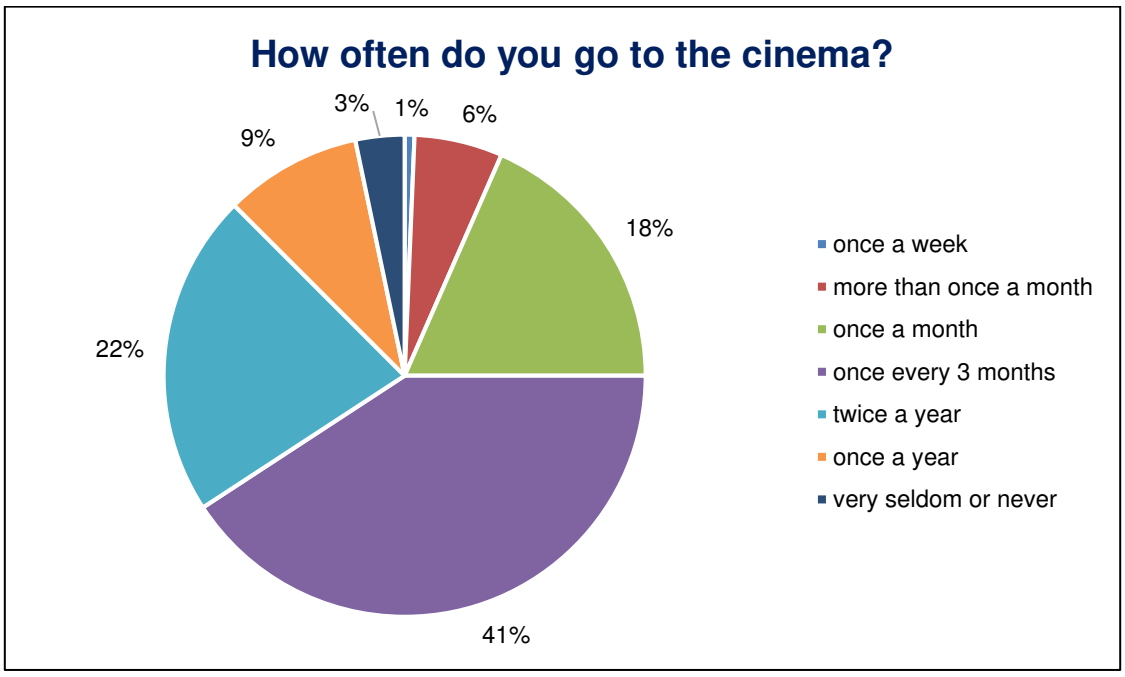

Figure 26: How often do you go to the cinema?

In multiple choice questions the respondents were asked about their cinema habits. The majority goes to the cinema every three months (41 percent), 22 percent go to the cinema twice a year, and 18 percent go once a month, as shown in Figure 26. This could be due to the release period for movies, which consists of three-month intervals. Some who replied that they go to the movies 'very seldom or never' supplied additional answers, which can be found in sections 6.6 and following.

When they were asked about their three primary reasons for going to the cinema, 21 percent said that spending time with friends was most important, directly followed by the big screen and good sound (20 percent), and 'watching specific movies on a big screen' (20 percent) (see Figure 27). This indicates that cinemas are still first and foremost a social experience, but customers also value the modern screening technologies they do not have at home. Furthermore, it suggests that modern home entertainment does not replace the cinema experience, which to an extent was an expected outcome.

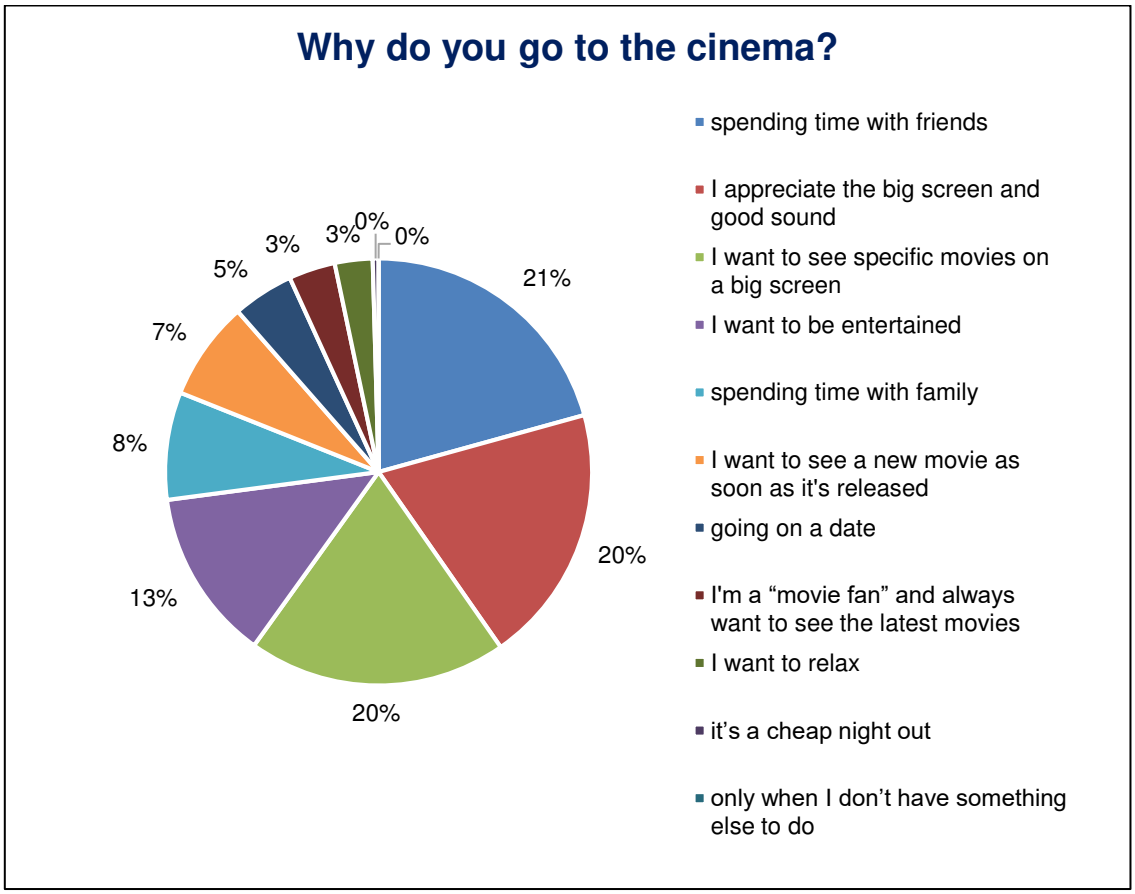

Figure 27: Why do you go to the cinema?

To give an indication of why the Danish cinemas should consider having recommender systems to help the users choose a movie, the respondents were asked about whether they found it difficult to choose a movie when they go to the cinema. Most do not find it

difficult to choose (75 percent), but 21 percent do indeed think so. One could argue that this might be due to their age group, as studies indicate that younger people have more difficulties choosing a movie (Appendix 14). The respondents that found it difficult to choose were also asked to state why; their answers can be found in the qualitative results in Chapter 6.6.

In order to understand how the users primarily book movie tickets they were also asked about the method they use most. Almost half of the respondents (48 percent) answered that they book mostly through the webpage with a phone ticket (Figure 28). This suggests that not that many use the mobile app for booking tickets in the current application setup. I can be argued that the functionality is insufficient, as the customers are redirected to the webpage for the payment process. It can be assumed that by improving the app's functionality and implementing an in-app payment service, more customers would use it.

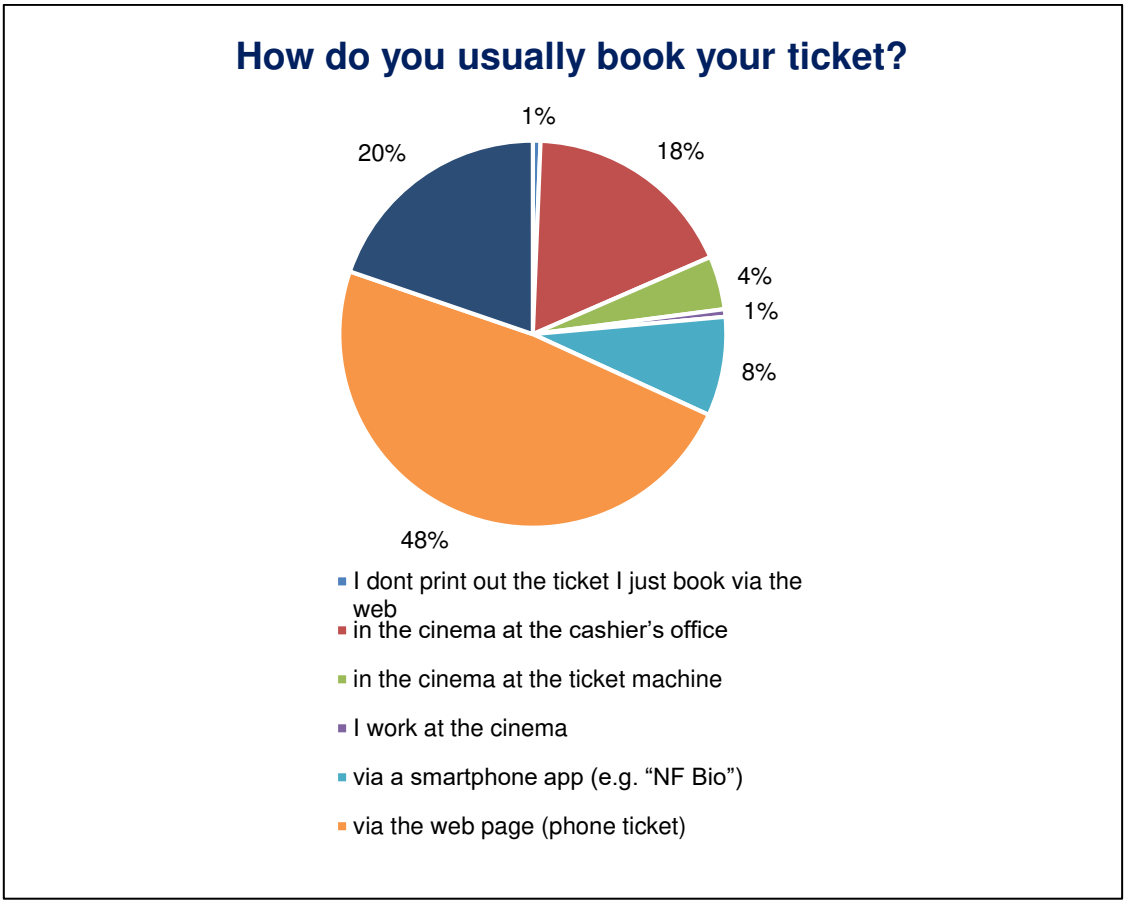

Figure 28: How do you usually book your ticket?

Lastly, the respondents were asked about how far ahead they plan their visits to the cinema, as this could give an indication of how the mobile application could be optimized in regard to increasing the planning flexibility. The majority (49 percent) plans their visits a few days in advance. 20 percent plan a day in advance and 17 percent plan only a few

hours before (Figure 29). The results indicate that the respondents are usually planning a bit ahead of time but like to be flexible to a certain extent. This could be due to the fact that many of them see the cinema as an opportunity to socialize with friends and family, which often requires some planning to coordinate multiple peoples' schedules. Based on this finding a minimum of 17 percent of the consumers would most likely appreciate a location-based notification system that informs them about movies starting within less than one hour. This might increase their short-term planning activity.

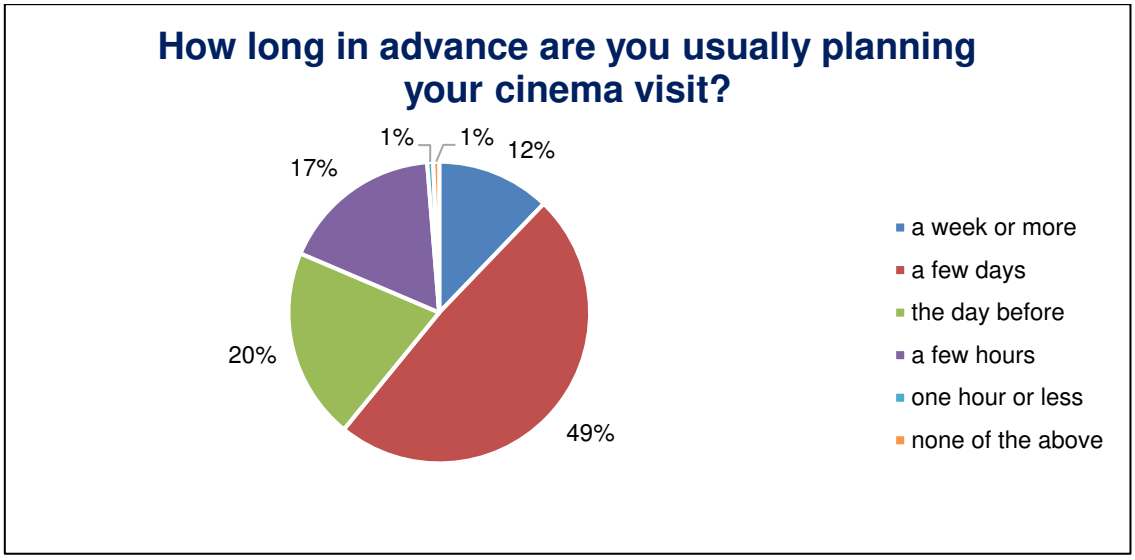

Figure 29: Planning the cinema visit

6.5.2 Self-Reported Measures

Here the respondents were asked to rate to which degree they 'strongly disagree' or 'strongly agree' with the statements on a scale from one to seven. One would be equal to 'strongly disagree' and seven would be equal to 'strongly agree'. This was to create more concrete quantitative data about how the respondents react to possible changes in transactions, experiences, and mobile service options. Firstly, the dataset was checked through normality tests. As the data is ordinal, it was expected that the data is non-normal, although the amount of data was not low. Then, mean, median, standard deviation, skew count, significance of skew, and coefficient of variation are calculated. The first statement was: *'When ordering cinema tickets with an app, I would prefer it, if the transaction of buying multiple tickets could be split between me and my co-cinemagoers directly inside the app'*.

Table 2: Analysis split payment option

Test type	Result
Mean	4,5
Median	4
Standard deviation (SD)	1,76
Skew	-0,14
Count	152
Significance of skew	Approximately symmetric
2*(6/Count)	0,079
Coefficient of variation (CV)	SD/Mean = 0,39

The mean and median suggest a medium to high agreement from all of the respondents regarding split payment of tickets through the application. The CV is low (lower than one), which suggests a low variation of data. The SD is more than one standard deviation away from the total of the mean, which implies that the standard deviation is low and that the data points are more spread out over a close range of values. The significance of skew is approximately symmetric, which suggests that the distribution on both sides of the mean is roughly equal. The normality test (Kolmogorov-Smirnov test) was executed by comparing the expected normalized values with the same mean, median, and standard deviation.

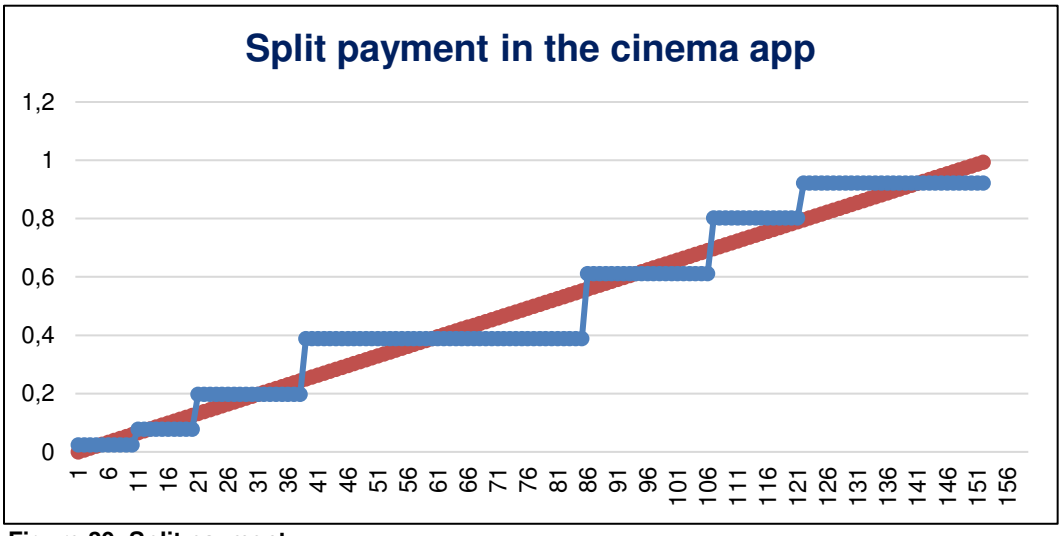

Figure 30: Split payment

Table 3: Critical D split payment

Calculation	Result
Greatest difference D	0,164
Critical D	$1{,}36/\sqrt{Count}$= 0,110

Based on the calculations of the cumulative values, expected values, ranked, norm inverted values, actual values, and the calculated difference, the greatest difference D is

found to be larger than the Critical D making the KS-test reject the null hypothesis (see Table 3). Therefore, the data is non-normally distributed, which one can see from the differences between the red and blue lines in the graph (see Figure 30). This concludes that the data should be treated as non-parametric data.

For the next question the respondents were asked to evaluate how much they agreed or disagreed with the statement: *'I would like to order snacks directly through the cinema app, so that I can pick them up right before the movie without having to stand in line'*. Again, mean, median, standard deviation, skew count, significance of skew, and coefficient of variation are calculated (see Table 4).

Table 4: Analysis click and collect option

Test type	Result
Mean	4,23
Median	4
Standard deviation (SD)	2,22
Skew	-0,14
Count	152
Significance of skew	Approximately symmetric
2*(6/Count)	0,079
Coefficient of variation (CV)	0,52

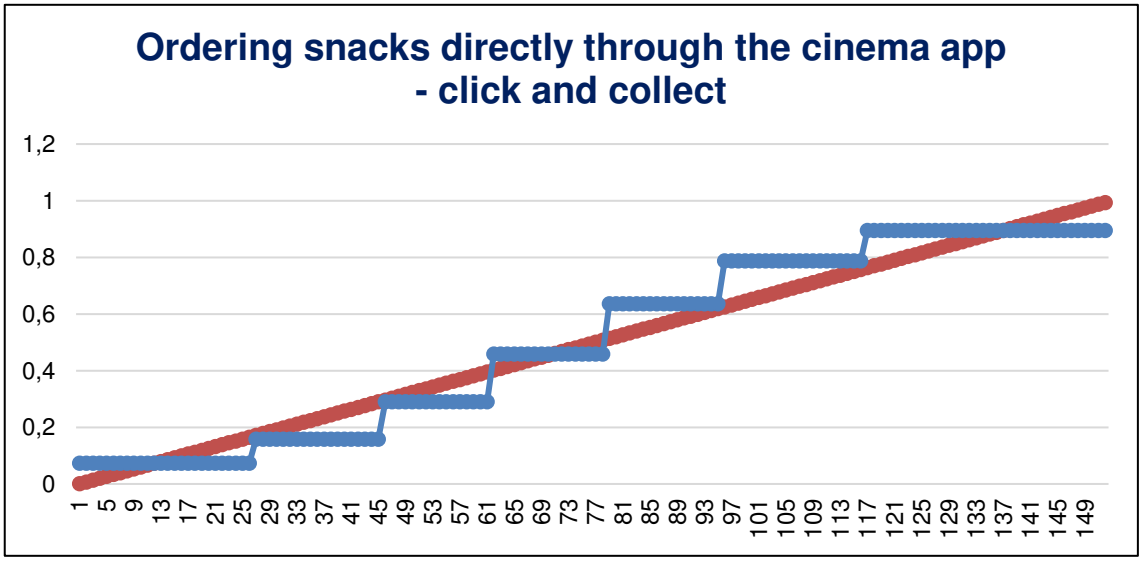

Figure 31: Click and collect

Table 5: Critical D click and collect

Calculation	Result
Greatest difference D	0,163
Critical D	$1{,}36/\sqrt{Count}$= 0,110

By looking at the calculations of the cumulative values, expected values, ranked, norm inverted values, actual values, and the calculated difference, the greatest difference D is found to be larger than the Critical D making the KS-test reject the null hypothesis (see Table 5). As before, the data is non-normally distributed, which one can see from the differences between the red and blue lines in the graph in Figure 31. This concludes that the data should be treated as non-parametric data.

For the next question the respondents were confronted with the statement: *'I would prefer to have direct personal contact with staff in the cinema'* to establish whether automated operations and transaction could be preferred over physical interaction.

Table 6: Analysis direct personal contact

Test type	Result
Mean	3,76
Median	4
Standard deviation (SD)	1,72
Skew	-0,15
Count	152
Significance of skew	Approximately symmetric
2*(6/Count)	0,079
Coefficient of variation (CV)	0,46

As shown in Table 6, the resulting mean and median suggest a medium agreement from all of the respondents regarding physical interaction with cinema staff. The CV is like the previous low (lower than one) which suggests a low variation of data. The SD is one and a half standard deviation away from the total of the mean, which implies that the standard deviation is high and that the data points are spread out over a wider range of values. The significance of skew is approximately symmetric, which suggests that the distribution on both sides of the mean are roughly equal. The normality test (Kolmogorov-Smirnov test) was determined by comparing with the expected normalized values with the same mean, median and standard deviation.

Table 7: Critical D personal contact

Calculation	Result
Greatest difference D	0,148
Critical D	$1{,}36/\sqrt{Count}$= 0,110

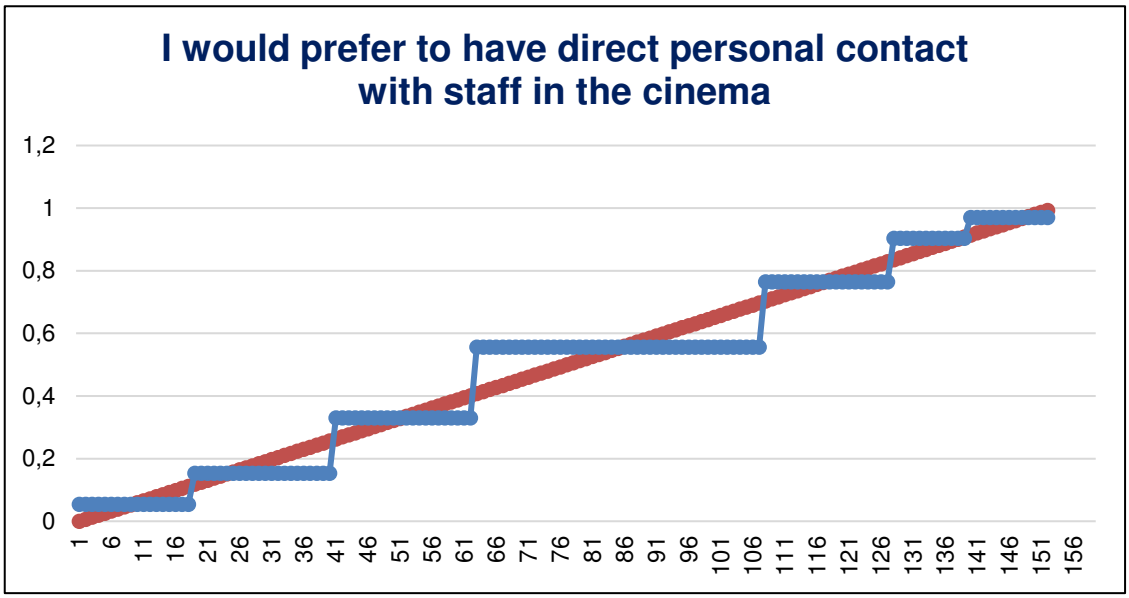

Figure 32: Direct personal contact

Through the calculations of the cumulative values, expected values, ranked, norm inverted values, actual values, and the calculated difference, the greatest difference D is found to be larger than the Critical D making the KS-test reject the null hypothesis (see Table 7). As before, the data is non-normally distributed, which one can see from the differences between the red and blue lines in the graph (see Figure 32). This concludes that the data should be treated as non-parametric data.

Then the respondents were asked whether they would like a recommendation system based on previous behavior: *'I would like the cinema app to give me recommendations for new movies based on my previous behavior'.*

Table 8: Analysis recommendation system

Test type	Result
Mean	3,99
Median	4
Standard deviation (SD)	2,02
Skew	-0,18
Count	152
Significance of skew	Approximately symmetric
2*(6/Count)	0,079
Coefficient of variation (CV)	0,51

Here, the mean and median suggest a medium agreement from all of the respondents regarding implementing a recommendation system in the application based on previous behavior (see Table 8). The CV is like the before low (lower than one), which suggests

a low variation of data. The SD is almost half of the total of the mean, which implies that the standard deviation is high and that the data points are spread out over a wider range of values. The significance of skew is approximately symmetric, which suggests that the distribution on both sides of the mean are roughly equal. The normality test (Kolmogorov-Smirnov test) was determined by comparing with the expected normalized values with the same mean, median and standard deviation.

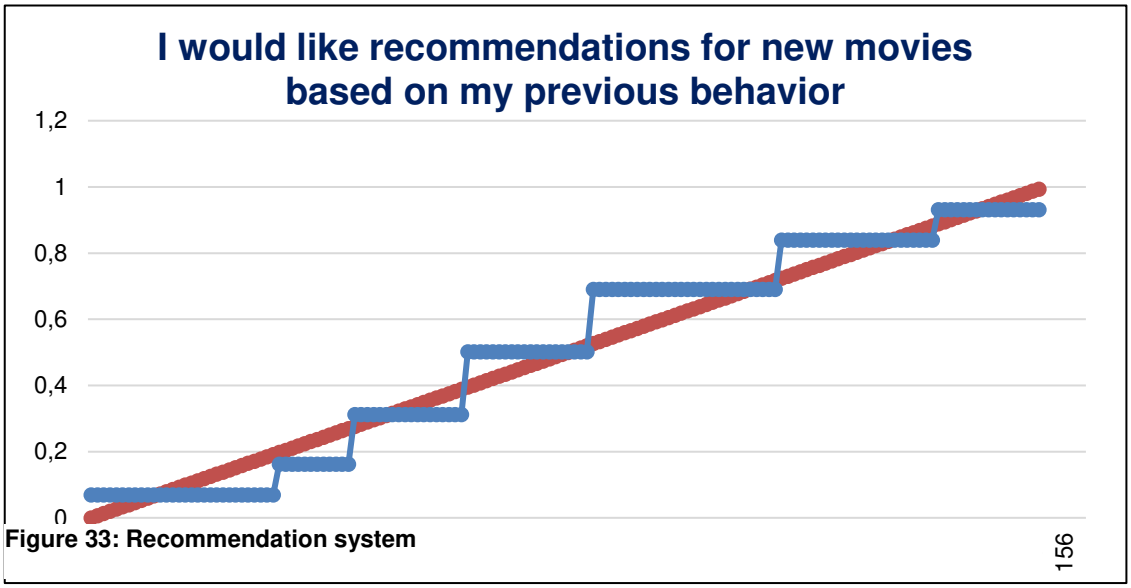

Figure 33: Recommendation system

Table 9: Critical D recommendation system

Calculation	Result
Greatest difference D	0,164
Critical D	1,36/$\sqrt{Count}$= 0,110

The greatest difference D is again found to be larger than the Critical D making the KS-test reject the null hypothesis, as displayed in Table 9. The data is again non-normally distributed, which one can see from the differences between the red and blue lines in the graph. This concludes that the data should be treated as non-parametric data (see Figure 33).

Next, the respondents were asked how much they agreed or disagreed with whether they would like the cinema app to recommend movies based on current location: *'I would like the cinema app to recommend movies to me based on my current location (e.g. when walking past a cinema)'.*

Table 10: Analysis location-based recommendation

Test type	Result
Mean	2,61
Median	2

Standard deviation (SD)	1,9
Skew	0,88
Count	152
Significance of skew	Moderately skewed
2*(6/Count)	0,079
Coefficient of variation (CV)	0,25

In Table 10, the mean and median suggest a slight disagreement from all of the respondents regarding implementing a recommendation system based on current location. The CV is like as all the others low (lower than one), which suggests a low variation of data. The SD is very close to the total of the mean, which implies that the standard deviation is high and that the data points are spread out over a wider range of values. The significance of skew is moderately skewed, which suggests that the distribution on one of the sides of the mean is more dominant. The normality test (Kolmogorov-Smirnov test) was determined by comparing with the expected normalized values with the same mean, median and standard deviation.

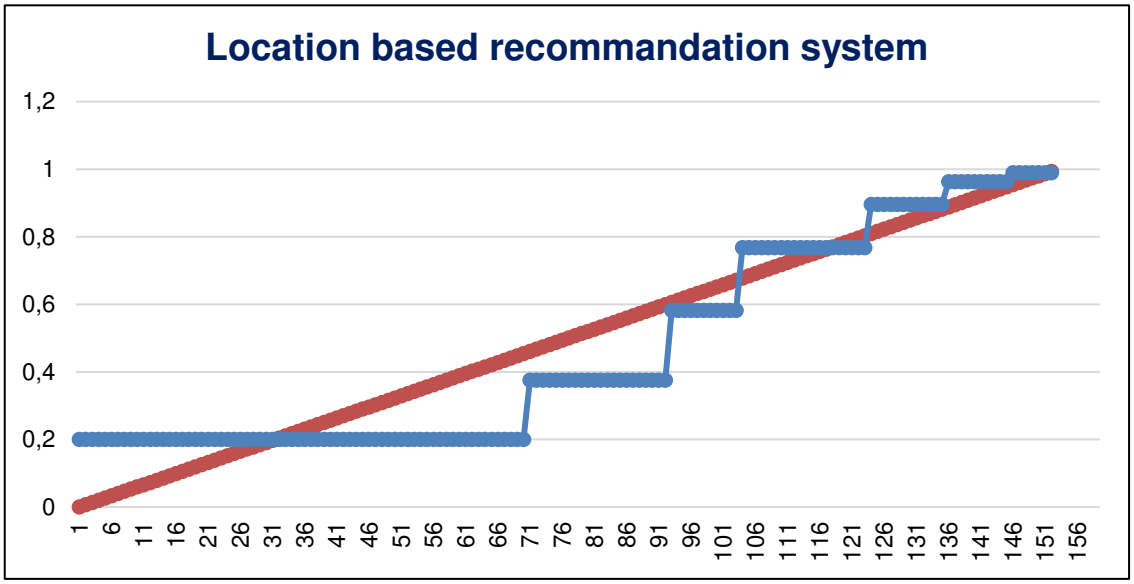

Figure 34: Location-based recommendation

Table 11: Critical D location-based recommendation

Calculation	Result
Greatest difference D	0,254
Critical D	$1{,}36/\sqrt{Count}$= 0,110

As shown in Table 11, the greatest difference D is like as all others found to be larger than the Critical D making the KS-test reject the null hypothesis. The data is once again non-normally distributed, which one can see from the differences between the red and

blue lines in the graph in Figure 34. This concludes that the data should be treated as non-parametric data.

Then the respondents were asked how they felt about sensors tracking their responses: *'I would be ok with having sensors in the seat that track my reactions/physical responses to the movie'.*

Table 12: Analysis sensor tracking reactions

Test type	Result
Mean	2,38
Median	1
Standard deviation (SD)	1,85
Skew	1,11
Count	152
Significance of skew	Highly skewed
2*(6/Count)	0,079
Coefficient of variation (CV)	0,77

Compared to the previous, the mean and median suggests disagreement from all respondents regarding implementing sensors to tack responses/reactions in the cinema. The CV is as all the others low, although closer to one, but still lower than one, which suggests a low variation of data. The SD is again very close to the total of the mean, which implies that the standard deviation is high and that the data points are spread out over a wider range of values. The significance of skew is highly skewed, which suggests that the distribution on one of the sides of the mean is dominant. The normality test (Kolmogorov-Smirnov test) was determined by comparing with the expected normalized values with the same mean, median and standard deviation.

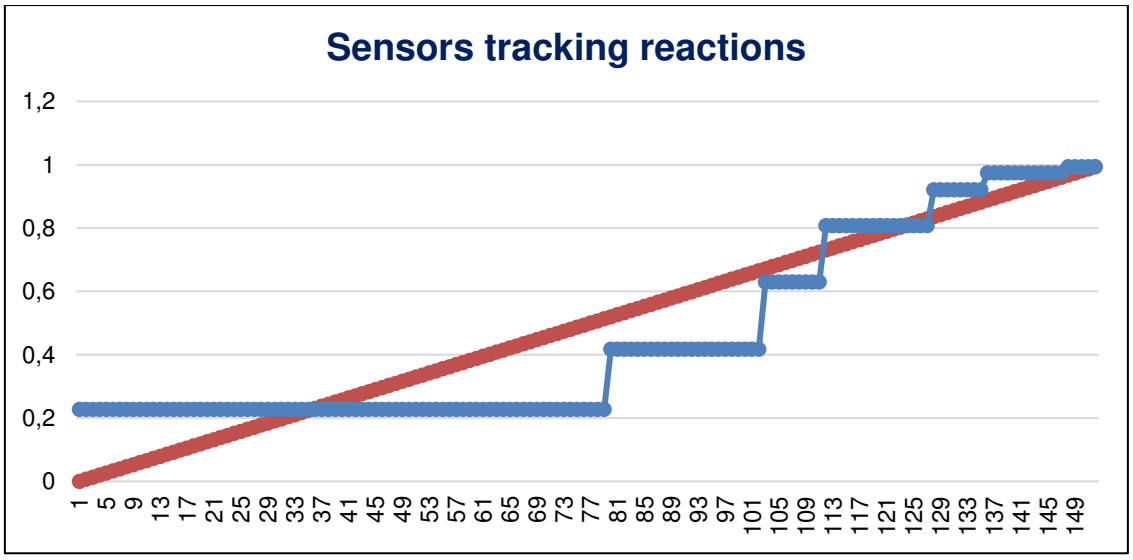

Figure 35: Sensor tracking reactions

Table 13: Critical D sensor tracking reactions

Calculation	Result
Greatest difference D	0,286
Critical D	1,36/$\sqrt{Count}$= 0,110

The greatest difference D is once again as all others found to be larger than the critical D making the KS-test reject the null hypothesis (see Table 13). The data is by default non-normally distributed, which one can see from the differences between the red and blue lines in Figure 35. This concludes that the data should be treated as non-parametric data.

To understand how they felt about sharing their private data, respondents were asked how they felt about the tracking/recording of reactions: '*If the cinema used sensors to record my reactions/physical responses, I would feel my privacy was violated'.*

Table 14: Analysis Violation of privacy

Test type	Result
Mean	5,44
Median	6
Standard deviation (SD)	1,88
Skew	-1,07
Count	152
Significance of skew	Highly skewed
2*(6/Count)	0,079
Coefficient of variation (CV)	0,34

In contrary to the previous, the mean and median suggests agreement from all of the respondents with regards to feeling violated, if their data is recorded – which compared to the previous was similar but with opposite statements (see Table 14). The CV is as all the others low as it is lower than one, which suggests a low variation of data. The SD almost a third of the total of the mean, which implies that the standard deviation is low and that the data points are spread out over a close range of values. The significance of skew is highly skewed, which suggests that the distribution on one of the sides of the mean is dominant. The normality test (Kolmogorov-Smirnov test) was determined by comparing with the expected normalized values with the same mean, median and standard deviation.

Table 15: Critical D violation of privacy

Calculation	Result
Greatest difference D	0,238
Critical D	1,36/$\sqrt{Count}$= 0,110

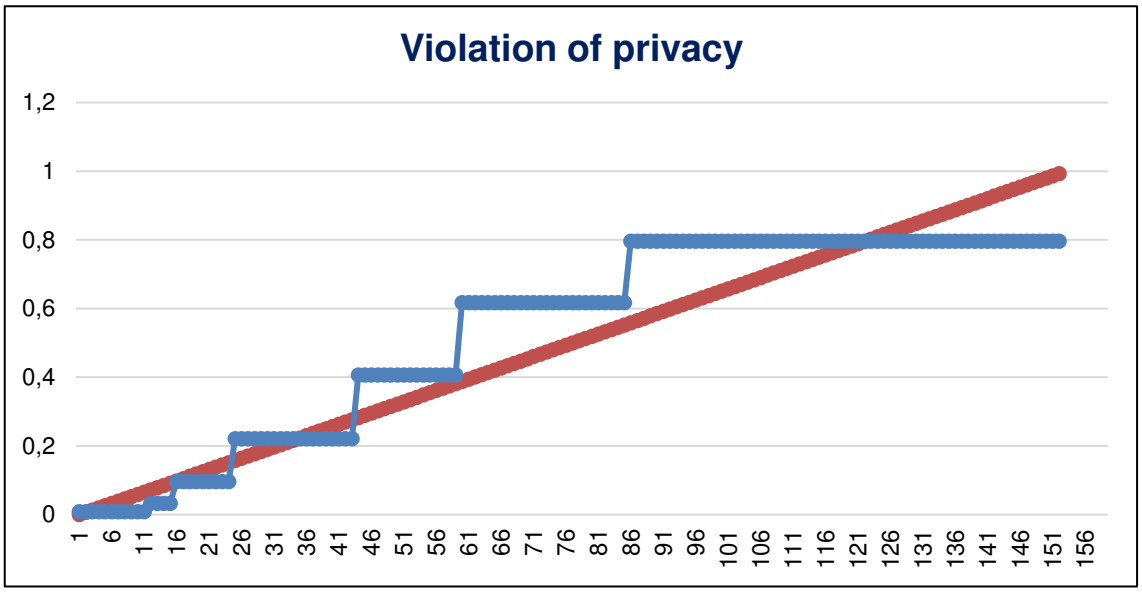

Figure 36: Violation of privacy

The greatest difference D is larger than the Critical D making the KS-test reject the null hypothesis (Table 15). Therefore, the data is non-normally distributed, which one can see from the differences between the red and blue lines in Figure 26. This again proves a non-parametric approach to the data.

6.5.3 Quartiles

Overall, all data is very clustered suggesting that most respondents highly agreed and disagreed with the same statements. To further evaluate the data, the quartiles will be calculated for each answer, as displayed in Table 16

Table 16: Quartiles

	Split payment	Click and collect snacks	Direct interaction with staff	Recom. previous behavior	Recom. current location	Sensors tracking reactions	Violated privacy
First quartile	3,75	2	2	2	1	1	4
Third quartile	6	6	5	6	4	4	7
Quartile deviation	(Q3-Q1)/2= 1,125	2	1,5	2	1,5	1,5	1,5

When evaluating the quartiles, it is very easy to see that the respondents primarily either agree or disagree with the statements. As the Quartile deviation is seeming low for all categories it can be assumed that the data samples are closely ranked.

6.5.4 Spearman Correlation

Based on the homogeneous or heterogeneous behavior of the data compared to each other a spearman correlation is applied. Each statement is either received very positively or very negatively by the respondents. Firstly, all data is ranked in order to perform the non-parametric Spearman correlation. The Spearman rho between each of the categories is calculated to test for whether they have monotonic correlation (see Table 17).

Table 17: Spearman Correlation

	Split payment	Click and collect snacks	Direct interaction with staff	Recom. previous behavior	Recom. current location	Sensors tracking reactions	Violated privacy
Split payment							
Click and collect snacks	0,321 = weak						
Direct interaction with staff	0,105 = very weak	-0,029 = very weak					
Recom. previous behavior	0,156 = very weak	0,119 = very weak	-0,0054 = very weak				
Recom. current location	0,130 = very weak	0,101 = very weak	0,084 = very weak	0,511 = moderate			
Sensors tracking reactions	0,138 = very weak	0,037 = very weak	0,035 = very weak	0,205 = weak	0,170 = very weak		
Violated privacy	-0,147 = very weak	0,0016 = very weak	-0,039 = very weak	-0,146 = very weak	-0,063 = very weak	-0,804 = very strong	

From the results it can be concluded that most of the dataset correlated with each other, has a very weak or weak monotonic relationship. The two statements regarding recommender systems have a moderate monotonically increasing relationship and the two opposing statements regarding tracking of reactions with sensors and the violation of privacy have a strong monotonic decreasing relationship. As only these have significant monotonic relationships, they will be plotted in graphs. It could be argued that it is expected to an extend that the two questions regarding recommendations are similar in both in statement content and data samples. The same can be concluded for the sensors vs. violation, as one is positively denoted, and another is negatively denoted in the opposite statement.

6.6 Evaluation of the Survey – Qualitative

In the following chapters the qualitative answers from the survey and the follow-up interviews will be analyzed.

6.6.1 Frequency of Cinema Visits

To understand why some respondents would choose not to go to the cinema very regularly, they were asked to comment on their reasons. The most frequent reason found to be the price. Many feel the cinema is too expensive. The other most common reason would be the lack of a good selection of movies.

→ *"Usually when I went to a cinema I was disappointed with a movie afterwards. Prefer to wait for recommendations and then rent the movie at home when I have the time. I only go to the cinema for movies that I want to experience on a wide screen (e.g. IMAX)"* (Female, 29 years).

→ *"I love going to the cinema with a friend, but I think it's quite expensive compared to just turning on Netflix, which I use a lot"* (Female, 24 years).

→ *"Quality of movies is not good enough to see that on the big screen, I only go to cinema if special effects are good or the plot are bearable"* (Female, 29 years).

6.6.2 Difficulty of Movie Selection

Some of the respondents in the survey found it difficult to choose movies in the cinema. To understand what type of recommendation system they might need, it is crucial to figure out why they find it difficult. Many find the selection too large or that they lack knowledge to pick the right movies. Some even find that the titles are often boring and the selection is too limited.

→ *"I feel like the movies to choose from when you're at the cinema look so uninteresting. I usually go to the cinema to see a movie I already heard about and would like to see. If it's a spontaneous visit to the cinema I find it very difficult to choose a movie"* (Female, 24 years).

→ *"Either too many movies I want to see at the same time or not even one movie that attracts me"* (Female, 26 years).

6.6.3 Perception of Cinemas: Positive

To understand how the participants generally feel about the cinema, they were asked which parts they like most about the cinema. This answer can give an indication of what should not be changed in a future environment, as it already works.

The majority said that what they appreciated the most is either the environment or the facilities. That is the good sound, the big screen, and the good seats etc. A third of the participants primarily like the entertainment aspect or the atmosphere in the cinema. This can be how immersive they feel or that they like the theatrics of the cinema experience or the atmosphere in general. Around ten percent highlighted the concessions as being a primary preference for the cinema. Among the rest there are comments regarding the webpage and the mobile services and the social interaction with staff and relaxation. Many also mentioned that the cinema offers a good alternative to just watching a movie at home and that there are fewer distractions. Below, some of the comments are displayed.

→ *"First, large pictures and good sound. Secondly, to get off the couch at home – I like the things that usually comes with it - alone time, drinks/dinner, going out in the evening"* (Female, 33 years).

→ *"Atmosphere, the quality of picture and sounds which you simply cannot recreate at home"* (Male, 24 years).

→ *"I like that it's a much more intense experience compared to watching a movie at home. You are more concentrated, and you don't multitask - meaning that you get much more out of it"* (Female, 23 years).

6.6.4 Perception of Cinemas: Negative

In addition, the respondents were also asked about what they dislike. Over one third of the respondents complained about too expensive ticket prices. In contrary to the belief of all Nordisk Film informants, the cinema is not considered a cheap entertainment by the surveyed respondents. Almost 20 percent are very unhappy about the number of people, crowds, and queues. Around ten percent found the concessions to be very overpriced, and several mentioned the reluctance towards not being able to bring their own snacks or food. Approximately ten percent complained about bad facility management, lack of cleaning, as well as too high sound, and uncomfortable seating (i.e. not being able to have enough leg space or having your feet up). Noisy people are also found to be a frequent dislike, as many people tend to talk during movies or use their cellphones. Other concerns included too many 3D movies, too many blockbuster movies in the selection, too many adds, and having to pick up tickets half an hour before movie.

→ *"It is sad that only Blockbusters and big productions are advertised. It would be cool, if cinemas helped low-budget-productions etc. a bit more"* (Female, 28 years).

→ *"The high price of and the insistence on 3D movies even though they usually benefit neither the plot nor the visuals"* (Male, 27 years).

→ *"That so many people are together in one room. Someone always bothers me. I am very small and unfortunately the seats are often arranged so that I cannot see anything if someone sits down in front of me"* (Female, 27 years).
→ *"It's extremely expensive - so I only go if there's something I really want to see on the big screen. Barely any student discount, and not a good loyalty program"* (Female, 23 years).
→ *"People eating, opening bags, making sounds. Also lack of leg room, I'm rather tall (194cm), so I have to get the expensive seats unless I want leg cramps. The seats are often too short as well.*
→ *"I also dislike the price of other goods. I understand that it's their main source of income, but the prices of basic stuff like water is crazy"* (Male, 24 years).

6.6.5 Ideas for the Cinema of the Future

Lastly, they were asked about ideas to improve the cinema in the future. The majority wants cheaper tickets and concessions. Many suggest more content diversity, such as independent and foreign non-American movies, operas, and documentaries, VR, and 4D options. Some want more events, such as movie marathons and sneak peek preview. A bunch came with suggestions for facility improvements, such as more service from the staff, more luxury seating, quality sound (through adjustable headphones), and additional live music to movies. A few want more height difference in seating for short people to see the screen better, some also mentioned that more leg space would be a great improvement. Two respondents suggest better, healthier food and snack options. Two suggests that a monthly subscription or discount card can be a great improvement. Some parents request an adjacent child care facility for the parents to have a nice night out. Beside the above mentioned, there are a few other things, such as recommender systems, more quality in general, more personalization, smaller cinemas and venues, overall better service, and more pre and post options inside the cinemas such as a café.
→ *"Focus on the film and few high-quality foods and drinks, loose the additional services. App for booking without paper and phone calls is highly appreciated"* (Male, 32 years).
→ *"Arrange days with marathon showing of old movies. For instance, one evening with showing all the Star Wars movies"* (Male, 35 years).
→ *"More luxury in the cinema - bigger seats, possibility to put one's feet down, possibly headphones so that one is not disturbed by others and the volume is individually adjustable. Maybe 4D cinemas for certain films. Rethink prices (films that have been out there for longer are cheaper to offer so that less well-off people have the opportunity to go to the movies)"* (Female, 26 years).
→ *"Monthly subscription so people would go more often or cheaper to go on certain days. Cheaper prices at the concession"* (Female, 34 years).

→ *"Have adjacent child care facilities so parents can go on a movie date"* (Female, 38 years).
→ *"Combine movies with live music, better ventilation, fresh air. More quality in the interior and lighting in the waiting areas. Co-ed bathrooms, so women don't have to stand in line"* (Female, 30 years).

Interestingly, the average age of the people who suggest improvements to the cinema is higher than the general average age of all the respondents (the question was not mandatory). This implies that younger people seem to care less about the improvements of the cinema.

6.6.6 Qualitative Follow-Up Questions

Because some clarifications were needed from the respondents, nine follow-up interviews were conducted between the 25th and the 30th of April 2018.

6.6.6.1 Personal Contact with Staff

Firstly, they were asked why they would or would not want to have personal contact with the cinema staff, as the removal of staff leads to cost savings and could generate a more seamless experience.
Most of participant feel that personal contact with staff is not very important for them. However, they would like to be able to ask for help, if needed. Some even answered that they think the people they arrived with are enough social interaction.

→ *"Sometimes I like to have personal contact with staff as I provides a pleasant experience, if the staff is competent"* (Female, 26 years, Informant PM, Appendix 15).
→ *"Indifferent. The majority of the time going to the cinema is fairly straightforward, buy a ticket online, buy popcorn, watch movie. There isn't much that extra personal contact with the staff can help with, or add to the experience"* (Male, 27 years, Informant MR, Appendix 15).
→ *"No, because it's mainly the big screen and the people I go to the cinema with that I enjoy"* (Female, 33 years, Informant MK, Appendix 15).
→ *"I would like to be able to talk to the staff in case the machines aren't working, or I need assistance in another way"* (Female, 29 years, Informant LH, Appendix 15).

Then they were asked, of they think that the atmosphere would be more cold and impersonal, if they enter the cinema through automated check-in points. Again, most feel that

the atmosphere will become colder, but overall, they are not against the concept of automation. In fact, some prefer it. Generally, none of the questioned are very opposed to having a machine checking their ticket instead of personnel.

→ *"Not really, you can build up a crowd by only allowing people in at a certain time"* (Male, 28 years, Informant KR, Appendix 15).
→ *"Yes, perhaps. but that could be compensated for if the entrance was in a coffee shop/wine bar/place with other people. I don't need to interact with cinema staff, just need a nice atmosphere. It would be a great idea to put the cinema, in the hall of a restaurant/night life kind of place"* (Female, 33 years, Informant MK, Appendix 15)
→ *"I already check in via. machines at the cinema (when paying for the tickets)"* (Female, 19 years, Informant MA, Appendix 15).

Afterwards, they were asked, if they would change their answer, if having automated check-out points in the concession store could speed up the process of receiving and paying for their snacks. Only one of the respondents still wants personal contact. That speaks to the favor of changing the system to be more automated and less manually handled, or at least give users both options.

→ *"Yes, and no. It would be nice not having to wait in line all the time, but you would lose a lot of human interaction which is generally not a good thing"* (Female, 26 years, Informant PM, Appendix 15).
→ *"That would be nice. I hate queues and often don't buy snacks because of this*" (Female, 33 years, Informant MK, Appendix 15).

6.6.6.2 Recommendations Based on Previous Behavior

The respondents were asked about their reasons for liking/disliking in-app movie recommendations that are based on previous behavior. Most of the people are positive towards recommender systems. They overall feel that a recommender system is a great way for them to stay up to date with the latest film releases. However, a few also mentioned that they want such a system only if it is voluntary, as they do not want to be overwhelmed by notifications and push massages.

→ *"That depends on the app. If I can go in and see the recommendations at my own time it would be nice, but if it came up as notifications I would not like it"* (Female, 26 years, Informant PM, Appendix 15).

→ *"Yes, because I am missing out on lots of movies and don't keep up with latest trends, that could save me time, so I won't need to research it myself"* (Male, 29 years, Informant SP, Appendix 15).
→ *"Neutral or slightly agree. I think it depends on what type of behavior is being recorded. I would be okay with recommendations, if they were based on basic data e.g. which movie tickets I have purchased and how I have rated movies"* (Female, 25 years, Informant PH, Appendix 15).
→ *"Yes, that's nice, because I don't make that much research for new movies myself"* (Female, 33 years, Informant MK, Appendix 15).
→ *"I think I said no. I think we are living more and more in a world in which an algorithm decides what we like, instead of just being curious"* (Female, 28 years, Informant AN, Appendix 15).

When asked about getting recommendations based on friends' behavior, the respondents react more reluctantly. Only three out of nine feel that they do not mind it.

→ *"No. I feel that would be too "big brother" like, where someone is watching all the time"* (Female, 26 years, Informant PM, Appendix 15).
→ *"As a separate recommendation feed, yes"* (SP, Male, 29 years, Informant SP Appendix).
→ "*No. I don't think the cinema app should have that much information about me"* (Female, 25 years, Informant PH, Appendix 15).
→ *"Maybe. depends. as long as it is not a pain in the ass. if I can choose to see it or something like that"* (Female, 33 years Informant MK, Appendix 15).

6.6.6.3 Location-Based Recommendations

The respondents were also asked, if they would like the cinema app to recommend movies based on their current location (e.g. when walking past a cinema), what they answered and why. The majority feels very opposed to having any kind of location tracking that can push recommendations based on location.

→ *"I would not like that. I find those types of spam annoying, when your phone sees where you are and automatically pops up with an advertisement"* (Female, 26 years, Informant PM, Appendix 15).
→ *"Strongly disagree. I don't like the idea of the cinema app knowing my current location"* (Female, 25 years, Informant PH, Appendix 15).

→ *"No. I don't normally go to the cinema spontaneously because I'm walking by a cinema. If I want to go to a movie I usually research it online beforehand"* (Male, 27 years, Informant MR, Appendix 15).
→ *"I think I answered no, I'm not the biggest fan of my position and other personal data potentially being shared with third parties"* (Female, 19 years, Informant MA, Appendix 15).

Furthermore, they were asked what they think about location-based advertisements in general. Many find them to be very invasive and annoying. The majority cannot see the potential or point in location-based advertisements.

→ *"I find them highly annoying and a little invasive"* (Female, 26 years, Informant PM, Appendix 15).
→ *"I think it's creepy. In general, I don't like sharing my location with apps, unless it is required for an important feature"* (Female, 25 years, Informant PH, Appendix 15).
→ *"A little too much big brother society - but properly just something that we need to get used to and then we love it"* (Female, 33 years, Informant MK, Appendix 15).
→ *"I feel ambivalent about it. I see the advantages, but I think it could be misused"* (Female, 19 years, Informant MA, Appendix 15).

6.6.6.4 Sensors in the Seat

In the survey people were asked, if they would be ok with having sensors in the seat that track their reactions/physical responses to the movie and if they have any privacy concerns. Then the respondents were asked to elaborate on their answer. Over half of the respondents completely dislike like the idea of having sensors in their seat in the cinema. A few feel it is maybe okay.

→ *"I answered that I would not be okay with having sensors in the seats, simply because I feel as it is an invasion of privacy"* (Female, 26 years, Informant PM, Appendix 15).
→ *"Strongly disagree. I don't think the cinema should have access to that type of private information about me. I think the cinema would gain more from it than I would"* (Female, 25 years, Informant PH, Appendix 15).
→ *"I am ok with that. It could enhance the cinema going experience. Some privacy concerns though, if the data gets sold to other companies/marketers"* (Male, 27 years, Informant MR, Appendix 15).
→ *"I would hate it and feel watched all the time"* (Female, 28 years, Informant AN, Appendix 15).

→ *"I answered no because I think it should be a personal experience to go to the cinema, I would at least feel like I was a part of a science project"* (Female, 19 years, Informant MA, Appendix 15).

Afterwards, the respondents were asked, if they would still say the same, if they knew the results would be completely anonymous and results are being used to make better movies in the future. All but one feel okay with having sensors in the seat tracking their reactions, if their data will be anonymized. Interestingly, this finding contradicts the general result of the survey, where almost all did not want sensors tracking their physical reactions. It could be argued that by anonymizing the data this system could be implemented.

→ *"I would not like to be 'monitored' while I was going out to have a good time"* (Female, 26 years, Informant PM, Appendix 15).
→ *"I am not too concerned about privacy in general, so I'm okay with both"* (Male, 29 years, Informant SP, Appendix 15).
→ *"Yes. I wouldn't care about them being able to make better movies. I'm not sure that I would trust that the company anonymized the data"* (Female, 25 years, Informant PH, Appendix 15).
→ *"Yes, I would be ok with it then"* (Male, 27 years, Informant MR, Appendix 15).

Additionally, they were asked if they would do it anyways, if the cinema offered them free tickets and/or free popcorn in return. Generally, people feel that it seems like bribery and many would retract their answer from before. They also think it will be like a bargain, giving something up to get something in return.

→ *"I don't think so. I think it depends on the size of the reward"* (Female, 25 years, Informant PH, Appendix 15).
→ *"Maybe, but I would feel like it was bribery in order to get personal data then"* (Female 19 years, Informant MA, Appendix 15).

Furthermore, the respondents were asked: '*If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?*' Almost all feel okay with sharing their data, if they know about its usage, only a few are still a bit against it.

→ *"Maybe, I cannot say for sure. But I still feel weird about having sensor in the cinema"* (Female, 26 years, Informant PM, Appendix 15).

→ *"Don't care, take my data for free, as long as I don't notice it"* (Male, 29 years, Informant SP, Appendix 15).
→ *"Probably. I think it is important to make it clear what data is being collected and what it is being used for"* (Female, 25 years, Informant PH, Appendix 15).

6.6.6.5 Offline

Lastly, the follow-up interviews were targeted towards knowing, whether people prefer the cinema to be an offline space during the movie. All respondents would like to be offline in the cinema, however, a few mentioned that it should not be enforced.

→ *"While the movie is running, Yes! before and after, while in the building, no"* (Female, 26 years, Informant PM, Appendix 15).
→ *"I think that this should be encouraged, not enforced"* (Male, 29 years, Informant SP, Appendix 15).
→ *"Yes. I like that you have to stay focused on the movie. I think I would be less engaged in the movie, if I was using my phone during the movie"* (Female, 25 years, Informant PH, Appendix 15).
→ *"I would because you can easily lose focus when you're on the phone"* (Female, 19 years, Informant MA, Appendix 15).

7 Conclusions and Perspectives

The aim of this thesis was to evaluate the value that digital services and technologies could bring to Nordisk Film Cinema and their consumers. The focus was on IoT technologies, but other digital technologies have also been considered.
It has been found that IoT solutions are still in their infancy and there are no appropriate use cases for media companies at the moment. This means that Nordisk Film should not implement smart seats that measure peoples' arousal – the technology is not well established (yet) and too expensive. It can also be doubted how useful the resulting arousal data is for movie and trailer production. Instead, smart wristbands could be used to measure cinemagoers' heart rate, if a valuable business case can be established in the future. The surveyed users also raised immense privacy concerns regarding the use of their arousal data but reacted less concerned when ensured that the data was gathered fully anonymously. Knowing about the exact use of the arousal data would also increase peoples' willingness to share their data. However, Nordisk Film Cinema should further investigate IoT solutions for facility management, especially because some respondents complained about poor facility hygiene.

Nevertheless, other digital solutions have been found to create significant value for Nordisk Film Cinema and its customers. It seems as if the company is currently focusing mainly on organizational value instead of consumer value and fails to prepare for future changes in the market. The collection of more data and consumer intel could contribute to a more successful anticipation of future market developments and consumer demands. In addition, recommender systems are perceived useful for both content curation and personalized movie recommendations for cinemagoers, e.g. through the mobile app. Furthermore, it can be concluded that other technologies are useful and accepted from the consumer side. This entails digital ticket scanners in the entrance areas, a split payment system, a click and collect system for concessions, and more app functionalities (e.g. additional information services regarding the movie and the aforementioned recommendation system). In addition, an in-app movie rating system presents itself as an easy solution to learn more about consumers' preferences by segment. Respondents also wish for more unique events in the cinemas on special occasions (including physical installations that correspond with the movies), and more food options. The current mobile app definitely leaves space for comprehensive improvements, which are valued by the consumers and would benefit Nordisk Film's gathering of consumer intel. However, proximity marketing with the use of beacons is not amongst these improvements and the market does not seem to be ready for it.

Users do genuinely like cinemas in their current form, even though more than half of the respondents complain about the increase of ticket prices. This is contrary to Nordisk Film's employees' perception that the cinema is a relatively cheap night out when compared to other activities. Some respondents also wish for a higher movie diversity in general.

From an organizational perspective, Nordisk Film Cinema could benefit greatly from a closer collaboration with the other Nordisk Film divisions and vice versa. In this context it should be mentioned that the GDPR indeed complicates this endeavor and special attention to data privacy should be paid. This might indeed lead to even less exchange between the different Nordisk Film divisions.
In general, Nordisk Film employees think of their organization to he highly innovative and change ready. This can be doubted, because they are mostly focusing on internal aspects wile disregarding the consumer perspective. In the Scandinavian market they can be considered first movers, but the technologies are not new to markets in other countries. There also seem to be significant differences between the change readiness of Nordisk Film Distribution and Cinema, which again underlines that the divisions could profit from more cross-collaboration. Generally speaking, Nordisk Film Cinema is following the traditional structure for companies in the creative industries by pursuing multiple activities at a time – this could lead to a lack of focus on their core business value. The evaluation of future threats including the possible dissolution of the traditional window structure for movie releases poses a risk to the cinema business and should not be disregarded.

All in all, the researchers found that there is indeed potential for increasing the consumer value with the help of digital technologies. Because IoT solutions for smart seats are deemed valueless, a concrete business case based on the STOF model and its four domains could not be created. Therefore, it was not possible to develop a concrete business case. Despite this, it cannot be repudiated that knowledge about the consumers should be cherished and gathered more extensively in Nordisk Film Cinema.

7.1 Managerial Implications

From a managerial perspective it seems highly recommendable to investigate more possibilities for cross-cooperation in the different Nordisk Film divisions. Furthermore, mangers should start challenging their dominant logic and fully take the consumer perspective into account. These measures could help avoiding silo thinking and organizational inertia. At the same time, Nordisk Film Cinema should reevaluate its core competencies and focus on exploiting them in order to stay relevant in the future. A balance between

exploration and exploitation activities should be found. In addition, managers should create more awareness for the value of consumer knowledge amongst headquarter employees.

7.3 Critical Review

It can be noted that the researchers might have been a bit too optimistic regarding IoT solutions that are already available on the market and overestimated the amount of research in this field. Subsequently, it could have been beneficial to focus more on general improvements and digital technologies other than IoT.
When considering IoT solutions, the thesis could have focused on cost savings in the area of facility management.
Furthermore, it can be doubted, if the survey data actually represents the opinion of the Danish population, because most respondents were quite young on average.
Last but not least, it can be argued that Nordisk Film Cinema was not the best choice as case study company, because the success of Nordisk Film in general is not highly dependent on the Cinema division. This implies that Nordisk Film Cinema might not have the needed resources and rather relies on business as usual.

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VI. Appendix

1 Interview Guide Dan Pappe Schönemann Hansen

His role: Nordic Consumer Insight Manager, Nordisk Film Distribution

General questions:

- Could you elaborate on your role as Consumer Insight Manager at Nordisk Film?
- What is the main problem you are facing at the moment?
- How do you think Nordisk Film managed to stay competitive in the market?
- Which role do digitization and mobile services play for the consumer in a cinema context?
- Do you think Nordisk Film participates in a lot of exploration activities, seeking new opportunities and looking for innovations? Or is it rather "business as usual"?
- Are you currently working on any project involving IoT?
- Does Nordisk Film try to personalize their products? If so, in what way, and what sort of consumer intelligence/data do you have on your average users?
- Do you ever produce content on the basis of demand data or tendencies?
- Do you feel the user demands of the younger generation have changed in comparison to the past generations?
- How important do you think easy, digital access to Nordisk Film's products and services is for your consumers?

STOF Model questions:

- Why do you think people still go to the cinema nowadays, if they could just stay on their couch? What is their main motivation? *[perceived value]*
- Do you think the cinema environment itself adds value to the customer experience or is it mainly the movie?
- Who are your external collaboration partners in a cinema context? How is the network structured and how are the tasks divided amongst the different actors? *[organization domain]*
- Do you know how big Nordisk Film's market share in the Scandinavian cinema market is? *[finance domain]*
- What is the biggest (financial) risk for the cinema market at the moment? *[finance domain]*

Questions regarding tests with biometric test screenings:

- Can you tell us more about the biometric test screenings?
- What was the purpose? What were your expectations from these tests?
- How did you test and measure it?
- What was the outcome?
- How can the results be used?
- Are you planning to do more tests in this area in the future?

Questions about the cinema in the future:

- How do you think the cinema will develop in the future? Are there any main trends?
- Which developments can you see regarding consumer behavior and demands?
- How do you think IoT technologies could be used in the cinema of the future?
- How could new technologies add value to the consumer experience in the future?
- Which data would be useful for you in order to improve cinemas and movies (e.g. data from sensors in the seats etc.)?

2 Interview Dan Pappe Schönemann Hansen

Date: 19.03.2018
Audio Length: 49 minutes 45 seconds
Speakers: Dan Pappe Schönemann Hansen [DSH], Sofie Krog [I], Caroline Weimann [I]

DSH: So, I can just give you a quick introduction to which division I work in, because we have…it's called Nordisk Film Distribution, and then there's Nordisk Film Production and there's Nordisk Film Cinemas. That's I guess what you would recognize as Nordisk Film. Then there's the other departments I told you about: games, bog, gift, ticket venue, PlayStation- things like that. Let's look aside from that today. So, Nordisk Film Distribution is responsible for distribution and launching all our movies and the movie that we buy the rights to. So, for me…I'm actually not…it doesn't matter to me, if they watch it in Nordisk Film cinemas or in another cinema chain. From our perspective, any ticket is a good ticket. If they choose to see "Så længe jeg lever", "Red Sparrow", "Shape of Water" – all those movies that we launch and market in Denmark, Norway, Sweden, and Finland. So, that's our mission. We do all of the marketing for the individual movies and it's in all of the Nordic countries. The movies we have are the ones from Nordisk Film Production, so those guys live on the lot, that's on the 19/10 buildings out here. And they produce, of course, Danish movies here in Denmark and it's similar in the other Nordic countries. I guess you know them: "Klassefesten", the movies with Carl Mørk, the crime movies, in a minute there's gonna be a lot of comedies. You know, traditional, local movies. On top of that we have an acquisition team that buys the rights to market films and launch films in Scandinavia. They go to Hollywood, straight up, and make deals with the big production companies over there and then become the Scandinavian distributor. And that's hence the name – Nordisk Film Distribution. So, the main part of all the people sitting on this floor, a large group of them are involved in marketing. How do we launch the movie as efficiently as possible, for as little money as possible, to as many people as possible? And that's where I come in. So, my role is to keep an eye on the market. So, how does the movie market develop – both in cinemas but also on home entertainment? How many people watch movies? Who watches movies? And why? I can see some of your questions is regarding that. And how do they differ? What kind of movies do people watch and for which reasons? So, we've done a very big segmentation, grouping the entire cinema market, not just cinemas: the entire movie market into segments, so we know exactly when we launch a movie. Ok, this is "Shape of Water". It's based on an evaluation of all the other movies in a cinema, and based on our testing of the new movie, we think it's gonna hit this target group. Then my colleagues, I help them – I'm like an internal consultant – to help them choose how to market it. So, how do you prioritize your spending? Is it gonna be mainly digital campaigns? Is it gonna be outdoors? How should the creative look? What kind of tag line? How should we hit the market with this movie? And then also the following formats: DVD, although it's small, digital buying, digital purchasing, and streaming, TV, and so on. The movie has a long life from cinemas and onwards over the years. Yeah, so that's my role: helping people not only market – that's the main thing: market the movie correctly to the right audiences in all of the Nordic countries – but to a larger degree I'm helping my colleagues buying the right movies. So, which movies should we invest in from Hollywood? Which movies should we start production on in Denmark, Sweden, Norway, and Finland? So, we do a lot of market tests, focus groups, and representative studies in all of the Nordic countries. Does that give a…that's a lot of info in a very short time, yes? So, market research, consumer insights, audience research in all of the Nordic countries on all of the formats. So again, you have the cinemas – I can see that some of your questions we spoke about over mail – how do cinemas work in a technical way? How can they improve the cinema experience? Of course, we're super interested in Nordisk Film distribution, but it's not our day to day work. If they choose to make pink popcorn – feel free! I don't give…you know. As long as they watch my movie. But of course, we're in a close dialogue with the cinema chains, but not only Nordisk Film cinemas, also other cinema chains. Yes?

I: Yes! So, you talked about the changes in the market. Could you elaborate on the main changes and tell us how Nordisk Film managed to stay competitive?

DSH: Yes. So, that is…if you look back…cinemas have been around for so long. It's impressive that the changes have not been bigger. Imagine how society has developed in the last 60 years. There's not a lot of other products that have been so steady. We actually see that around 80 percent of the people in the Nordic countries go to the cinema at least once a year. That's what we call our 'reach'. So, we reach a very big share of the population in all of the Nordic countries and it's fairly stable. Looking back, we don't have reliable data going back 50 or 40 years, but we

do have reliable data 10/15 years and it's surprisingly steady. You have seen the rise of Netflix, you've seen the rise of so many computer games, so many other entertainment products, but the cinema is still going strong. And even the past 5 years, 10 years, it's only fluctuations. We don't see any major trends towards cinemas being less interesting or popular. But what we do see is one the home entertainment side of it, it's not surprise that DVDs have gone down. So, here we've seen a big technological change. There's been the rise of streaming services and in general you can get movies wherever you like. So, Blockbuster went down, DVDs went out of the shops and today it's only the bigger like Bilka, Qvickly – they might have a small standee. If you go back 5 years, they would have a whole isle of DVDs. So, there's been a technological challenge and what we have done and still are doing, is trying to unite all the distributors into and effort of pushing the digital formats. So, this is gonna be a little bit technical…you know...but you have Netflix where you pay a subscription and you can watch all of the movies you like. It's a buffet. Old movies though, new series. We're pushing that you can buy and rent your movies digitally on iTunes, the new and released…you know…they brought Blockbuster back. You know, all of these formats where you can actually rent new movies and buy new movies way before they come out on Netflix, years before they come out on Netflix and ViaPlay and the others like HBO. So, that format is something we're investing in heavily and we do see there's a high interest, but it's coming from…there's only a smaller handful of shops. Not a lot of people hear about it. So far, it's been, until recently, it was iTunes and then Blockbuster jumped on board then…let me see…In Denmark it's PlayStation, Microsoft, it's very tine. So, iTunes has been alone in that field. So again, we're not in charge of, we don't have the direct hook on the customer. We don't have any, we don't have people coming into our shop in Nordisk Film Distribution and buying a movie, but we do have partnerships with new technological companies who sell these movies to people. And we try to help them. How should you phrase your marketing? How should you market our movie on your platform? Who should you reach? Who has not come into the market yet? So, that's the major trend, of course, with no surprise that past years.

I: What are your collaboration partners in a cinema context then? Because, in our thesis, we're focusing more on cinemas and less on home entertainment, so….

DSH: Ah ok, good to know. All of them. We collaborate with all cinemas and we cannot prioritize Nordisk Film cinemas more than anyone else. I'm not sure what the market share is of Nordisk Film. But did you get a hold? I think I referred you to one of my colleagues.

I: Stephané, yes,

DSH: Stephané…do you have a meeting with him as well? I'm sure that he can tell you. So, thez don't, of course, they don't have all of the markets. Let's just…I think I guess you focus on Denmark, or?

I: Yes. Or at least we only focus on Nordisk Film cinemas actually, we don't look at all the cinemas. We wanted to initially look at a loft of different things, but we had to…

DSH: Focus, focus, focus. Yeah…But that's good, because that also makes it a lot easier for me, because my mind is always Sweden, Norway, Finland, and Denmark. So, Nordisk Film cinemas have only cinemas in Denmark and now they're opening one in Sweden, Uppsalla and then they have, of course, in Norway as well. So, Denmark the bigger chains are…it is a bigger cinema group called D12. Have you heard of it?

I: No…

DSH: I think you can look it up actually, I'm pretty sure they have a website…and then Nordisk Film. So, those are the two major and then there's a lot of smaller ones. I must admit: I actually don't know them, because I don't need to know them. We have…but if you want a list, I can definitely get it. It's no secret. So there's…I guess there's a few networks of cinemas. There's not that many independent ones left. There's like "Osterparties", "Vester Vov Vov" – those small ones, they have a niche area. As long as you are multiplex, it's one of the big ones. So, yes, we work with all of them.

I: But D12, is that also like iMAX or Cinemaxx or so?

DSH: Not that I know of. They have traditional, conventional cinemas. It's only Cinemaxx that has iMAX. There's onlz one iMAX and they're opening one in Aarhus I think.

I: They have two.

DSH: Ok, so two and two is coming. And Cinemaxx is obviously a big partner as well, even though they only have two cinemas, or three?

I: Ohhh Cinemaxx, I think there's one in Copenhagen, one in Odense and one in Aarhus.

DSH: They have a large share of the market actually, very efficient cinemas, very big multiplexes, so they're a very interesting partner as well. And we don't discriminate against any of them. We don't wanna do deals with Nordisk cinemas that are better than others. On top of it, I think it would be illegal. From our perspective, every cinema is a good cinema.

I: But which fields are we talking about in specific?

DSH: Yes, so…every movie; I think they do negotiate on a broader scale. From year to year they make negotiations. So, you show our movie and you pay a certain percentage of the ticket to us and the rest is for the cinema to keep. So, of course, an ongoing negotiation: how big a share do we get and how big a share do they get to keep? That's an ongoing negotiation in all of the Nordic countries with all of the cinema chains. Just like any other product. If "Heinz" wants to be on the shelfs in Føtex: same deal, they have to negotiate.

I: But that means that Nordic Film cinemas are like financially independent from Nordic Film in…

DSH: Distribution, yes. But, of course, we have the same…you know, Nordisk Film A is on the top and then we're on the same level but independently. In terms of each other. So yeah…I can hear your question leading in the…It's a negotiation. We cannot give them a good prize, a discount. We're interested in getting the best price possible. On top of that, there's, of course, a lot of collaboration in terms of marketing. Ok, we have some cool posters for this, we're gonna have a cool event, we're gonna have a gala. Would you be interested in hosting it or should we go to another cinema? How would you offer this? How…So…Or we have some cool merchandise or so, but that's on a smaller scale, of course.

I: You talked about it before, that the cinema market is super steady, but why do you think that is? I mean, why should people still go to the cinema, if they have Netflix and other streaming services?

DSH: So, people…I think it's easy to make an assumption and make the mistake to think that it's the same reason for everybody. Our segmentation is that it's very different reasons people go to the cinema. Big audiences, the majority of the audience, they go to the cinema to be entertained. Why would they choose the cinema over watching a film at home? Well, it's a nice to get out of the house, you don't have to plan it a lot, it's easy. This is the…you know Mr. and Mrs. Smith or what you call them in English – half of Denmark. Totally normal: family, kids, children…eh…dog in the yard and then a movie three or four times a year. It's not important for them to be a part of the cultural scene or what's the newest…what do you say…Oscars nominee. They like to be entertained. So, for them, that's the reason to go to the cinema. Good entertainment, easy, fairly cheap compared to a lot of other things and the cinema experience is nice, but not something they go around and talk about every day with their friends. Then you have other segments in the other end of the scale, who are crazy about the cinema. They love the atmosphere, they love the entire Hollywood feel and they really value the big screen, big sound, good seats. And you have to be locked in a room. Your phone is on airplane mode, all of that. So, you can see there's a lot of scales. And then you have another segment who's…it's social. I like to hang out with my friends. What movie do I choose? Whatever they choose, I don't care. And yet we have another segment who know that Star Wars is coming out two years before it's been announced and they have bought tickets for the pre-premiere. So, if you have to boil it down, the cinema experience: people go to the cinema for the same reason they've done it for the past 50 years. It's an outgoing activity, and as any other outgoing activity – why do people go out? They like to have new experiences, hang around with other people, go out on a date. All of those things. So, I think cinema is delivering the same as it has always been delivering and there's always gonna be a demand for this kind of outgoing experience.

I: But are there any risks for the cinema market then? Because it sounds so steady that nothing can happen. Maybe environmental, social, financial risks?

DSH: Definitely! I think, what you always have to keep an eye on, we can never take it for granted that new generations are gonna adopt the behavior of the older generations. So far, we've been good, and we do have a lot of products aimed at the youth. You have to keep a constant eye on that we're not losing people to Snapchat, Facebook, and Netflix. Or virtual reality in your own home. Or whatever. Of course, cinemas are competing with any other experience. It could be a net café, it could be playing live role playing in the forest – everything is a competition. So, I think nobody can foresee the future, but we have to keep a constant eye on the youth. So, that's what we've actually done. We have a regular…we have a youth task force that I'm part of. So, we're a group of people across the division who constantly keep an eye on: what are you young people doing? Inviting your people in. What do they do in their spare time? How do you plan a cinema trip? What are we competing with? And employing consultants to tell us what's going on in the minds of young people. And we have our own youth panel, as well. They're actually coming tomorrow to watch a movie and then we ask them: ah ok, what do you think? What are you doing past time? Why would you choose that movie – why not? So, that's part of always being on top of the game. So, yes, I cannot say technologically we fear virtual reality, because…it's…virtual reality could also be a benefit for us. We're hosting virtual reality or any other tech or any other development, because we see that even in financial crises cinemas do well. Financial upswings? Cinemas do well, 'cause it's a fairly cheap outgoing experience.

I: You mentioned the exploration activities with the youth panel and so on. Are there many others and do you think Nordisk Film in general is good at seeking new opportunities and being innovative?

DSH: Yes! I definitely think…without revealing too much, I can say that when a new technology arises, I think Stephané can tell more about it, we actually…I've just been part of another project. So, when there's new tech, we put down money. Nordisk Film in not afraid of investing in small companies in that field or area. Not necessarily to gain high yield or expecting to become the new Facebook or anything. Just to have an investment in the field, just to see how does this develop? How do people in the industry work? What is this? It could be whatever you see around you – it could be IoT. Not that we have anything going in the moment. It could be virtual reality, it could be other stuff. So, I think I must really give credit to the management that they're brave enough to put significant sums in the areas that we don't know a lot about and that we need to see: is it gonna develop? It might fold, it might be nothing, but it could also be a lot. So, that goes with new…and that's also what we're gonna talk about in a minute, about the biometric test screenings and stuff. There's people also always very open for new ideas.

I: We have a few more general questions before the biometric tests. So, do you try to personalize the product and if so, what way? What sort of consumer intelligence and data do you have on the average user?

DSH: We have any data you can imagine on the end user. But only what they tell us themselves. Since we don't have any…we're not iTunes. We don't have any data – cinemas do and we always ask for more. So, we do talk a lot with people. So, in terms of personalization, it's difficult for us to personalize the consumer experience when buying the product. But we can personalize the marketing and the communication to this group. And that we do a lot. And that's back to the segments. We're really trying to make a communication and a marketing that feels personal to the consumers and to their needs and wants so that we don't say to this group that only goes for social reasons: "Oh, it's finally here, the award nominee, the art movie of the year so that you can see the new way of making movies". They don't care. They would like to know it's on the cinema and you can bring your friends and by the way there's a discount this weekend. So that's why we personalize it and that goes a lot more on the home entertainment side of it, because we can affect things more there, whereas the cinemas work independently on their own.

I: Yes, but do you know of any movies that have been created on basis of demand data or tendencies?

DSH: Oh yes, that's a really good question, because that I would love to answer "yes" to. I have no knowledge of any movie arising solely based on data.

I: No, of course, it's a combination.

DSH: I can say how we work, that's no secret. There's a lot of ideas always brewing. In Denmark, you cannot make a movie…ok once every century people do it, but you cannot make a movie

without support from the film institute and earn money. Some people make movies without and it's maybe, it can be a great success, but then it's on the headline of the news.

I: It's the Danish model, right? Where all the companies share the same funding for making movies, right?

DSH: Yes, so DFI have a big sum of money and that for different movies. It's very complicated and they do it in different ways. So, you might have the best ideas in the world, but you still have to search for funding. You could have a data-funded, data-backed movie and if it wouldn't get funding, it wouldn't get made. So, it's a bit more complex than just standing in a circle and having a great idea and then you can get around and make it. The path to making a movie is long and winding and has a lot of curves. So, we do make a lot of tests when we have an idea, when people come to us with a manuscript or when people come to us with a movie – to production, not to us. We work very closely with production. So they're like: "Ok, we have this idea, is that something people are interested in? Is it actually working?" And I can give a lot of data, I can tell them about audience tendencies and can see if I know this guy in this movie, but in the end the decision is mainly based on the premise, if this producer can see a good story. So, you have to see the data on top of that. If he feels it's a great story here, he has the perfect producer for it, he has the perfect script writer, he has the perfect director and he can find all those three who would like to work on that project and the data backs it up and he gets the funding, then you have a movie. But to get there, it's a lot of pieces to the puzzle. I think the data can just back up how you should handle the project. So what we see a lot more, is projects being shaped to the audience. It doesn't arise out of data, it's being shaped by data. Ok, you were thinking of doing this? Maybe consider that the target group has these preferences and go along these lines.

I: What type of data are we talking about, except for consumer preferences?

DSH: That is the consumer preference. It could be market data, like what kind of genres do well, what kind of actors do well, but it could also be how's the awareness this concept/book/person/event is based on? How did previous movies that look like it perform and what audience like it? What we do is that we evaluate every movie and we sometimes see that great movies perform not so well. Ok, what went wrong? It could be that it's splitting its audience in two. You have a young audience who likes American blockbusters, but you aimed it at them. Ok, if you're doing a Danish movie, then maybe you should do this. Or maybe you want to attract mature audiences with a…you know, you can always try this and see: did it put itself between two chairs (as you say in Danish)?

I: Yes, so…biometric test screenings, now we're there.

DSH: Actually, I would like to show you some stuff, I'll just get my computer, 'cause I think you'll be very interested, just got it last week.
[Gets out of the room to get computer and comes back.]

DSH: So, sadly, I cannot send this to you, but I can show this to you. Luckily, this will become public, but through DFI. We're gonna do a seminar at Danish Film Institute.

I: When is this?

DSH: In August or September, so probably you've already handed in your thesis by then.

I: Yes, but we can probably make a non-disclosure agreement, if there's a problem with sharing the data.

DSH: Yes, the problem is that…I just have to ask a lot of people. [laughing] So, let's just have a look at it. If there's something you're really interested in, then we can have a look at it and maybe I can ask the entire group, but it's a lot of people and a lot of opinions. So, it can be difficult. It's on 19 percent, because it's a very big file. But I can tell you about the project. So, I became aware that DR is using biometric tests when they do their TV series and a biometric test is like a small device you put here [points at his hand] and then it measures…you have a sensor on two of your fingers. So, it's not very intrusive, cause I also heard about some tests where people were wearing a helmet and sensors…and way too much. People become super aware of this stuff. This one, they forget it after one minute. It measures the electrical current, it's the current from here to here [points at his finger and hand]…what is it called in English? The current and how well the current

it being transmitted. How much resistance is there? The more you sweat, the easier the current travels. So, it's basically a lie detector. Cause we have in our blood cells, we just get the smallest. If somebody came in and yelled "buh" at me, I would start sweating, perspiring in the inner skin layers. I would never feel it, I would never know it. It would be just one fraction of a second where the amount of sweat will increase and then it's gone again. So, it's really good to see how people are emotionally experiencing a piece of content, cause it's actually…within seconds you can see how they're aroused. That's what it's called in the scientific language. So, you get some very nice arousal peaks showing how people experience what we showed them. And the thing is that thing is fairly expensive as it is, so in order to try it out, we made a project group with DR, Danish film institute, and us. And we got some funding from a foundation, which is called "Biografklubben", the cinema club that you probably know of. They have a foundation giving out money to the industry. The purpose was to see whether this is something we can use. Very broadly, is this a viable method to research peoples' emotions? And I think I can already say now: yes, it works fantastically well. Interpreting the data – that's another thing. But the data is very reliable. And then we wanted to use it on our content. Cause here, on my level, on this floor, we produce trailers. Trailers are our most important marketing tool. But how do you cut a decent trailer? We all have a lot of gut feelings about it, but nobody knows. We don't have any data on it. So we were trying to gather some data on trailers. How do trailer affect audiences? Is there any link between the trailer that have an impressive arousal peak? And which trailers can they remember when being asked after the test screening? And there's a very clear link, actually. So, we showed them a totally conventional movie screening: trailers…no sorry: commercials, trailers and then an entire movie and then we asked them which trailers they remembered. We asked them between the movie and the trailers, and they just say them. They saw five or six trailers and they couldn't remember all of them. That's less than a minute after. Because you're not in that mood, you're like "oh nice, entertain me, popcorn". So, it shows how important it is to make an efficient trailer that gives an arousal peak. The reason why it's so slow, is because I'm on WiFi…

I: Sure…how about baseline data? Did you have some data to compare it to?

DSH: Yes, that's the difficult thing – how do you benchmark this? So, at the moment we only have these five or six trailers. So, what we're doing is, we're not comparing the trailers in terms of peak level. The thing is, if you just watched a horror trailer, your arousal level is quite high. And then you're gonna watch a new trailer, so your level is quite high. We can measure: is it increasing? Falling? Increasing? That is reliable data, but whether or not it's one, let's say index one or index 20, or 120 – it's not so reliable. So, we're not looking at that so far. Maybe down the road we'll gather enough data to make a benchmark, but so far, we're only looking at the trailer individually. How does it perform individually? Cause that is very reliable. So, you pull all of the data…We have 35 people in the room and you see on an average level: how do they…

I: How about like compared to…if they just saw something super scary and then they see something super boring?

DSH: Yes, that I can show you.

I: Ok, cause I could imagine there would be like a…

DSH: Yes, and the theory is we have to lean on the theory in this field. The theory is that it's ok to have down periods where the arousal level goes down. That's fine as long as it comes up again. Cause we know that uninterrupted and long streaks of non-arousal is like, you know, people are just sitting there, they don't care. But when you watch a movie, you know, it's ok that things are being steady for a while and then you can be engaged again. It doesn't have to be one big up, up, up, more, more, more. Maybe in the super hero movies. I think that they think that they need to build that, but it doesn't work necessarily well.

I: But is there a benchmark for that – the perfect arousal curve?

DSH: No, no, and I don't think you can develop it either.

I: No, and nobody has the same so that's the problem also.

DSH: Yes, that's the problem. We see that a guy, he has been in a traffic accident. In one of the trailers there's a traffic accident, so, of course, he's out of the scale. So, we level everybody out and we're just looking at increases and decreases. On top of that, you can actually see, if the

increase…I could be very aroused, if somebody says “buh” or traffic accident. But is it positive or negative? And that’s the next layer and we haven’t gone to that level yet, but it’s in the data, we’re still crunching.

I: But that’s like psychological, I guess?

DSH: Exactly! So there is this “ah ok, he’s a guy peaking, but it’s disgust”. Or he is a guy peaking and it’s interest. Finally!

I: Facial tracking.

DSH: Yes, we thought about this. The problem is, it doesn’t work very well in a cinema, it’s too dark and too expensive. Yes, that’s the thing. Galvanic skin response. And we hired a guy to help us with the project and he can give you an hour of explanation about how it works and the inner layers. But I’m gonna skip that…

I: I’m familiar with it, so we can probably look it up.

DSH: Ok, great. So, one two, three, four, five – yes, five trailers we tested and there’s a…sorry?

I: How many people?

DSH: 30, just a bit more than 30. There’s some that we took out, because they had too extreme reactions. So, we ended up with 30 and in a very specific target group. It’s the target group of the cinemagoer, which is mature women. So, what we were looking at is the relationship between peaks and recall. We’re doing marketing, we want recall. If people cannot recall the trailer, there’s not gonna be a what we call “want to see”. It’s the, you know, marketing funnel. We want people to know our product and then to buy it.

I: But couldn’t that also be a problem with segmentation?

DSH: Definitely! Big differences. That’s why we tried to have a very narrow segment here and then we showed only trailers within the segment and then “Get Out”. You know “Get Out” – the horror movie? It’s a new horror movie…

I: Does it have a different Danish title?

DSH: No, it’s actually called “Get Out”. It just came out a month or two ago. So, just to see what happened we gave them something that was out of their league, but it’s horror, so it’s supposed to have a lot of peaks. But I’m just gonna show you how they interacted with the trailer of “Så lange jeg lever”. You can watch this at home, it’s just the new [inaudible] movie. But here’s the peaks. So, this is the seconds of the trailer and actually this is what he (our consultant) called it’s a very nice curve with some room for improvement. The theory is: you need to hook people very early on. Even though they’re in a cinema, they cannot get out unless they step on top of people. You need to hook them very early and then you also need to, definitely need to have a peak at the end. We see a direct relationship. If you don’t have this peak in the end, they cannot remember it. And that’s very fascinating. You saw one and a half minute of something and you don’t remember it? So, here’s…this is not perfect, it’s not bad either. It could be better, but it takes a bit of a while before you get this high arousal peak that they’re in on the story. And this [points at increasing curve] correlated exactly with the start of the music. Of course, music plays a big role. And especially when you have popular, famous tracks that people know. So this, he says is too small a peak. Ok, they recognized the guy, the actor, there’s some intensity in the music, but not a big enough peak. It is very slow. People yelling always gives peaks and also, there’s playing music. And then a small peak here, not something to mention. And here he calls his wife and says something very funny, and then you have the big love scene between the two and then he even cries and that also usually gets people excited. Just to show you a big contrast: there’s another movie called “Breathe” – you can watch it on YouTube as well – very cute trailer, lot of violence, big drama. American…English movie and you see here: nothing! We put that trailer in the test, because we thought that’s how we should do it. This is an amazing trailer, lots of pathos, you know. And in the end, it turned out to be the worst one. Only two or three could remember they saw this trailer, one minute after they saw it. That’s pretty crazy! Whereas the other one was on their mind. And as you can see, it’s just one uninterrupted downward arousal peak. So, they don’t…they’re not that engaged.

I: Could it be because of it following the other one?

DSH: We randomized them, so every…we had four screenings and they had random positions. What we though – we actually talked with the panelists afterwards – and it seems this trailer is super nice, but it's like a short movie. They spoil the big drama in the first 30, 40 seconds. The guy becomes very sick – is he gonna survive? Yes! And then he survived and everything is happy and very merry and they live happily ever after. So, they show the entire drama, so people were like "that's nice". And when you watch a trailer, like when you watch a commercial…If I watch a commercial for diapers, I wouldn't even know I saw it. But if I watch a commercial for traveling to Mauritius and surfing, oh man, I'm very engaged there. So, they actually…my theory is that they disengaged on the product very early on, because they saw: "oh, that looks nice, and yeah, that's nice, too, nice, nice, nice", and they were not really considering to watch it or not. So, an example not to follow. This is more…and yes, the peaks are not that interesting. This is very secret, so this is probably something you should put under a non-disclosure in your thesis. It's just a bit of extra for you guys. So, they also wore the thing during the movie and this is…here I see a big potential to do something called 'klippetest' – cutting tests. So, we should have an audience like this watching our final cut when you still have abilities, the chance to change that movie.

I: But don't you have that anyways? I mean without the device?

DSH: Without the device, yes. You actually do multiple ones. But this shows what people could not say. We knew that the beginning of the movie was not perfect. And only because we built it ourselves. The beginning is a bit slow, but is it working? Maybe not? But there's a lot of things you need to tell in the beginning of the movie. Knowing that you need to hook people very early on, this is a catastrophe. Compared to the rest of the movie – this is only the first 17 minutes – the rest of the movie has much higher peaks. A lot lower, a lot higher. It's ok that it goes up and down. And in the end, the movie is really, really good. People liked it a lot, everything is good there. But the beginning is a tough one. Uninterrupted downward arousal. This one is ok, but nothing compared to the peaks we see early…eh, later one.

I: What if people get too aroused? Is that even an issue, if you actually have that many fluctuations that you get like completely…?

DSH: Yes, I'm not sure it can happen, but good question. No, I think that would be like the super hero movies, where it's just 40 minutes of fighting. And then I think you would just get a decent curve. You would just end up being not that involved. I don't think there's a limit to how aroused you can be, unless you're ready to run out of the cinema, because it's so scary…or pass out.

I: Yes, the scary movies, they have like a very…

DSH: Yes, extreme arousal levels. I think they're in a league of their own. We don't make that many scary movies. But the starting is boring. There's a lot of bac story that they're telling. So, if we had had that test much earlier on, we could have changed it. I don't know how, I think an editor is better at explaining that. I can just identify there's something wrong.

I: Is that the direction you want to go to in the future?

DSH: Yes, I think that's one of the…now, we're starting to get an image of how much work is it. How much time? How much money? How long before we have the results? Because in movie production, you need to have the results very quickly. So, I think in a year, maybe two, we could start seeing the first biometric test screenings that we would be able to act on and edit the movie slightly better. Definitely in a year, we would be able to test trailers on a more efficient scale. Is this trailer doing what we hoped it would do in the cinema to the audience?

I: In on of our scenarios, we developed (for the thesis)…we have sensors in the seat that measure the arousal of the spectators. But would you even say that makes sense? Because by that time, it's already too late to change the movie, of course. So, would the data from that give any value to future productions?

DSH: I could definitely see that, yes, definitely! You could develop a very nice benchmark on what worked well. I think it would really be harder to do hardcore editing changes, cause in the mind of an editor, in the mind of a script writer, in the mind of a producer, every movie is very unique. It would be hard to get back to this movie and say: "oh, in the third act they made an error".

I: But you could use it for segmentation maybe?

DSH: Yes, I think I would use it more for which audience is engaged and which is not? And that would definitely be interesting. But you could use the same technology for test screening. But how could that be solved? So it's like…you get a needle up your ass?

I: No, it could be like movement sensors in the seat, and sound sensors, and maybe heat or sweat. We're not sure how this can be done exactly. We have to talk with a guy on Friday. And also, what was it we talked about?

I: Facial cameras, but there the problem is the light…

I: Yes, I don't think that will give much. It could be like an instant photo, if it's right after. If you just want a reaction. But I don't know, we have to figure that out.

DSH: Or you could put like, in a gym, you have those handle bars and you could just have it on the seat or something.

I: Yes, finger…exactly…Also, that thing with sweat is different.

I: And then the audience would need to keep their hand where they are…

DSH: Don't eat popcorn!

I: It could be a heat sensor, because people often have heat response. That is also a different…
DSH: Yes, that's the thing. Keeping the temperature in the cinema consistent is very tricky. But we managed…we have a very big air conditioner and since we only have ten people, they cannot heat up the room, so…

I: Yes, but I think we have to jump a little, cause I can see the time…

I: So, I mean, I'm not sure you ever though about it, but after we talked just now, do you think IoT technologies can be used in the cinemas in the future and how?

DSH: Yeah, that' the thing – how? If it's in terms of my perspective, research tool like the one you mentioned would be super interesting. And any kind of feedback we would get from our audience in the cinemas would be great. I guess the cinemas would have a monopoly on it. I cannot access it without buying it from them, but I would be very interested in that anyways. So, I think it's just a matter of coming up with the right idea. I don't have it, as I said, I don't have the idea, but we're always interested in…we wanna map the consumer journey. How did people end up at the movie the did how they did? And how can we affect the travel there? So, anything that's connected to ticket purchase and marketing, that could give us more feedback would be very interesting.

I: So, that's the data you're mainly looking for when trying to improve the whole cinema experience? Ticket sales and so on – anything else? Segmentation probably then?

DSH: Yes, we're really seeing the huge differences for all our products. We don't have a concept. We're not launching a new car every year, we're launching 40 totally different movies to totally different audiences. So, everything that could give me a feedback on the segment, demographics of the people in the audience would be very interesting. And what and why did they end up there? What made them go? What kind of marketing pushed them there? Was it only word of mouth, was it PR? But mapping all of those things is very tricky.

I: I only have one question in regards to the co-production, we talked a little bit about it. Do you actually do any co-production with Netflix, for example, or similar streaming services?

DSH: Oh, Nordisk Film Distribution don't, but Nordisk Film Production do. I actually think they made a very recent TV series that's gonna be launched on Netflix. I'm not sure of the title, something Sci-Fi dystopian stuff. So they, when you're Nordisk Film Production, just like I don't care whether the movies are out on Nordisk Film cinemas or other cinemas, Nordisk Film Production, they don't necessarily…they wanna fund their productions. It's nice, when they go through the conventional cinemas, home entertainment, DVDs, all that. But if Netflix is buyer? Well, by all means…So, they sold their series.

I: The reason I'm asking is more from a data perspective, because Netflix has a lot of intel…

DSH: Yes, do we get anything back? No, that's the thing. They're a closed book. We're working on our relations to the transactional shops: iTunes, Blockbuster, ViaPlay, all of those, cause they're more interested in working with us. But Netflix is running their own game.

I: But it could be in the future. If you get more data, they could know more about the Danish segment and that's probably different than other ones.

DSH: Yes, yes, yes. I would love to dive into their data sheets, but I think they're gonna keep them closed.

I: Yes, that's it, you answered everything else […]
[…]

3 Interview Guide Stéphane Salzinger

His role: Director of Operations, Projects & Innovation of Nordisk Film Cinemas

General questions:

- Could you elaborate on your role as director of operations, projects, and innovation at Nordisk Film cinema?
- What is the main problem you are facing at the moment?
- How do you think Nordisk Film cinema managed to stay competitive in the market?
- Are you planning to target markets outside of Denmark, Norway, and Sweden?
- Which role do digitization and mobile services play for the consumer in a cinema context?
- Do you think Nordisk Film cinemas participate in a lot of exploration activities, seeking new opportunities and looking for innovations? Or is it rather "business as usual"?
- When innovation, do you follow a specific concept/process?
- How do you schedule the movies? Is it computer based or does someone do it manually?
- How do you decide on the order in which the trailers are shown (recommendation system)?

User Data and Technology Questions:

- Does Nordisk Film cinema try to personalize their products? If so, in what way, and what sort of consumer intelligence/data do you have on your average users?
- What other data do you have your customers?
- Do you share data across cinemas and division of Nordisk Film? If so, how - instantly or when demanded?
- Do you feel the user demands of the younger generation have changed in comparison to the past generations?
- How important do you think easy, digital access to Nordisk Film's cinema products and services is for your consumers?
- If a potential user buys tickets for more than one person, how can the system distinguish between the different user segments?
- Are you currently working on any project involving IoT?
- Can you tell us more about the technical infrastructure of cinemas?
- How difficult would it be to implement an IoT solution including the corresponding platform?
- How long would it take and how costly would it be? (estimate)

STOF Model questions:

- Why do you think people still go to the cinema nowadays, if they could just stay on their couch? What is their main motivation? [perceived value]
- Do you think the cinema environment itself adds value to the customer experience or is it mainly the movie?
- Who are your external collaboration partners? How is the network structured and how are the tasks divided amongst the different actors? [organization domain]
- Do you know how big Nordisk Film's Cinema market share in the Scandinavian cinema market is? [finance domain]
- What is the biggest (financial) risk for the cinema market at the moment? [finance domain]
- What effect does the decline in revenue growth have for Danish cinemas over time? [finance domain]
- What type of financial funding does Nordisk Film Cinema get? DFI?
- Are there any restrictions regarding the cinema operations? Governmental regulations/laws? Regulations made by the production companies?

Questions about the cinema in the future:

- How do you think the cinema will develop in the future? Are there any main trends?
- Which developments can you see regarding consumer behavior and demands?

- How do you think IoT technologies could be used in the cinema of the future?
- How could new technologies add value to the consumer experience in the future?
- Which data would be useful for you in order to improve cinemas and movies (e.g. data from sensors in the seats etc.)?

4 Interview Stéphane Salzinger

Date: 21.03.2018
Audio Length: 48 minutes 2 seconds
Speakers: Stephane Salzinger [SS], Sofie Krog [I], Caroline Weimann [I]

SS: A lot of good questions by the way

I: Thank you, we tried our best, now we just need a lot of good answers

I: we seem to think so

SS: but you are working with internet of things and that is your focus?

I: Yes, well it is kind of combination of the business angle and and IoT so it is not only the IoT

I: So we are trying to develop a business case, of how IoT technology could be used in the cinema of the future. But then we are also looking at it from a user perspective to have a more seamless experience, where you don't have to buy tickets in advance, or go to the ticket counter so both angles but also how the data from IoT can be used

SS: yeah definitely, that's also something we want to get

I: should we start with what your role is and what you are doing here?

SS: Well first of all my role here is quite new, I have only been with the cinemas for a year and a half now, basically I am responsible for all the IT department at the cinemas, and in that servicing all the cinemas both the in Denmark and in Norway and we have about 43 cinemas in total now and the upcoming cinemas in Sweden, and that is one department, and then there is stream technology which is also technology but all about sound and image, so that is people taking care of all that sound equipment and screens and projectors and technology that is very specific for cinemas and again we are servicing both Denmark and Norway and now also Sweden around the corner, and also the solution we have at the Copenhagen airport, we manage all the screens for advertisement, so that is also a part of that department and then we just organized our IT department few weeks ago, until then we had a guy working exclusively with the new initiatives like E-sport and VR or what ever new things that could come up and that is now going to be more integrated with the IT department. So that is basically what I do, I also work with the Nordic management team, to make sure we have a full overview of our project portfolio across the three countries and spending now a lot of time right now preparing for the launch in Sweden, and spending also on a lot of projects I take care of myself like VR, we are going to implement two VR rooms, one in Denmark and one in Norway. Yeah, so that is basically my role, making sure that thing work

I: So you talked about the technology infrastructure in the cinemas can you elaborate on that? What did you do there?

SS: Sorry, can I get this one again?

I: The technical infrastructure in the cinemas, you said that you changed it?

SS: No, the organization

I: Oh I thought you said you changed it.

SS: No the IT in the cinema has been quite stable so the major thing that happened the last couple of year, you can say that we have changed our ticketing system in Denmark and in Norway and that is a huge change for us because that is the core of our business and operations so everybody here at the head office is using that system to manage prices vouchers, gift cards, loyalty, membership, programming, concession items, everything is in that system and it is also that system that we use online to sell tickets and the system we use at the cinemas to manage all the guests and the tickets so it is really the core of everything

I: what kind of system is it?

SS: ticketing system

I: Okay, what is it called, is it like a?

SS: it's called vista, it is a industry system. It's the biggest system in the world I think they have about 38% market share in cinemas, they only do cinema ticketing.

I: and about the technical infrastructure of the cinemas, do you know more there, like for example is it cloud based or on their own servers or

SS: the cinemas as such don't have much infrastructure. It's mainly again the ticketing system. So the central servers are all hosted externally on what we call a private cloud and then due to the architecture we choose which was back in the day, so we also have servers locally at all the cinemas managing all the local transaction but also making sure that if the central server are not available then we can work off line at each location

I: okay, about Nordic film in general do you think it is an organization that tries to explore a lot of new opportunities and innovate? or is it more a bit business as usual?

SS: are we thinking cinemas or Nordisk film?

I: Nordisk film cinemas in this case

SS: Okay, I think it is both, we have a very steady and profitable business with the normal cinema business. So that just need to be taken care of and be profitable and be really optimized. But at the same time we always try to do new things - like for example today I am going to Aarhus to open a 4DX screen, I don't know if you saw it on - it was on the TV news yesterday. And we have one in Oslo as well. we are opening one in Lyngby later this year. That is definitely innovation it is also a big investment, these projects are quite expensive and we are the only one doing it in Denmark and in Norway. We are opening VR lounges, one in Lyngby and one in Oslo in April, may, that is also innovation. We have experimented a lot with E-sports, doing viewing parties, and showing E-sport competitions now in cinemas, that is also something new, so in that sense we try big things, like fear 4DX or premium screens like Supreme in Lyngby which are huge investments and these are really need to wear? because they go directly in our core business and then we try other things that are more risky, again E-sport and VR, just to try to see whether there is something for us.

I: Does digitalization and mobile services also play a big role in that context except for the screens?

SS: Its huge, yeah except for the screens but in terms of consumer interaction it is huge. you can say that the cinema is a 100% digital business everything is bit and bites now. We do not have these old wheels with the movies anymore and everything was digitized back in 2010-2011 - so it is all about technology and IT now and in terms of consumer interaction. People even in the older segment they book their tickets online or on the mobile phone and they use the app and they use the ATMs and everything is digitized.

I: but you can't buy tickets inside the app as far as I know, is that something that is coming?

SS: yes you can

I: well you get redirected to the webpage.

SS: Oh yeah in that sense, yeah, the issue is that we have and old app in Denmark, which was technically build on top of the website, but we are re-implementing the app completely going live in Norway next month with a completely new app with build in purchase flow and then we will roll out the new app to Denmark right after.

I: Okay, does Vista also schedule the movies? or how do you organize that? within the cinemas like which movie which cinema or which …

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SS: that is a central functioning here called the booking department they take in all the movies that have release dates they evaluate the potential of all the movies and then they make programmation and then they push that to all the cinemas so there is very little local flexibility or local involvement to manage the programming. There is a little bit if they want to do some local event or something like that but it is very centralized managed. Right now we are using Vista but in Q2/Q3 this year we are going to implement a new system called cinema intelligence which is, I don't know whether it is AI based or at all, but what it is going to do, is that it is going to look into our historical data and the way films perform and will suggest a programming which is very system based to optimize the way we utilize different screens and the way we can maybe extend the life cycle of some movies. The way we can also optimize the way different films start so we have less queues in our shops so we can get more revenue from popcorns and so on. So that is a new way of doing programming.

I: how about the trailers, is there a specific system in which order they are shown?

SS: No, I think that is also made on it own, I think its booking department kind of prioritizing the trailers based on the market potential
I: So the important ones come first?

SS: No last,

I: Okay

SS: the most important slot you can get before a more is the last slot. Because that is when all people are sitting and ready so also in terms of advertising the prices go up.

I: and do you also try to personalize the product, I mean you already talked about the new app. But are there other ways and what type of data do you use for that?

SS: it depends on what product you are talking about?

I: cinemas in general

SS: cinema in general? well it is hard to personalize in the cinema what we can do is

I: recommendation for movies for example

SS: okay so then we are talking about the webpage or the app?

I: not about the cinema hall

SS: yeah the user platforms, we are not quite there yet, through our loyalty scheme we have about 5-600.000 people now in Denmark and maybe 260.000 in Norway so it is quite big base we have there - we have a great potential to push more personalized recommendations but what happened when we changed the ticketing system and we also changed our marketing campaign tool and the tool we have right now is not really geared for personalization so actually we have a project going on with and external consulting agency to look into our way we have structured our customer data and maybe look into what we should do in terms of campaign tool to be able to do more personalized recommendation that are not, build after, you can say hard segments but more build on the personal transaction history and the films we have in the pipelines, so it is completely customized for each customer so that's the vision and I don't think we will get there before Q1 next year - because we have to do some, a number of changes

I: and what data do you have right now on average or on your consumers in general

SS: Everything, everything they have seen, and if they use their profile to book a ticket then we know everything. If they don't identify themselves then we don't have anything. And we can't do much about that.

I: would you also have the age and preferences

SS: for some of them yeah - again we made quite a few changes through over the years in terms of what information we require when they join the membership club and that is definitely something we going to focus more and more - we have quite a lot of new people in our marketing department, we also now have a Nordic commercial director which we didn't have before - so there is much more focus on what we can do with our customer data and our loyalty and there has been a bit of standby the last couple of years on that front - but we are going to focus more and more on that

I: do you share the data you have on your users across different cinemas and divisions in Nordisk film or

SS: well cinemas don't use the data it is only the central, the headquarters that are using the data - a local cinema doesn't use the data that much they have access to the loyalty profile when people come in the cinema so if you give them your telephone number they will be able to see who you are and where you live and how many films you have seen and how many films you have booked and not picked up and so on and so forth - so they can see that, and they have access to the data - within the cinema they work with the data a lot - but it is not data we can share because of legal restrictions it's getting even more strict now with GDPR the new EU law so data is not going to be exchanged that much then you need a lot of procedures in place to be able to that -

I: but how about Nordisk film internally

SS: we are different legal entities so we are not allowed to exchange data without having a clear permission from customers to do that we can do, exchange data, aggregated data for some statistical purpose but we are not allowed to exchange individual profiles, so we are very careful about that also because we are quite strong on the market we have a strong position so there are also restrictions in terms of what we can share and not share so there are a lot of things that we do not discuss with our colleagues on the first floor because we are not allowed

I: you just mentioned the strong position how do you think Nordisk film managed to stay competitive in the market - how do they differ? what do you do differently?

SS: we try to differentiate on several fronts first it is about locations, having the right locations having the right coverage in regards of population but we are building new cinemas all the time to make sure no one else is coming. So, last year we opened two new cinemas in Denmark one in Waves which is a shopping center south of Copenhagen and one in Køge the year before we opened one in Frederikssund the year before we opened one in Aalborg and before that we opened one in Fields another shopping center and we have plans to open new cinemas all the time so that is one way of fighting the competition to control to be close to the packets of population where there are positions to be taken

I: so what is your current market share

SS: I would believe it is about 44 % in Denmark and in Norway 30-35 % - it is something we track on a weekly basis actually in Denmark

I: are you also trying to or planning to expand outside of Denmark, Norway and Sweden?

SS: No, maybe right now the focus is on Denmark, Norway and Sweden, its like that - we have two project committed in Sweden. We are going to open and we are going to go after much more, many more location in Sweden, so that is taken most of our focus

I: so you, we talked a bit about the change in the market, do you think that especially the younger generation has changed and has different demands and what are they?

SS: Yes, they are demanding and challenging, well we did a huge report with some, with the whole of Nordisk film in that case with Red Associate which is an agency doing like anthropological analysis of consumers focusing on the young segments - not the millennials but the generations that follows and there were some clear trends there and one of the is that they have for example - a group of young people have a really hard time taken a decision to go somewhere or do something because no one is really taking the lead in the group to get to a point where a decision needs to be taken and that is an issue for us because then we end up with a group of

young people who wants to go to the movies, they really want to do it, but they don't do it because they don't manage to reach a conclusion. That is something we have a lot of focus on and also I've been experimenting with DTU the university and actually they made three reports - three groups choose to work on that problem in the AI department to see whether we could build some small algorithms that could help coming up with the right suggestion of the right movie to get the group to take a decision. So we are trying a different angle there to see, but it is not that easy and we are also working on solutions in our new app for split payment because we also see it's an issue with the younger generation no one dare to put the money upfront and collecting afterwards - I see it in the cinema - every year we go in - one day in a cinema - all the management and the staff to sell tickets and pop corns to experience real life and if you get some time, two or three young people 16-17-18 years old, they have booked tickets together and if one of them i paying with a credit card, he is going to wait until he has received money by mobile pay from his two friends before he presses okay and I have seen that several times, it is really something new and it is strange, so there are new behaviors with the younger segments and that we are trying to understand and trying to work with so that is just a couple of examples

I: yeah, and are you also working on any projects that involve IoT?

SS: not, it depends on what you mean with IoT because that can be a lot of things - it can be many things which - we have tried with bicons - if you put that into the IoT - and it didn't really work - the technology was not mature enough we couldn't catch people at the right time or at the right place and - so we dropped that a little bit and put it on hold - I had a few meetings with IBM regarding their Watson IoT offering and we are going to have a new meeting after Easter to try and identify some use cases that could be relevant - that could be about forecasting the right production of popcorn for example, could it be about forecasting a way to go and clean all and empty dustbins, could it be about the temperature in the rooms and so on, all things where you can optimize some costs at a large scale in our cinemas - so we are trying right now to identify some realistic use cases that can be interesting to work with and then we will try to go into it. so we are not there yet - but it is mostly I guess about facility management type of IoT we are going to start with

I: do you think, if you find that one IoT technology that is very useful, do you think it would be difficult to implement it?

SS: it is very hard to say, it depends where it is - I would have to say without looking at a very concrete perspective - in every single investing we do it is always measured against a business case so we know exactly why we do it, and how it can get return on investment - so if we go into IoT - because we can optimize operations and operational expenditures with that - then we need to be very certain that it gets verified - typically we would start of with a pytup - we would take one cinema and see whether it works and then expand on it and to the rest of the chain

I: speaking more general, why do you think people still go to cinema when you have Netflix and everything on demand?

SS: It's a discussion we have that has been around since the end of the 70's and the rise of the VHS and then DVD and then cable and satellite and now streaming. I think there a definitely several factors, I think its a social thing to go out in the cinema people want to go out together and not necessarily always sit on the couch and see movies and we still have an exclusive window with titles and the experience in cinema even if you can get home cinemas and so on is still something unique and if you compare cinemas to other ways of going out in town it is still the cheapest evening in town you can get so there are different things and i think that makes cinemas still relevant and still expanding and growing

I: are there any external collaboration partners for the cinema division or network?

SS: depends what you thinking about - partners, technical partners? or external vendors? I mean we have outsource a lot of our technical development, we don't have a development department in house. So all the front end is outsourced to developers in Bulgaria for example all the costing or ticketing systems are from New diland so that is some the key partners we have then off cause we are a part of branch and organization as well in Denmark we are a part of an organization with the other cinemas there is also a European organization called unique and we are trying to get all the cinemas to work together on some shared problems so that is some of the constellation we are navigating within

I: and what would you say is the biggest risks within cinema is? it could be both financial but also on a, non financial ?

SS: that's interesting - people have over the years been very concerned about what we call the window structure - do you know what that is?

I: not exactly

SS: it is that when a movie come out - it comes out first in the cinema - that's the first window and it goes into exclusive satellite and cable channels, then it goes into premium viewing, then it goes into transaction viewing and then so on and so on, so that is the different windows where a movie is available on different platforms and the one thing that really threatens us is if the window structure gets erased and if movies are being made available on all platforms from day one

I: isn't it already like that?

SS: No,

I: I thought iTunes had actually a lot of release dates the same day as the premiere

SS: No

I: No?

SS: No, very few - some people have made some trials but the studios are not that interested in that yet so they get a lot of push back - so it is only a few trials - off cause Netflix is doing it - they are releasing directly their own production on their platform - so far they haven't really managed to make quality movies - but that is a threat as well - but then we are back to the social dimensions of cinemas which is still very resistant to these threats - so I would say, one of the biggest threats is the window structure collapsing - streaming services going much more into film production, major changes in people's behavior - we know that if young people don't get used to going to the cinema it is really hard to educate them going to the cinema later on and that could be a threat, another threat could be the influence of China on the whole cinema market. We can see that in terms of production coming from the US that are more targeted ad China in terms of scenario, quality and that is why we have had some issues with some titles flopping because they are not targeted at the European or American market - because the money is elsewhere and that can also be a threat

I: so more in terms of supply that you don't get enough

SS: yeah, we are extremely dependent on the quality of the movies coming and we cannot do much about that, and last year was not a very good year because the titles were poor and then we had a big Danish title that was pushed back from 2017 to 2018 and that is many 600 or 700 thousands tickets that wouldn't come because it is not something people will replace with another title so you also need a lot of very strong local production that is a lot of threats if the local production is not good enough

I: and we found a statistic saying that the revenue in general is increasing whereas the revenue growth is decreasing for cinemas in Denmark is that a phenomenon you see as well?

SS: well revenue is increasing yeah

I: but it is increasing slower

SS: Yeah, it is not - it is a steady growth - but it is not a huge growth - I think it is 2 % or something like that a year but it is still a good business in that sense - but the growth - do you mean the speed of growth is decreasing?

I: yes

SS: yeah, I don't know I think it has been quite stable for what I have seen - sometimes we also have one bad year. So last year was not good for example. One thing that is more interesting I

think is the difference between the growth in revenue and the growth or decrease in number of tickets - I find that a bit more worrying personally - off cause growth in revenue is great and that can be fueled by increased ticket price, increased revenues from special formats like 3D or so on but we need to be careful there a not any big trends in terms of admissions going down too much

I: is there one right now?

SS: yes, again it depends on the segments, and it depends on the years but on some younger segments it is decreasing

I: and more about the financials - what time of founding do the cinemas

SS: not at all, no we are full commercial so we don't get founding like the production business get for example so we don't get any founding

I: we heard about something called the 'biografklubben' yesterday or Monday

SS: 'Biografklubben Denmark' yes

I: yes, and that is also a part of the DFI founding

SS: no, I don't actually know how they do get funding, that I don't know, but it is not something - we are a part of it, like all the other cinemas in Denmark - so it is something targeted at the older segments - like people above 50 or something - where they have 10 movies a year suggested and if they are a member of the club where they pay an upfront subscription for that then they can get one ticket for free out of two or 50 % discount on the tickets - i don't know whether they get funding actually, that I don't know. But it is not us who i driving it, and it is a separate board and everything and it's a different organization

I: okay so you don't benefit from it at all?

SS: no.

I: and how is exactly the cinema structure within the cinema organization especially when looking at the single cinemas over Denmark.

SS: well we have a central Nordic organization which is sitting here, where we are CEO, CFO, CCO, CTO, COO and that is really responsible for managing the chains across Denmark, Norway and Sweden. So it is a management level where I am and then we have the central services which are basically the departments under me. And another department called 'Projects' which is basically renovation and building department they are the ones taken care of new cinemas being built and renovations projects in our cinemas - so that is what we have on a Nordic level and then we have local operations in Denmark and in Norway with there own directors and then we have the sales and marketing departments and they have the finance departments they have the booking departments they have concession departments - buying all the products you can buy in the shops

I: local managers for the cinemas as well?

SS: yeah, and then - so that is a local head caller you can say and then at the cinema level we have a cinema manager - we typically have dependent on the size of the cinema a service manager, operator, controllers, and we have a few, very few actually fully employed people - sometimes it is only two sometimes it three, four, five for the bigger cinemas, and everything else is part time employees - a lot of students especially in Denmark

I: which control, or how much control do they have over the cinemas - is it I mean, does it all follow the same structure? or is it bit more individual?

SS: it is very much, you can say franchise driven and organized so it is the same brand - in all the cinemas, it is the same product - the same price structure - the same IT systems so it is really top down - so they just have to make operations work on a daily basis

I: when talking about governmental regulations and laws and maybe other restrictions by the production companies which ones do come to your mind regarding the cinema operations?

SS: well we do have regulations in terms of safety

I: for example yeah, every kind of law

SS: okay so that is one important thing, especially when we make new concepts and new cinemas - we need to get all the clearance to operate. then we have employment regulations especially when we have younger staff, then we need to off cause in force the censorship rules, that are movies that are not allowed for young people, unless they are with an adult - at the end of the day it is the parents who decide it - but if it is the kids that comes along we can refuse to give them access to some movies and we do not do porn or things like that - so it is not a big issue but - it is mostly an issue with the horror movies - with young people trying to see them but it is maybe not a good idea, but otherwise it is not because we have huge constraints from regulations. It is mainly when we do like, new building or new projects that we need to get all the authorization in place

I: so that is more like fire

SS: yes fire, or construction and

I: so really about the facilities, what about the IT? are there any?

SS: no, then it is GDPR the data protection rules, we need to live up to and that is the main thing.

I: So our project is about the cinema of the future and how do you think the cinema will be in the future - like do you have any idea?

SS: depends when, but in the future

I: maybe 10 years or 5 years

SS: I don't think it going to be a huge difference from what we have today - I think we still will have cinemas everywhere with rooms as we know them or screens as we know them. I think we'll see maybe more concepts like 4DX which we are rolling out now or luxury rooms with full recliner, seats where you can lay down more or less in your seat - that kind of things. One thing that is interesting to consider is whether is going to be a trend in Denmark, I am not sure, is dining - we can see that in Asia and other places it is very profitable - to dine in the cinema, people get food delivered in the screen - I am not sure if it would work here, there are cultural differences. I think a trend we also will see more is more diversified content, that we will show. Already today we do a lot of opera showing, we tried with E-sports and we tried with concerts, football and so on. But I think that could be a trend as well - were we will see different kind of content being shown, with a server capacity we can use there.

I: any trends regarding consumer behavior - you already mentioned the younger and the payment

SS: we need to be careful that all our solutions are really well thought through so there is not so much friction. So it is very easy to use and very easy to support the businesses we have so that is definitely our focus we have to step up all the time. Intuitive and easy, and especially with payment and bookings and so on. Otherwise people will just give up right away - and we have a lot of competition, not only from cinemas but also other forms of entertainment - so we need to make sure that when people are ready to buy a ticket or to go in as quickly and easy - without a lot of issues and that is not easy because cinema tickets are quite complex - it doesn't seem that complex but there are a lot of rules, pricing and gift cards and

I: which rules do you mean in specific?

SS: No, just technical rules that you take, not rules of such but we have a lot of different prices dependent on time of the day and the type of movie and we have a lot of different kinds of, especially in Denmark, of gift cards and vouchers - especially external vouchers and gift cards we except. There is a way that we need to work with those, and we have Biografklubben Denmark, we have Telia tirsdag and all these things make online transactions quite complex, because we

have a lot of combinations of tickets if you are four people and some have some vouchers or gift cards and the others have something else, we need to be able to combine all that in one transaction and that is not easy.

I: Okay, so as I mentioned before we were talking, or we had a scenario in mind where there is sensors in the seat, like IoT sensors, that can gather data - what type of data would be useful for the cinemas themselves, it doesn't have to be from the seats but that was an example it could also be a

I: GPS tracking,

I: mobile devices and so on

SS: there are definitely things that could be interesting; whatever things we can do to optimize our facility management and insure everything in terms of cleaning, in terms of temperature, air ventilation and all that - that is interesting because that is where we can make large-scale savings

I: so if there would be a sweat sensor in the seat and you recognize that - that people are too hot?

SS: No maybe not sweat sensors

I: Heat sensors

SS: No, I think more about opcuping and tracking the activity of the screen and the ventilation needs and the temperature it needs so it can, really adjust the temperature, all the time based on the number of guests we expect to get at the different times of the day

I: what type of projectors do you use? or do you have projectors or LED screens or what do you use actually?

SS: we only have projectors

I: only projectors okay, so that i why it gets hot?

SS: yeah, the projectors have special needs in terms of air conditioning but I am thinking more about the screens where we have the guests and that we adjust the temperature dependent on the number of people we have, that could be one thing, cleaning to make sure that we only clean when it is necessary based on again flow of guests, another thing regarding data could be in terms of advertising, knowing what segments we have in our cinemas at one point and see if we would use that in the advertising we are showing - a lot of companies are working on that right now and trying to aggregate data, from different shops or chains like us, and sell that to advertisers, so they can always adjust their adds, so that is also a trend, that is more about the traffic on the Wi-Fi, that you can collect there,

I: how is that?

SS: Well you know, when people are in our cinemas and we catch them on our Wi-Fi - so we can in principle know who is in our cinema but then we have rules we need to be aware of

I: like GDPR?

SS: exactly, but you can work on it on a application level and not a universal level were you can then extrapolate to some segments and then it is less restrictive, what you can do

I: but right now, are the advertisement targeted to like the expected target group of the movie or

SS: Yeah and that a company here called Dansk Reklamefilm who is working on that

I: I am just going to see if there is something we missed, that you didn't say,

SS: Do you have a hypothesis about the cinema of the future?

I: we kind of have yes, we have thought about different ways of for people to actually more seamlessly go into the cinemas and do the whole transaction process through their phone but actually were the popcorn would be preordered and ready, their seats would be ready and they basically could just walk in and sit down wherever and whenever, no matter where they are, and they can get push messages for example if they are walking on the street, 'hey there is a cinema right here, you watched this and this movie and you might like because it looks like your preferences you have ordered previously for example and then the seating would be like measuring people's reactions to the trailers and the movies, in order to understand how to experience the movies, how to experience the trailers to get an understanding of their profile but also how to actually make the right trailers, and the right movies for the right audience. So it is a kind of back and forth data travel, but that is mostly consumer based. That is why we are asking because you have like a completely different aspect like you also want the maintenance the whole operational aspect

SS: absolutely, that is were a lot of money goes. One thing that is very important to also remember and consider, in all the aspects is the human dimension - it doesn't have to become a cold experience. Its like people walking in and everything is checked externally and automatic and you don't have staff, it can be cold.

I: Yes exactly, but it could be a choice, then you could choose to do this, but when you look at like the more younger generation, this is how they actually do most of their purchases, they don't really physically interact with people so it is a different target in a way, yeah.

SS: No, but that is true

I: and also with the recommendation system I would say there is a lot of possibilities in regards to actually targeting the right audience. So they don't have to make a choice they get the choice

SS: that is also an important thing - when we discuss streaming services and cinemas we are still in some way curating the content in the sense that when you go into the cinema you have maybe on a single week for on average we have maybe 10 movies being shown and it is not a huge list of movies you need to select from compared to when you go on Netflix or HBO and so on it is a huge list and sometimes you just end up not knowing what you want to see - so that is also an important part of the business that we curate the content and make sure that the content also fits with the seasons of the year, that we have kids movies when there is a holiday season and so on and so forth

I: do you actually curate in regards to where in the country it is or is it all the same in all the cinemas

SS: almost, especially know after digitalization all the movies are released at the same time

I: okay so there is no difference

SS: not really

I: how about Norway and Denmark then?

SS: sometimes we have differences in release dates but it is mostly on local productions - international productions also due to piracy are moving more and more to international release dates

I: Yeah makes sense

I: Actually I have a favor to ask because we had problems getting in touch with a, some of the, or one of the cinema managers - like a local one. But you mention that they exist. Do you maybe have a contact you could give us, someone we could talk to?

I: Just to get a more local operations

I: like a hands on

SS: yeah, I am trying to think of who could be best. What you could do is, I could send you a couple of names, because what we have in Denmark is that we have two regional directors and

all the cinema manager report to them and they are just split into two groups, so I could ask them to find out who would be the best person to talk to

I: yes, that would be great

I: it would be really good

I: we wrote to the general email addresses of the cinemas but it didn't work

SS: didn't reply?

I: well, we get a info reply, like sorry we cannot help you - it seemed like it was almost just a standardized answer

SS: it is a centralized email yes.

I: we tried to look up people - but it is not that easy

SS: but you cannot see them actually on the web or the cinema address

I: yes, and not even on LinkedIn actually - tried to like track people down on LinkedIn

I: they have like different job titles or so we didn't

SS: Biografchef har du prøvet?

I: yes of course, I tried the Danish and the English

SS: No one popped up - or yes there was a few from Norway, but it was not really the right profile - but i think maybe it could be a premium thing if they have a premium account maybe I can’t see them

5 Interview Guide Kristina Schollert Jørgensen

Her role: Regional Manager Nordisk Film Cinemas

General questions:

- Could you elaborate on your role as regional manager?
    - Which cinemas are you responsible for?
- What is the main problem you are facing at the moment?
- Which role do digitization and mobile services play for the consumer in a cinema context?
- Do you think Nordisk Film cinemas participate in a lot of exploration activities, seeking new opportunities and looking for innovations? Or is it rather "business as usual"?
    - When innovating, do you follow a specific concept/process?
- What are you doing to optimize the cinema operations?

User Data and Technology Questions:

- What data do you have on your customers?
- Do you think there would be a way to share this data with other divisions of Nordisk Film?
- How important do you think easy, digital access to Nordisk Film's cinema products and services is for your consumers?
    - What could be done to improve that?
- Are you currently working on any project involving
    - digital technologies
    - mobile services
    - IoT?
- Can you tell us more about the technical infrastructure of cinemas?
    - How difficult would it be to implement an IoT solution including the corresponding platform?
    - How long would it take and how costly would it be? (estimate)

STOF Model questions:

- Why do you think people still go to the cinema nowadays, if they could just stay on their couch? What is their main motivation? *[perceived value]*
- How do you think the cinema environment itself adds value to the customer experience?
- Who are your external collaboration partners? How is the network structured and how are the tasks divided amongst the different actors?
- What is the biggest risk for the cinema market at the moment?
- Are there any restrictions regarding the cinema operations? Governmental regulations/laws?

Questions about the cinema in the future:

- How do you think the cinema will develop in the future? Are there any main trends?
- Which developments can you see regarding consumer behavior and demands?
- How do you think IoT technologies could be used in the cinema of the future?
    - How do you think your customers would react to the new technologies?
    - What do you think would they value most?
    - What could their biggest concerns be?
- What do you think would be the biggest challenge when trying to implement a concept similar to ours?
- How could new technologies add value to the consumer experience in the future?
- Which data would be useful for you in order to improve cinemas and movies (e.g. data from sensors in the seats etc.)?

6 Interview Kristina Schollert Jørgensen

Date: 24.04.2018
Audio Length: 34 minutes 30 seconds
Speakers: Kristina Schollert Jørgensen [KSJ], Sofie Krog [I], Caroline Weimann [I]

I: Should we start

KSJ: yes, lets start

I: could you elaborate a little on your role as a regional manager and what you are responsible for in the region?

KSJ: it is not geographically specific, it's a little bit of mix of the different cinemas that we have, so I have some in Jylland and some in Sjælland and my colleague has the others ones, so we have half each and the reason for that is that we don't want it to - if you have a regional division then it can be a little bit split between how to do things so we want it to be more mixed. And therefore we have done it like we do. But my role is to - I am the manager of the cinema managers - so actually I have the operational responsibility for 11 of our cinemas which each have a local cinema manager. Generally, it is everything that is away from Valby it is the client satisfaction, the staff satisfaction, the economy, the buildings, the instore - everything related to the local marketing and operations that they do.

I: okay, would you say you are facing some major problems at the moment?

KSJ: No, I don't think so. You mean like the company?

I: Yes, the cinema operations part

KSJ: No, I think we are changing step by step like everything else with new technology and we try to be first movers on the different things that comes, in order to satisfy the client's needs and what they want for the experience in the cinemas.

I: okay, and what is that? what do they want?

KSJ: yes, for example they right now, right now we are implementing a 4DX movie screen in Lyngby and that is one of the examples of that and it will open now at the 17th of May and we already opened one in Aarhus, and we see that it is something different and something that makes the client choose us instead of some of our competitors

I: are there any other technologies you use

KSJ: right now we are also trying, also in Lyngby to make a VR center inside of the cinema and it is going to open tomorrow [25th of April] so it is not like a screen like your traditional cinema, but we think that the user, like you see VR centers all over the city that is popping up, but the thing that is different about our connection is the connection to the movies and to the content. I think that the content matters when you try to connect to these things and therefore we see a strong connection to the regular cinema goers and therefore we think it will be fine. And also to try to put in something new and VR are the new thing at the moment so therefore it makes sense for us and it will we really cool. You have to go and try it.

I: what about digitalization and mobile services in general do they play a big role? for the consumer?

KSJ: I think more and more, you also see it in other things that people consume - I think in Denmark in general we are very digital compared to other countries and you also see that a lot of people buy online, so I think the Danes are very used to it, and therefore also they are more happy to use it. I mean it is like a rolling ball getting bigger and bigger, so therefore I think it is really important to have the convenience and the easiness on these mobile platforms, because I think that if it doesn't work then you will get the opposite effect and you don't get the client satisfaction and then you can also lose some market parts [shares] - I can't remember the word. But you know what I mean I think.

I: I think market segments

KSJ: yes

I: when you, I mean you already mentioned that you tried a lot of innovation and innovative activities - is there a specific process or concept you follow or does it really depend on a case?

KSJ: it depends a little bit on the case how we see it, but you know there is always part of it, I mean, one thing is providing new technology, but there is a lot of surrounding it and especially in the operations, and where I am seated, we are very into how it works, and how we will do it, and what we will tell the clients, and what will we tell the staff, and how will we implement it - so all of these very concrete plans for how to create it, and then the marketing mostly talks about how great it is, but we talk more about how to create it. I think that is the main thing.

I: In general we are mainly interested in the data and technology parts of cinemas, could you tell us what data you have on your customers at the moment

KSJ: that is the marketing department who has the control of that, we do of course think of the GDPR right now, so everything is actually going to be managed and I think that we are very far in that process. So in general we have a very good overview right now about how much data we have at the moment and of course we have from our loyalty club for example we know what they see and what they don't see and what they buy in the concession shops and things like that

I: you said before that, that it is very important for the consumers to have easy access to the product and what do you think could be done to improve that? Are you already doing something in that direction?

KSJ: all the time we are pushing the buttons in order to make it more and more and more convenient because I think that is the win, if you don't do anything your competitors - it is status quo - and it is like going backwards, because everybody else is moving forward - do you understand what I mean? And in order to stay relevant, we have to do it all the time, because you can't just say that we do it every half a year, because it has to be a process, and it has to be something that you think about and you do every day - and when you do it like that it is difficult to say 'oh we do like this' because it is like 'oh maybe this button should be green instead of red and then people would be more happy to push it' but for example right now - right now, no, what I will say is like, there is the daily operational thing where you push the buttons a little bit each day, but there is also like the bigger projects were you say like, 'now we need a new website because it is starting to get updated so we have to have a new website with these and these features' and the same with the application - and that we are doing right now at the moment, we are working on a new application. I hope we can have it ready at the end of this summer I think - in order to get it more easy for the consumers to buy tickets, and I think actually if it is not easy to use then they buy the tickets in other cinemas

I: are there any other projects? you mentioned the application and the website and anything regarding Internet of Things maybe?

KSJ: No, not that we have any concrete project but we do look into opportunities right now and for example I think it will not be that far away that we start to look at like the click and collect on our concession stores - right now it is not the highest priority but it will be something to look into later I think

I: and by click and collect you mean sensors that

KSJ: no, actually I mean like when you order your ticket you also get the opportunity to buy the popcorn and drinks menus upfront for example, and then also you know there is a lot of companies contacting us with the new technologies and we can do it like this which is very smart and you know it is always a decision based on, what does it cost, what does it give and how much does it cost, does it cut cost, and can you increase your ticket price or your earnings in the store - does it make sense?

I: talking about cinemas in general, why do you think people still go there nowadays if they could just as easily watch a movie on their couch

KSJ: Because the thing is not only about the movie, I think my - it's like at home now you have very good possibilities to make a really good cup of coffee at home, you know everybody has either a nespresso machine or an espresso machine in like an italian style thing so you can actually get a really good cup of coffee at home but we didn't stop going to the coffee shops and I think the reason is that it is a social activity and I think it is the same with the movies, I think it is a social activity and we see that most of our clients do also go to a cafe before to eat the, or to eat something or drink something or they do it afterwards to discuss the movie and things like that, so actually I think, and I am also happy about it because I think that we people need to be together and not only go online and have each a separate life, do you understand? I think that, I watch a movie in another way when I watch it at home on a mobile platform or on the telly than I do when I go to the cinema, so that is actually another thing is that, I think that you see the movie with more intensity when you see it in the cinema because you don't have any distractions, you don't have the mobile phone, the ringing, you don't have the need of "arh I have to go and pee or I have to go and make a coffee or oh I have to get the children to bed so I just put on pause on the screen" or something like that, so I think the way you watch the movie is also different - so therefore I think there will always be a need - and I think that the basic thing is that you will always have a need for social activities and to be with your friends around something - you can also be with your friends around something else but I think still it makes a good, I think everybody has a good feeling about going to the movie theater, I think you still have the feeling from when you were a child at the first time and you sat there with your popcorn and things like that and I think you are searching for that feeling also every time you go there. But I think maybe it can be differentiated what you see in the cinema and what you see at home - but I mean home entertainment have been there for a long time - it is easier now than when I was young and you had to go and collect the movie box at the video store before you could watch it because not everybody had a video machine at home but still you have a lot of TV channels you have a video or DVD player at home and things like that so it is not like new that you can see the movies at home and I think that also in the 80's when the video machine came into the household everybody said "oh, now the cinema will die" but it didn't and actually I think when you look more at movies then you also get more in touch with what movies are coming and you get more interested in movies so we actually also want to see more movies. So, no, I think that we have a good future in the cinemas, I think we need to be together still

I: are there any risks?

KSJ: of course there are risks, there are risks everywhere and I think there are more competition and competitors right now in the industry that, there are more new cinemas popping up and everybody has new features and things like that, so I think that you could say that is a risk. What other risks are there? the risk is also that the products become, in regards of privacy and things like that, that the projects will not be good enough that can also be a risk that you don't make so many movies in high quality that's good for the cinemas, and if you don't make high quality movies then you will - if you get more B-movies as we call them in Denmark, and Danish like, then people will be more anxious to see then on the television because they don't want to pay for going to the cinema for a higher experience and that can be a risk - but I don't think, I think there will be, I don't think that will be a problem, I think we have good movie years and we have bad movie years and that is actually, I have been there and it have been like that all the time

I: Do you collaborate with any other external parties or actors of other companies regarding the operations

KSJ: yes we do, we made like a, we worked together with Starbucks, we have Starbucks in some of our cinemas in order to get that brand that people know well into our concession stores, so we have like their machines and their coffee and their, to give more sales and also to give a brand evaluation, the brand evaluation is high on that product and I think that is one of the things we have very much in focus in our concession stores is that we have to have high quality in the stores so, and therefore we use like Starbucks, and it is a very good brand for us

I: and would you say there are any restrictions regarding the cinema operations like governmental, like regulations or laws - so that really hinder you from doing what you would like to do?

KSJ: No, but we can say that the laws against piracy for example is a big factor, that you don't make an environment where it's getting more easy to make piracy and things like that, it is very, because if you have too much piracy then you don't, the money is not earned on the movies and

if they don't earn the money on making the movies they wouldn't produce movies. Then it hurts the feeding process if you understand what I mean, so that is one of the things, and another thing in the industry can be the competition law, how much can you - I don't know what it is called in English, I have to say it in Danish because I don't know the thing - [translated] Many smaller cinemas is union cinemas for example and they get maybe, and they have volunteer employees and staff but also get grants from the municipality and there is a limit to how much a, one can get in grants to ensure that it wouldn't be distortive and that distortion of competition have been included in a EU case at a time, because in connection to the digitalization people were very nervous about - It is obvious that there are many municipalities who thinks that there should be a local cinema, and that they want to support, as they see it as being cultural value, but due to the fact that the cinemas shows the same films as their commercial partners, there has to be a restriction to how much financial support the public cinemas in order for it not to distort the competition.

I: where do they get the funds from?

KSJ: [translated] from the municipality for example, and the municipality is very willing to support financially, but there is a limitation to how much they can support with, and that is something that could influence the competition when the cinemas at the same time are using volunteered workers and so on, we who runs a commercial organization, has to follow an organizational convention [overenskomst] in regards to salaries, and we do not get any funds from the municipalities, and therefore it becomes a distortion of competition, because there is a limit, I cannot remember how much it is

I: why is it they do it, is it because they think it is a cultural heritage?

KSJ: [translated] I think they think it is important for the society and to uphold the life in the city in the evening and have a cultural rallying point - it is kind of the same reason as when they give funding to theaters and so on - but the regular theaters do not operate, or they do that too, but not in a commercial environment but we do, but before, before the digitalization you had a - you had - you had some that were premiere cinemas, who got the movies before the others because they were produced in a limited number of copies and does copies - they maybe you made a movie in 40 copies and first you would give it to the largest cinemas and then to the medium sized cinemas and lastly in the smaller cinemas, so that meant that some of the who got the grants would not get the movies before a lot later than the others, so it never became a competition, but in that moment where all got equal rights to the movies at the same time, then it became distortive of the competition, because the municipalities pay grants, and do not do it for the commercial ones, because we do not get it as a commercial organization, but the smaller cinemas do, and it creates a distortion of competition in the entire industry. If does differences will change or something, or that they do it anyway like they give some indirect funds that isn't visible, they don't have to go down there and say “here you got 250 kr. or 250.000 kr.” maybe they give it in terms of buildings or plots or something like that which can create even more competition in the industry

I: did you get it?

KSJ: you understood it? we could take the rest in Danish. No, it is just a bit difficult to explain it for me in English, but maybe you will have to google it and find out what’s up and down on this one, because there was a EU case on this during the digitalization

I: where the cities subsidized

KSJ: you know where EU went in and said to the government that you have to make some restrictions around this because otherwise it is distortive of the competition and they did but still it is something that

I: it is kind of like the difference between the public and the commercial channels basically

KSJ: yes, it is

I: our thesis is about the cinema of the future so to say, and what is your perception of the cinema of the future, what do you think, and how do you think it will develop?

KSJ: I think you will develop more concepts like IMAX, 4DX, and I think also you will see cinemas exploring the VR and things like that and I think you will see that we will have to be first movers

in regards to technology in order to make the cinema experience be different from the home experience - I think it is important. but then i think it's basically what cinemas does is get in touch with your feelings and it will be very strange to see like a drama in 4DX, I mean like a very slow French drama in 4DX wouldn't make sense so I think you have to have both, I think you also have to have the classic theater, cinema theater experience and so I think you have actually also to look also to technology that can either lower your cost or lower the ticket price and things like that so that you keep in touch with the business

I: what technology could that be?

KSJ: it could be like click and collect for example but it could also be like you know in many, like when you go to football matches for example or to a concert then you get through a thing where you put your stretch code to the scanner, and there is nobody there controlling, you just walk in - things like that, maybe, maybe not, I think it is a balance because you also have to meet people because people want to meet people because that is also one mix you feel good about it and the place and feel home and comfortable, we work also very much by how to work with the instore so that we make an environment that is nice to be in and that people would like to sit and have a cup of coffee, so it is also like a balance, but I think that you will see things like that in the future

I: and which developments do you see in regards to consumer behavior and demands maybe with the younger generations in specific?

KSJ: I think it has to be quick and easy, because otherwise they are, they already move to another place, but there are no signs of the younger people doesn't like going to the cinema actually then we did some of the I think also on the inside consumer thing - I think also some of the questionnaires showed that the younger people really like to get offline actually - you talk about they are very digital but actually they think also it is nice because then it is legal to put away the mobile phone and not answering for a moment. I think that many young people also think that it is stressful always to be online and that is also some of the things that we see is that they like that really much and it is legal to say ‘oh I was in the cinema’ ‘okay, that’s why you didn't answer, okay’. Then it is okay and it is acceptable. So I think that people will have desire to get offline and I think that could be actually bigger in the future because everything is moving on faster and faster and you are more and more connected all the time and online and I think the people also have to also get offline

I: could you still imagine a way, how IoT - internet of things technologies could be used in the cinema?

KSJ: Which kind of technology?

I: Internet of things - that means that you have sensors and actuators or let’s just say little devices that somehow measure things and they evaluate the data and communicate with each other and then the cinema operator for example could get information based on that or could adjust - let’s pick a very easy example, you could have sensors that measure the temperature inside the cinema hall and when it gets too hot the air condition will start

KSJ: we already have that

I: yeah, but that is a simple system, and we are talking about a lot further than that so for example - what if for example there were sensors in the seats that could record your reactions to movies and that data could be used for further knowledge about what the consumers like and dislike for example it is very extreme of course but like these kind of things

KSJ: maybe, I don't know, I think that, I don't know I really don't know, I think for the Danish environment it is to extreme right know but maybe we will see it in in smaller things, I don't know. It is not something that we look into right now

I: okay so you think they will be like no, that’s yes, too private and I want to be offline

KSJ: I think you also have to look into the GDPR, to see what’s is possible and I think that will actually, right now of course of the GDPR that the people are very aware of these things and I think a lot of people don’t like that - they don't like the Big brother thing, so I think we have to be careful what we do about these things

I: looking at the whole data thing from your perspective will there be any type of data that would be specifically useful for you to have where you can then improve the operations or improve anything else about the cinemas

KSJ: there probably is, but I cannot just like this say anything that I think right now, because also the reason is that if I knew it I would do it or at least, pursue it, so therefore I don't have anything in mind right now

I: anything else from you Sofie?

I: well basically the thing about the new app, you already talked a little bit about it, I just want you to elaborate a little bit about what it can do basically, the new app you are making?

KSJ: one of the new, I don't know if that is in version 1 and I don't know if you can say it to anybody

I: We could probably keep it to ourselves, we only share the data with you and our university

KSJ: one if the things is that with the young people and one of the barriers is can be that if they use mobile pay to pay for the tickets they don't want to put out money for their friends - because they are always afraid if they forget them and things like that, and one of the things we are looking into is to find a solution, a split payment model where you can buy the tickets and then you can send to the four friends that you bought a ticket for and say you have to pay this, so that everybody pays to us and you don't get or have any money between each other, so that they have to be afraid not to get the money from Sofie because she never pays or things like that, you know what I mean, so that is one of the things we are looking into

I: and you have Click and collect in the application

KSJ: no, that is not right now, so it will be further on, we have some other things we would like to look into and focus on our ticket system right now, so we have to wait till we finish that at the moment. One of the things we are working on right now is to be able to, we have these vouchers that we sell in the supermarkets and things like that and right now we are trying to implement so that you can use them online, because right now you can only use them by showing up in the store and that will of course be better for the clients and then they also find it easier to buy

I: I don't know, is there anything else do you think?

I: not really

I: I think we covered everything, yes, and I am pretty sure that when we have done everything, and done all the testing and we are done with the report

KSJ: when are you testing?

I: well right now, we actually have a survey out and asking like basically main consumers from all ages about different aspects of what they want and what they don't want about the cinema, in regards to the IoT idea, because our idea is actually to try to find a new way of collecting data about the consumers in order to make more personalized products, like recommender systems or creating a new way of understanding the consumers, we talked to Dan for example, and he showed us this test they had done with biometric testing measuring sweat response and then that kind of stuff could be very interesting to know more about, like how do consumers reacts to different things in the movies and in the trailers and so on, so like that aspect of course and also the whole aspect of going and coming to the cinema that could be more seamless in a way, like if I am walking down the street and I want to see which movies are near me, like that could be a thing my phone application could show me through GPS signal and of course going and having access to all the data basically and then maybe I could order and do the click and collect and have all this, and if I want to walk in from the street without having contact with people that could maybe also be an option, so these kind of things that could make the process more seamless and also more personalized, if that makes sense. Yes, so that is what we are looking at, but of course we also got a lot of things from Stephane, and he talked a lot about more these facility management solutions that also could be an aspect of thinking about IoT and making sensors that could register when garbage cans needs to be emptied

KSJ: That would be very interesting

I: automatic door closing, cooling down the screens and that kind of stuff, so yes, that is also a part of it, I think, we also talked with a GDPR specialist to get that aspect, and who else did we talk to?

KSJ: yes, it will be really nice and that would really mean something to me in operation if you could do like all of these things with sensors.

7 Interview Charlotte Arnø

Her role: Business Consulting Manager at Nordisk Film/Egmont
Date: 07.05.2018
Format: Email
Speakers: Charlotte Arnø [CA], Sofie Krog [I], Caroline Weimann [I]

I: Dear Charlotte, ee just talked briefly on the phone together about our thesis project. It would be a great help if you could shortly outline what we discussed based on these questions: What challenges does Nordisk Film Cinemas have if they want to share data across their mother organization Nordisk Film e.i. to Nordisk Film Production with specific focus on personal data?

CA: If Nordisk Film Cinema wishes to do so, they have to obey the GDPR rules hereunder purpose, legal basis and fulfilled the disclosure obligation etc. If the data subject have given permission to share the information no challenges will be present. As I do not know the concrete case in detail, therefore I cannot be more concrete in my answer.

I: Is it possible to share data if the company informs the customers of the usage of the data?

CA: It is generic for all companies. If one upholds the rules of GDPR with regards to the purpose, legal basis and fulfilled the disclosure obligation etc. then they can share the data. As mentioned, I do not know the specific case about the cinemas in detail, and can therefore not confirm if the cinemas have this in their current setup.

I: Is it possible to use data across the sub firms (Nordisk Film Cinema and Nordisk Film Production) if they anonymise the data e.i. in a way where Nordisk Film Production only know the segment (age and gender)?

CA: one can share data if it is not personally identifiable as this is not seen to be personal data

I: Is Nordisk Film Cinema (and other sub firms) required to inform about Egmonts involvement in their personal data contracts?

CA: I will need a greater clarification when I do not know what you mean by personal data contracts.

I: Who is the current ‘controller’ for the mobile application (the firm behind the application) that Nordisk Film Cinema uses?

CA: I do not know who developed the mobile application.

I: What has to be changed if they want to utilize GPS tracking through mobile phones?

CA: I do not know. But you have to be aware that one cannot use GPS tracking without a consent from the data subject to the usage and otherwise upholds all other aspects of the GDPR

8 Interview Guide Per Lynggaard

His role: Associate professor at AAU Copenhagen

General Questions

- What is your concrete research focus regarding IoT at the moment
- Did you also participate in projects other than smart homes/cities and Loon?
- To which extent do you consider the business perspective (e.g. implementation, suppliers, organizational change) in your projects - or is your interest solely technological?
- Can you explain how the Cloud of Thing (CoT) works and differs from IoT? What are the benefits and disadvantages of using one or the other?

IoT Questions

- Are you familiar with any IoT projects involving media companies?
- hat are the current problems, enablers, and risks with IoT and its implementation?
    - technological challenges
    - operational
    - ethical and data security, privacy
- What are the best practices in this area? Can you give us an example?
- Which aspects does a company need to consider when starting an IoT project?
    - What are the enablers?
    - What are the limiting factors?
- Could you elaborate on the required infrastructure for IoT solutions?
- Are there any critical points one has to consider that can be easily overlooked?

Cinema of the Future Related Questions

- Before we “spoil” you with our own ideas, we would like to know how you imagine the cinema of the future with the use of IoT solutions?

Now, we would like to present you our approach of the cinema of the future in three different scenarios that can be combined as well. It would be great, if you could tell us your opinion about these scenarios and how you would change/evaluate the technical set-up.

Scenario 1: Personalized Experience

1. User gets notification on phone about new movie he might like based on previous behavior and preferences
2. Overview of movie schedules and cinemas in app
3. Option of sharing the movie with friends to invite them
4. In-app payment (possibility of splitting amount between people)
5. GPS based real time tracking starting e.g. 30 min before the movie to predict the user’s time of arrival
6. Notification to cinema staff to prepare pre-ordered popcorn/snacks
7. In the cinema hall: in-app wishlist user can add preferences to → gets added automatically when phone records the sound of the trailer

- What do you think about this scenario?
- Since it doesn’t include IoT but more traditional mobile services - can you think of any IoT technologies that could be useful here?

Scenario 2: Seamless Process

1. Movie notifications to users triggered by proximity to cinema
2. Seamless process for payment and seat selection

- How do you think the technological set-up for this scenario could be? (Beacon technology and proximity marketing)
- Do you have any ideas for improving the user experience?

Scenario 3: Data Gathering

1. Some seats in designated cinema halls are equipped with sensors to measure the arousal of spectators for ads/trailers and during the movie
2. Users have to agree to terms and conditions (data processing) beforehand

Examples for sensors:

1. Presence sensor that detects whether a person sits on the seat or not (other sensors are activated accordingly)/weight
2. Motion sensor that measures how much the viewer moves during the movie
3. Humidity/moisture sensor that measures the amount of sweat/heat
4. Heart Rate monitoring?
5. Acoustic sensor that detects if the viewer is laughing, sighing, screaming, talking etc.
6. Facial camera built into the back of the seat in front of the viewer that can detect emotions, gender, age, attention etc.

- What do you think about our choice of sensors?
- Can you think of other sensors that could be useful in this environment?
- Since you worked with ECG and heart starters at Artema - what do think is the best way to measure people's arousal and response to audio visual content?
- What kind of technical infrastructure is needed in order to make a functional automatically tracking sensor-system in a cinema?
- Do you know of any platforms that can be used for gathering and analyzing the data?
- Could you elaborate on the expected information flow in this scenario?

9 Interview Per Lynggaard

Date: 23.03.2018
Audio Length: 59 minutes 27 seconds
Speakers: Per Lynggaard [PL], Sofie Krog [I], Caroline Weimann [I]

I: So, we looked a little into your profile.

PL: Yes, I can see that. I didn't know we had put that much out there.

I: Oh, it's the general AAU website with your publications and so on.

PL: It is? Ok.

I: Yes, it wasn't a long search.

PL: Well, Google is collecting information and Aalborg university obviously, too. Anyways.

I: Exactly. So, we saw that you're doing a lot of IoT projects actually, especially in a home context.

PL: Yes, some. At least a white paper that comes in. The projects are mostly student projects, of course.

I: Yes. And what is your concrete research area and focus?

PL: It's Internet of Things, actually, and machine learning, and…what is it called…high frequency Wi-Fi…wireless communication. That's maybe a better word. So that's what I'm doing. All these and research and also teaching, there's a connection there.

I: And do you have any other research projects or top papers at the moment other than the ones that were already publishes about smartphones and cities and project Loon?

PL: [inaudible]

I: I didn't get a chance to read all of your papers, so do you also consider the business perspective or mostly the technical aspects?

PL: It's mostly the technical.

I: Yes, so you're not really involved in implementation or the supplier network or the organizational structure?

PL: No, because much of what we do is…you know…one step ahead. It's out in the future. Much of it has not really been built yet. For example, when we discuss smart cities and those things, so it is going on, for example in Amsterdam, Copenhagen and other places, there's some…what should we call it…small projects going on there.

I: Like prototyping and low fidelity projects?

PL: Hmm, not even at that level. But they look into it and that's right with the internet. So, that means the business case is not really there yet, because they're just trying some different technical things. But later on, of course, there will be a business side in this, too.

I: And…you're probably an expert for that…

PL: I'm not sure I'd say yes to that.

I: …could you explain the difference between the Cloud of Things and IoT? And benefits and disadvantages of the two.

PL: I can see that, that's number four. Because I put some notes…

I: I'm not always following the structure.

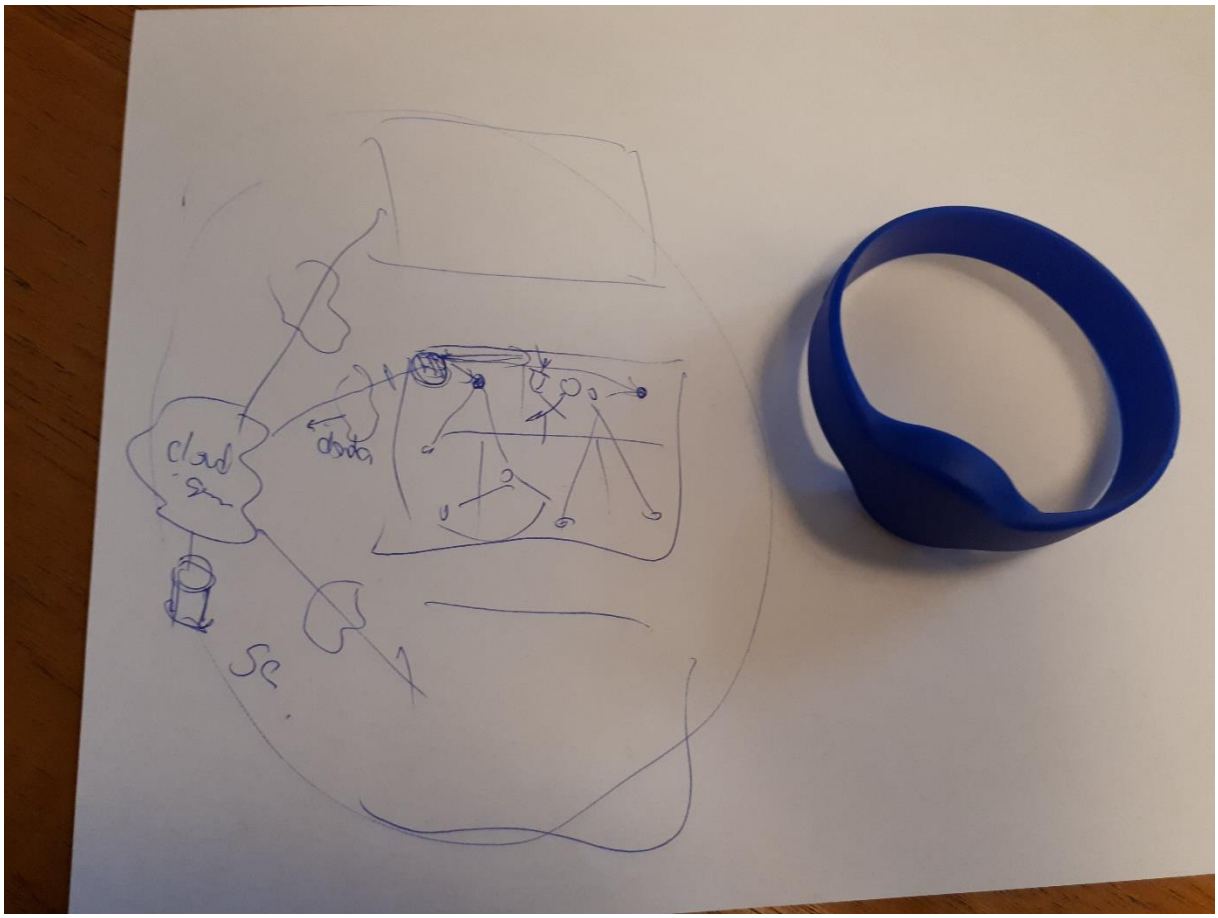
PL: Ok, ok. Because I wrote down some notes here that we can walk through.

I: You're very prepared.

PL: Ah, prepared…a little bit at least. So, the idea is that the Cloud of Things, you know, consists out of a lot of servers, cloud servers, right? Whereas Internet of Things is any small device where we put in some computer power. It could be, you know, small sensors like light sensors in a room or [inaudible] sensors in a room and those things. So, it's a lot of sensors that is powered. There's three criteria for Internet of Things more or less and that is: it should be able to sense its context, some kind of sensor, meaning it could be temperature, light level, those things. The other things is, it must have some kind of processing power like machine learning on board, so it can manipulate those data and work with them. And the third thing is, that it must be able to communicate. And that means it should be able to talk together in some kind of wireless sensor network. So, that's more or less the three criteria we have for machine learnings…or sorry, for Internet of Things. So, Internet of Things here, and then you have the cloud over here. You need to connect those with services for people. So, because if you have internet it's expected that billions – thirty billion things will be on the internet in 2020 more or less. That means it will be impossible for humans to actually manipulate of off those. I mean, we are seven billion people on earth, right? So, there's at least 30 billion there. And that means we need some ways to communicate or work and use the services that those machines provide. And the trick then is to use the cloud services we have already in Google or Amazon, they all have cloud services, to connect those machines, small internet of things, to the cloud services. And then from that it should be in some way be high level services out of those cloud services. And that's what cloud of things does. It simply connects those clouds with services people can enjoy.

I: Ah ok, so it's kind of automatic, or?

PL: It's a kind of interface. Cloud of things is a kind of interface between people and the cloud in form of services offered from the cloud to people.



I: But is it like a program that runs the different servers?

PL: It can be a lot of programs. It can, because I mean, if it's a particular service that can do something for somebody, then that service can run on [inaudible] and then it can hook up to some cloud there, cloud server. And that cloud server then hooks up to all internet of things. For example, if you'd like to control your home, let's say there's a lot of sensors in home control: heating, light, everything. Those sensors are then hooked up to a cloud service with machine learning, so that they can learn your behavior, so they know how to switch off and on your light and so on. Because, I mean, especially heating is a subject, because if you leave for work or for study and you're gone for eight hours, then you could switch down the heat. However, if you're only leaving for two minutes, because you're out at the garbage bin or something, then it should not switch off…and so on. And that's what the machine learning takes care of and that requires a cloud service. It requires a lot of resources to do it. So, the machine is out in the cloud and then it connects to the sensors in the home. Then we like, of course, to be the boss there, in charge of our own home. So, you should [inaudible] where you have an app and that app communicates with the cloud…the machine learning, the machine in the cloud. And that's cloud of things, this service between those two.

I: Ok, makes sense.

PL: Great. So, yes, that's what it is…spooky word.

I: Yes! So, we're studying with a focus on media management and so is our thesis. Are you familiar with any projects that involve media companies?

PL: Hm, that was a really good one. Really..no. Because, as I said before, it is a really really new area, internet of things. Everybody talks about it and they've done it for some years, but no one has really done something, not something that sells. There is something they claim and say: "this is an internet of things device", but even it isn't. Because real Internet of Things devices require smart thinking, require some kind of machine learning built into the devices and we're not there yet. Devices cannot do that yet. So, there's some restriction, actually.

I: Oh. So you mean that the sensor should be able to think and be smart and not only the platform or software is then put into?

PL: Exactly, or to learn something at least. So, the cloud can think now, but the sensors to some extent are not just dumb sensors. But I mean, in the future this should change. The sensors are some kind of distributed intelligent network. And that's where…that's real Internet of Things.

I: So, according to your definition, real IoT doesn't exist yet?

PL: Not very widespread, no, at least. Because, somebody is probably on to something I don't know. So, what we see there, if we zoom out, is smart cities could be a good example there. If you look at Amsterdam, that's one of the top smart cities. What do they do? They collect data, for example, when people are diving around and so on. And based on those data, they collect that in a data center and then other people can build services based on that and so on. So that could be an example, Otherwise, I would say that…I don't know any companies or media companies especially that provide stuff. I couldn't really find any. No…smart cities is the closest we come, really. Cause a lot has been going on there, but it's still not really in a business case.

I: Yes, we had the same impression when looking through the research.

PL: Because a lot is written on the internet, you can find a lot, but real…and then you would say: "ok, where can I buy it? Hmm, not for sale, just a research project". So, that's the problem yet with it. And then, of course, one of the conclusions you'll also come to later is why I'm not there that I can go and buy it? But it requires a lot of thinking.

I: It's exactly the question afterwards. Talking about the problems and risks with IoT and its implementation and then on the other side also the enablers.

PL: Yes, there was those. You had three perspectives on it here: technology, operational and ethical. And, I mean, the technology is still this, the processing power is not available on these mobile devices, because if they should do that, then they use battery power. Because there's

small devices put anywhere in your home, there could be a 100 of those different places. And I mean, if you then have battery, they use battery power, then you need to substitute or replace 100 batteries every year or something like that. Probably a no go. So, I mean the power must be so low that the battery can last at least ten years or something, because then maybe it's okay to do that. Because it's just a few batteries year, that can be done. But we're not there yet simply. That is one problem. The other problem is that they need to communicate and you can imagine 200 devices trying to communicate in your home. And if it's an apartment, then they will also have 200 devices around in a big building block. So you can imagine a thousand devices that should talk at different times. And they talk a lot actually. Because if it's a movement sensor in the room here and each time we move, or the dog, or the curtain moves…whatever, it will send out information. So, there will be a lot of information going on there and that means it simply collides. There's not enough resources to take care of that information. And then, I mean, we will have a lot of interferences. They will simply collide when they try [inaudible passage] but actually you did the same scenario and now we have to try again, because it was lost and so on. And then that's called interferences in wireless communication networks and that's a huge problem. And that's not solved, too. People write a lot about it, but it's really not solved. So, that's probably the main thing from my technical point of view. Then of course, you also asked about security and ethical and I see at least…Yeah, there's the same thing there in this perspective, because the privacy of data. Your data, if they're going out to a cloud server, if you have all those things in our homes, you have a cloud server out here. And we take…and those sensor to some extent can describe what we're doing in our home. And that's actually sent into a cloud. Do we then feel safe about sending that to a cloud? Google owns the clouds, we will be safe about that, right? We can ask that question. And how about hackers? Can they hack in and get all our personal information there? And, I mean, especially with hackers, all our data is in the cloud and everybody who has a home, their data is also in the cloud. Then you can imagine what an extensive amount of data there will be there and if hackers and other bad guys so to speak get access to that, then you will see it is a big problem. Because then they can explore a lot of things and then we have no privacy. So, I mean, that's the problem there. And know hackers also become better over time, so they can do a lot of things today and in the future maybe the machines itself can be part of the hacker. Because I mean when AI comes into place, more and more intelligent machines, they can start hacking those things and they are more clever then we are at that time. So, how about that? So, as you can see, there's a lot of things about privacy and we will actually hand our personal data to and so on and so forth. And, of course, we have laws now that say there's restrictions to it - the new GDPR - that is coming up and so on and s forth. But implementing it and how do we really know they respect it and so on. That's a lot of [inaudible], especially about security, which is probably one of the reasons we do not have this Internet of Things now. I mean, how many people would like to have a camera in all of their rooms in their homes. I don't think, I can't imagine many. People say this is too invasive, we don't want to have cameras. Blindfolds, no. But maybe movement sensors, ok. I mean, if you can just turn on light because you move in your rooms, ok, that's ok. So, there's also something there that is maybe more related to the ethical part. Because, how much do we like to do there? And especially, for example, when you have something we call [inaudible]. That is the case where we try to use ITT technology, so elderly people can stay longer at home, because many people don't like to go to some care giver home or some foster home or something like that. They actually like to stay home and then ITT could help them with that so that they can still contact doctors and relatives and all that stuff. And that's called ambience system livings there. And that is also some chances there, because then we could say, yes, we could use Internet of Things devices as part of the ITT devices in those homes. But that means it could be a camera. And I mean, would old granny like to have cameras in all her room so that she can stay longer at home? Maybe, maybe not. So, there's a lot of problems in that, so...

I: What do you think is the main driver then on the other hand?

PL: The enablers...yes, what did I wrote there, actually? I can't remember them all.

I: Is it the companies wanting more data about their customers for marketing issues or do you think it's mostly the 5G?

PL: Yes, that depends on what kind of companies that we look into. Of course, from a technology point of view, it is the 5G technology that actually hit this massive machine to machine communication, also relying on machine communication. That's part of 5G. And I think what drives is more or less and also to some extent limits it, is finding good use cases really. You also had problems there? That's one of the main drivers actually, but also one of the main problems. Because we have those smart devices, we have those clouds and we have those connection to phones and

other interfaces there. And we can say: "oh, but in the end, what should we use it for? What should it do for us? What is the services we can't live without that this can give us?" And that's part, that's one of the big problems why we don't have it yet, because I mean we have the technology, but we don't have the good use cases. So, that's probably some unsolved problem. And then you asked something about...wasn't that the same thing? Needs to consider...yeah, when starting an IoT needs to consider what. And I mean they need to consider that, the good use cases there. They need to look into 5G and also maybe create partnerships with other companies that maybe have the technology and the other stuff. Because maybe they can derive the use case, but the technology is pretty complex, so they need to create some partnerships there. And then you also asked what is the limiting factors, right? In the next one there....and, what did I write there? That's, of course, security, as we have discussed. That's one of the main things. And also that, how do you provide new business opportunities? How can we run a company here? User adaption - will the user accept it? Will they say: "ok, it's part of my life, it's ok with that camera, I'm used to it and I know the data will only be saved and so on...". Maybe that can come in ten years' time or whatever in the future. It's still a no-go now and that's probably also the reason why it doesn't really penetrate the market yet, there's other things that rise. I think...and, of course, the services one more time. I mean, if you can't find good services, then why do it? It costs money. So, I think that's more or less the main factors there, that's also wide, people-wide.

I: And we already talked a bit about the infrastructure - could you elaborate on that for let's say maybe smart homes as an example?

PL: Yes, we could do that. I just have to see...I made some drawings...oh that's maybe later, because that...Oh you mean the infrastructure and what is needed to do all this? I'll just take a piece of paper. Let's see what we can do. I'm shifting over your phone there. Then...let's see where I'm going here. Now I have to make a consistent [inaudible]. Oh, that was in relation to actually the cinema part here.

I: No, not yet.

PL: Ok, so we could do it for homes, the infrastructure. There's different ways how it can be done. Of course, if we have the home here and the floor plan and the home and whatever rooms you have in the home, that will be a lot of sensors in the homes different places. And they need to create networks to talk together. So, they will do some wireless sensor networks here. They will connect to each other. Then there's different ways now, because what happens in those sensor networks is some of them is a kind of super node. There are master nodes in those soft nets there, so they take care of the other ones. You need to use [inaudible] things there. And then they collect information from the other ones there. Then the next thing is: ok, now we have the information, now we have to convert it into services, if it's a smart home. That means, there's different ways this can be done. We can have our own server here in the smart home, which communicated wirelessly, of course, it's all wirelessly. And that server can then run some AI or part of an AI system and based on that it can like a butler, you know, it can offer services. So, it knows, that if you pass a geo fence two kilometers from your home, your phone sends that you passed the geo fence it has from the GPS system. And then it says, ok, it seems like you're going for work, then the home can look into your calendar and say, ok, it seems…oh the server now...ok, it seems like you're actually are going for work and then it powers down everything. You don't have to think about that really, it's just a basic. So, it will go save the heating and lighting. And if something is on that shouldn't be on, then it will say, ok then we switch that off. And maybe it will ask you, send you a message "should I do this for you?" and so on. So that's actually, that's one way to co-actively run a project and I have some students looking into that right now. They do a Master thesis on that. And then the server...the AI partners that'd learned from your calendar, that learned from the geo fence and all that sensors there, can be in your home. So, it's a home server. The good there, of course, is all data stays inside the walls of the home. I mean, they're on that server there only. The bad thing, of course, on the other hand is that you need to maintain it, you need to invest into new software for it and you need to be sure it runs, and you need to update, all those things. So, that's is, you know, always [inaudible]. So, what probably another solution is here is to use a cloud server, cloud service. Then you use that. Then you can use this as a kind of what we call a thing client. We need only to extent collect the data, pack them, and send them out to the other one. So, it doesn't do much, but it can also take part of the [inaudible], because there would probably be some people here with a smartphone there, which communicates with the server in some way. And...so...but then the main process takes place in the cloud server, because there's much more power there. And they, of course, take care of backing up your data, maintain it. All that stuff will be done for you, if you just pay some Amazons some small amount for that.

However, then your data is going out there and that is, of course, a risk, especially when it's Google. They can use them. The payment in Google is data. So, that's more or less the architecture of a smart home that you have. A lot of sensor nodes here, you have user interfaces, of course, and those nodes can also be also be...it can be TV, it can be, you know, Fritz!, it can be a washing machine, dishwashers, all those things. Because, if we can control those intelligently, you can imagine you can save a lot of power. I wrote a paper about that, if you're interested, you can find it. Where if you have to organize things there, you can say why let the washing machine run in the expensive hours. I mean, at each evening everybody uses power for cooking. And that means that the suppliers for that really, of the electricity and so on, they need to fire up extra turbines that use a lot of oil or whatever they run on. That means pollution and those things, because it co-starts. It starts up and provides a lot of power in the evening between six and seven and then it goes down again. It switches off again. And you can imagine, because it's not heated, it needs to heat up and it does a lot of pollution there, a lot of CO2 in that phase. And then it runs for an hour and then it powers down again, because everybody uses power from six to seven. And if we then run our dishwashers or washing machines or other things in that time, that's stupid. I mean, it doesn't matter, if the dishwasher runs from eight to nine, as long as you have something clean the next day, right? And the same with the washing machine. So, maybe a system could be built that actually could schedule, so if people have 100 washing machines in a large building, maybe we could schedule them so they're not running at the same time and not making this peak load worse than it actually is. So, something like that can be done on schedule. The problem there is that then you have more than one home. You have a lot of homes in a building, apartments in a building block there. Then you need to combine that, because if you should schedule the washing machine here, here, and here, you need to do that from some centralized service here. So, and then the cloud services come into play and try to do that in an intelligent way. That's, of course...and still, the users the users should be in control. They should, of course, accept what it suggests. Or they could set some rules and say: "you need to...it must be run before eight or seven tomorrow, so I'm sure I'll have some clean clothes then, so...". So, that's actually more or less the architecture. And then, of course, this cloud service here normally is part of a smart city. And there could be small cloud services locally on the way here, but they can communicate with a larger one here, which has a huge database and that's what they do, for example, in Amsterdam and other places. And then they can collect data. People actually say, ok, we accept these data handed out. Because then it can be collected here and used for a lot of services. This way you can have neighbor help and you can do some social activities together with other people, because all the data is there. What people are doing...of course, it needs some filtering, privacy, security, all those things one more time, but if people say: "ok, this data ok I will give this free", then they can go to this database. And then we have a full city where everybody puts up what they're interested in for different places, maybe so. And then the data is free, meaning that everybody who would like to do an app can get the data access to them and then build nice apps, which hopefully improve our lives. So, that's more or less the idea of what's going on out there right now.

I: How about the internet capacity? Is there a specific internet capacity that needs to be upheld?

PL: Yes, to some extent, of course. But, that's why we have this one there. Because, if you have all those nodes and as I said before, you have a curtain that moves in the wind, that room sensor will send a lot of data, or the dog, whatever it is. And that means this data should be filtered, it doesn't give any meaning to say the person is in the room 100 times in ten seconds. I mean, if you do it one time in ten seconds, it's probably ok. So, you need some filtering. Ok, the 999 should go away, one should be sent out of 1.000, so 900 off you go. Some things should filter that away, cause that will be a lot of load on, if you send all those data up here, you'll send all 1.000 in ten seconds for one sensor. You can imagine what that will sum up to over a long time for all the homes for all the sensors. So, some things should do some pre-process on those data before that leaves the home and that's actually why we have the sync line to the server there. It's right to filter out and say those data doesn't give any meaning. I mean, if you know the person is in the room, then he is probably also in the room two seconds later, for example. If he isn't, then we will see two seconds later it's efficient resolutions. Then we can say, ok then he has left the room, but probably close still in two seconds, we'll know, right? So, I mean, there's a lot of filtering that takes place there. And because of that, it is possible to actually [inaudible] angles to do things like this. The other problem, of course, also...if you have those 1.000 data which is the same in that short window, you will fill it up in a very short time. Even a huge database will be filled up, because there are many houses. So, we need to be really sensitive about our data and that's why we try to move part of the intelligence out here, because instead of sending 10.000 data from different sensors in a home that's saying the user is leaving, then we could check why not just say "user is leaving". And substitute all the other ones. If that's the service demand and that's why we try to

distribute part of the service out to the homes here. And say, ok if the home can do it itself and detect you're leaving, then, if they have the sufficient information for doing that, they could do the local detection and then it could send that event, high level, and say "user is leaving home", not 1000 of sensors which then that one finds out "user is leaving the home". See, there's a big difference here of the amount of data. And that means, of course, that we can compress data down to the minimum, there is a minimum, of course. Also, for...problems in this concept is also that we have a single point of failure. You start one...if there's only one...

I: But there's always a proxy.

PL: There's always back-ups and then you have kind of a flow, switching node balance in all those things are different. So, normally it will not go out, but single point of failure could be that your internet connection is cut off next to your home. And then we say, ok, we know we don't have internet connection, the router is down for some reason or somebody has broken the cable out there. What then? Do we work at all? Can you unlock the doors? Can you disable the security system because you can't talk with the server? So, we need some kind of back-up to be able...and that's actually also part of that thing client to run a minimum system, so it can still unlock the doors, if you have electronic locks on those things, still disable the security system. Fire alarms should then work. There's a lot of services that should hopefully work and that can be a little bit tricky. So, it is about moving it moving the intelligence from here down here, but not such much that it cannot back it up...we cannot not...if it goes into failure mode, we should still be able to provide some minimum services there. So, there still need to be some out here and some here, but not too much. So, it's a balance. Yes?

I: Do you have any hidden pitfalls so to say when implementing IoT solutions? Something that no one thinks of initially...

PL: Oh...what was that one? That was question...

I: The last IoT one.

PL: The last IoT one, I'll see if I can find that. Ah, number six, yes! The only thing I think, if, if, what I wrote here was...if some companies like to go into this, into Internet of Things future, then they should look into what has been done out there already and how mature it is. And you know the Gartner hype? The Gartner curve, that one. Where it can be...and Internet of Things is at the top of that hype curve, meaning it is not really established yet. It's still something that people talk about, it's very hot, but no one has really done it yet. That's the downside there of the...of the hype curve you meme. Then it goes down, then it goes slow up again and that's actually where things become solid and Internet of Things is not there. So, I think, if somebody likes to go into that business, they should look at those data and...what has been done. You know, Gartner's hype curve is actually pretty good, and they can see that there's a risk of doing it. Of course, they can be front runners and, you know, harvest the ten percent of the good things of those buyers that is front runner buyers and say, ok, we would like to have this technology just because it is new. Then, of course, they can take that market. But...the solid market where we sell a lot of products over time there, it's probably not there yet according to that curve at least. And I don't know about any services...for example, if I go to IKEA, I can't find an intelligent lab that can learn what I'm doing and turn off and off - on and off automatically. I don't think, I can't find it. So, I don't think really you can buy those things yet and that's also what the theory says so...Yeah, that can be a pitfall, that going into the market too early. But on the other side, first person also gets the ten percent that are willing to pay. So, it depends what market you would like to have. Yes?

I: Yes! And now we're moving a little into the more cinema related stuff. When we wrote to you first, what did you think when you heard "cinema of the future and IoT" - how did you imagine that and what did you think it was about?

PL: Yes, my ideas before...because you have some really good ideas there, I think. It's actually pretty good what you're doing there. So, let's see what did I wrote? I took another piece of paper that day. And yeah...some of it is actually the same, but not all of them. For example, I wrote here, that the ticket and the snacks and those things could be pre-paid in the smartphone or actually a smart watch. You know, many people have smart watches today. And you all should use that, I could see later on. Maybe some kind of guidance to your seat could be added, so that your smartphone could guide you to your seat.

I: GPS.

PL: Yeah, actually some other location services indoor, so GPS doesn't work there. But there's other ways that can be done. And that means maybe, you know, if the light is not, it's normally not that much light in the cinema just to start the movie or if you're a little late, then it could be nice, if you have the phone saying "certain row, two seats that direction", or something like that. Something like that I wrote. And then I have some more, that's more about the experience in the cinema, where I was thinking about tactile feedback in the seats there, that could be something maybe, right? So, you feel, oh, you're driving, then you do this and so on and so forth. If you're accelerating. You know, in a rollercoaster you can also feel that and so on. So, tactile feedback could be something.

I: That exists already.

PL: It does?

I: Yes, it's called 4D cinema or 4DX.

PL: Yes, I know that. They have one in Tivoli, actually. But, I mean, that could be part of what you could do for cinemas in general maybe. And then, augmented reality glasses. You know, Google have those Google Glasses. So, maybe you could in some way differentiate the movie experience for different persons by having glasses that give information. Maybe you'd like to know something about the player or the scene or who actually wrote that one or something like that. Then you can have it in your glasses and next to it stuff like that. So, get an augmented reality, you know, where you put text and pictures on top of what you're seeing. That's what could be done with those Google Glasses some years ago. So, something maybe there. Advertisements also in that place. Maybe also some kind of 3D sounds, because if you put something in the seats, then you will be able to make much better sound. You would actually be able to make some real 3D sound there. That could be nice. And, of course, the last one was the only one you had, because that was monitoring the person there with some body area network. So, parameters which can tell how interested the person is in the movie and so on. So, but you also had that one. So, that was the one I wrote before you sent this one. I actually wrote that some days ago. That's why it's on another piece of paper.

I: Yes, and if we then go directly to the seats that somehow measure peoples' arousal or response to the movie. Well, we thought of different ones, like a presence sensor just to see whether a person is there sitting on the seat or not, which is quite common already. I found a lot of examples for those and then motion sensors.

PL: Ok, so it's already done?

I: Yes, they tested it, for example in...

PL: Ah ok, but at a test level.

I: We are not sure it's fully deployed, maybe in Amsterdam. I'm not sure.

PL: That could be, I don't know. I have not seen it, but it's very interesting.

I: But, they did real-time testing for that with metros, where when...before the metro comes, shortly before, people can see where the free seats are.

PL: Ah ok. Sometimes it's in parking lots, too.

I: Exactly. So, that's not so advanced. But then, yes, motion sensors and something with humidity or moisture or...

PL: Blood pressure and those things...

I: Yes, heart rate monitoring, blood pressure. But I couldn't find anything that is integrated in a seat.

PL: Not in a seat, no. So, we can take that now, so we don't follow the order, right?

I: Then it's just a Galvanic skin response, right? Or?

PL: Yeah...yeah that can measure it. Actually, there's some new technology ongoing there. So, because I have...I wrote an idea...You asked what could be improved to the ideas there. And I think that maybe you could use a...what did I wrote there? Maybe some wrist band. I actually have one for...

I: Is it infrared?

PL: Yep, I will just try...should be in this box here, if I can find it. If not a student borrowed it and forgot to hand it in again. No, actually there is it. Something like this. It's actually have an...that's an RFID on, so that you can read that with your phone actually.

I: But is this an infrared reading?

PL: No, it's only an RFID, but just to illustrate the idea. Because if you have something like a ticket that you are handed out at the entrance, then you could use that, you know, for...as a ticket when you go out, if you go out for the bathroom or a break and need to go back later on, you just use it each time, so you don't need anybody to control your tickets. You can just use that at the [inaudible]. And it will raise an alarm, if you don't, right? The you could also use the smartwatch thing to monitor, for example, the blood pressure, the...the heart rate monitored there and another really important thing I also think you should also take there is acceleration. If people are moving...
I: Accelerometer.

PL: Yes, or something like that, right?

I: Didn't we write that already?

I: No, motion sensor.

PL: Ah ja, ok. Ja...because I also wrote that you could use your mobile phone, if you don't have the wristband then peoples' mobile phones could be used for the same thing. Because there is actual meters on board.

I: Ja, that's true.

PL: And then you have it for free as long as they have your app, so you can monitor it. But that's not...oh sorry. But if you take that one there, then you can see a smartwatch could also be used for, of course more complete than that one, could also be used for ordering snacks during the break. So, when you sit there and think: "oh, we need some cola". Just order them. When the break comes you will go out and pick them up and pre-paid, of course. I would say just pick them up. It could be used, for example, also when it is dark in the cinema and when the movie runs, so if you need to be guided to a toilet, then you can also, you know, use your [inaudible]. There and there, it's around the corner, so go there. Maybe we can do something there for location things. And then, of course, you can also use it for some kind of...of information system for the movie. If you have a question for the movie up there and say: "ok, who's actually the main actor there?". Ah, so get information to you. Smart watched can do a lot of things and it's becoming cheap now and running Android and all those things, so. And they also have RFID like that one there and then you it has a nice interface, small displays. It's like a mobile phone on your wrist here. And that means it has all the sensors on board, so it can measure those things.

I: RFD stands for?

PL: That's a small frequency radio.

I: Ah, good.

PL: So, your phone, if you have an Android phone it's actually on board. You can just send a beep and then it opens up and say what is programmed on that one there. Yeah, you know...use...when you use payment, what's it called?

I: NFC you mean?

PL: Ja, NFC, that's actually the near field communication. Ja. And those are [inaudible] or something called RFID text. That's a sub-framing of that. Ok. Ja, ja, so you know. So, something like that could actually be done there, if you build an intelligent wrist band or use peoples' smart watch in the future, if...I think most people will buy that in the future, because you can do so many nice things with emails and everything on your...on your wrist there. But, now we jumped, I think. We had this nice thing here where you also said scenario one that is not maybe really based on the Internet of Things. It's more, you know, mobile phone.

I: Ja, it's a mixture, because we have different angles. One from...ja, one is the user experience and that side, how you can improve everything for the users and then the cinema side where they get data to improve their side kind of.

PL: Ja, of course, that's the idea.

I: It's a mixture.

PL: Ja, ja, but there's also something in it for both parties, so to speak. So, that's really good. So, ja...

I: And regarding peoples' arousal during a movie, for example with the heart beat or the Galvanic skin responses - what do you think is the best way in a cinema set-up to measure their response?

PL: Ja, that depends on how things are built, because then there's more different ways. One of them could be the smart watch thing. And then, of course, you need the identity of the person, if you're going to build a profile of that person. Because if you have some kind of identity, then there's a lot of information available out there, you know. About us...and that can do...in some way that can be used to adapt our experience. So, so...that's one way using this watch, as we discussed. Of course, you...meanwhile it's not here yet. Everybody don't have it. So, what we'll use is probably the mobile phone for now to try to improve our experience there and that means that....then the user should in some way run an app. So, you need to...you also should suggest developing an app there, which can improve, where you can recommend movies, if you're passing next to the cinema or something like that. So, that kind of app could also be implemented, that'd be substituting this wrist band opinion. Because, as I said, we have the accelerometers, so it can get those for free. The only thing is how can we in some way detect the identity of the user and that is a small problem there. The way it could be done is that, if you have the mobile phone and the user is running this app, then the user have registered to actually to allow to download that app. Then you have the user's identity. And then you know user of this identity is sit in seat three. And then you can maybe do something with that information, because then you have some kind of profile of the user. And especially in the long-run, because then ask users after the movie and say, if you vote for the movie: what did you like? And then ask a few questions to the user on phone and then say, if you participate you can win popcorn next time you come here or something like that, right? So, so, and then you can get actually users who through food and movie and say: "ja, what's good? What's not so good and so on?". He vote default that can be saved [inaudible] a kind of personal information for the user because you know that entity. Next time user come and see another movie and vote that. Over the long-run, you will actually know the profile of that user and that's how a recommender system works. And that's what I'm so [inaudible], you know....[inaudible]. And that's actually you can do the same thing here, because then you can learn the user profile and recommend all the movies based on this. But, so, that's something you could look into also. And then, of course, you can combine that with what you can measure. Especially, if you have that watch, right, and the heart rate and, and skin contact and things.

I: Could you build anything into the seat like if we say they don't have smart watches they don't have the...

PL: Smartphone, ja.

I: But they do have their phones and the app, so at least we know who they are. Could be build something into the seat that could somehow connect you to the mobile application?

PL: Yeah, connect to the mobile? So, we assume they have a mobile with that entity.

I: That's not necessarily need to connect to the mobile.

I: No, just so we know at least who they are, that's the only thing.

I: Ja, but if they book their ticket, you select the seat and then the sensors are in the seat, so you automatically know which person is sitting there.

PL: But if you have your phone, you can use that also. No?

I: But I don't think everybody has a phone on them in the cinema. I mean, mine for example is always in my bag somewhere on the floor.

PL: Ah ok, it can also be switched off. Yeah, that can be. Of course, you can build sensors into it, but then you cannot measure heart rate and skin conduction, you'll not be able to. Maybe you'll be able to measure some kind of movements. I mean, if the user...ja move or something like that.

I: Actually, you can measure heart rate. They can do that already.

PL: Ja, but there's a lot of noise there.

I: Ja, it's not very precise, that's true, but...

PL: I don't think so. Because they normally...I know the seats are in some way connected to each other, some framework that carries them. And that framework will resonate. Because what you do there, is you use the pressure and try to filter out all the noise so that you get the heart rate, because we move a small amount each time the heart beats. And that's you try to detect. But I'm pretty sure that the noise level, if you have ten persons on one solid frame, all of them have different heart beats. I don't think it'll be very precise. But I don't...maybe someone had done that, actually and there's a process.

I: And actually, you mentioned something earlier also, that the number of sensor might be an issue, if there's too many.

PL: Ja, also. So, that at least I think, they have to rebuild the seat there. Maybe if the seat is not connected anymore and people sit still and the [inaudible] level is right, maybe then you measure the acceleration. But I'm in doubt there, really. It will be a hard thing to do and also be a pretty complex software.

I: Could you read the heart beat by heat sensing?

PL: Hm...

I: Like for example the infrared, for example, that's one way to do it, but like sometimes people resonate at different heat measure depending on their hear rate, right?

PL: Hmm...I've never seen anything about that really. Because then the...I was thinking of the blood penetration...

I: Ja, the blood flow.

PL: ...And it's think layer of skin and...and so maybe...Of course, that is done and, you know, nowadays in those where you put this clamp on here and then they can put light in through the finger and see it. But, as you also, if you've seen some, the light is very, very red.

I: But you have to hold very still.

PL: Ja, and the light is very strong. There's a lot of power in that light, you should not look into it. Because otherwise they cannot measure it. And I mean, if you put a camera 20 meter from all the seats and have all the people sitting there, I'm not sure.

I: It's only because I'm thinking of those kind of...where you...

PL: Ja, it's a good idea.

I: Where you have these kind of cameras that can detect movement in darkness, right?

PL: Yes!

I: So, what if you combine that with some kind of infrared, so you can actually see the heart rate, beat in some way?

PL: I don't if it's been done yet. Have you looked up, are there some papers out there?

I: Well, we have looked at a lot of different things, but not this in particular.

I: Not that one.

PL: Ja, it's a good idea. I mean because then you can set up one camera next to the screen and then you could take pictures of everybody there and measure all the blood...the heart rate of all of them at the same time. Like signal processing.

I: Yeah, and then you could do image processing afterwards let you see, if it's actually changing between the pictures.

PL: Yes, cool! But I don't know, if this can be done. Because...

I: No.

PL: Because I think the problem can be that what they do with those thermal cameras which are also used for houses, you know, to measure where is the [inaudible] and all those things...Ohm, what they do is, there are error rates over long time to get rid of noise You know, if you take a lot of pictures and put them together, then the noise will drop.

I: Yes, exactly the image processing.

PL: Yes, that's part of the image processing. And that means, if that window where the error is too long, then you can't catch the heartbeat. If you error out two seconds, you will miss one or two heart beats. And that, I think that could be the problem. Because then we can say, ok, then we're not errors more than half a second, because maybe then we can catch most of the heart beats. But then, there will be so much noise, you can't use them for anything. That's always...

I: What about a combination of things then where you have like...let's say you have all the things we mentioned here. We have the, the, the weight, so we know, and we have the accelerometer in the seat as well...

PL: Yes, in the seat, yes.

I: We also have let's say some kind of acoustic sensor and maybe also facial tracking to some degree and then we also have the heat sensor. Do you think the combination the combination could somehow...?

PL: Normally, it will...the more sources you have, noisy sources you have, then you can always boost them in some way to increase, to lower the noise level, ja. But I don't know, if it'll be sufficient. Ja, I don't know. You'll need to look up, if somebody have done research there. I don't know if it...how, how the resolution is for those things. How good are the infrared cameras you can buy for money today, because there's also a perspective in it. How expensive are they? NASA probably have something, right? But you can't buy that. I mean, not for cinemas. You need to buy cheaper ones and what can they do? What is the...? So, you need to find some research papers where people have done that.

I: Yeah, but this is also...

PL: It's good yeah...

I: ....a futuristic case.

PL: Ja, ja, but it's really a good idea actually, because it's...then you can get feedback. And actually, I have wrote a question about this, because I will then say: if you get that feedback, what will you use it for?

I: Well, we actually talked with the cinemas during this week and at least for the consumer insights manager, he was talking a lot about this knowledge about knowing, for example, how to make good trailers or good movies, for example, in regards to arousal peaks. They actually made a biometric test with Galvanic skin response recently.

PL: But isn't that different for different people?

I: Yes, of course, but that's the thing. If you first establish a profile, right? Then over time you can know who the person is to some degree, of course.

PL: So, you will have individual advertisement to the different, to individual people?

I: No, since they're all sitting in the same cinema hall. Their main focus was on whether they could remember the trailer they just saw. Like they asked right after the trailer were played: "which ones do you remember?". And there was a very stunning amount of people who couldn't remember the trailer they've last seen, a minute ago.

PL: Ja, that's how it is.

I: And then they, they looked at how the arousal curve somehow corresponds to whether they can remember it or not.

PL: Ok. So, so, but I mean, this is, they use the majority? Because I mean, if you ask people, some will say "ja, I can remember" and some will say "I can't". So, you're...maybe...if you end with a 50/50 of those, then what should you really do, right? Then you would say, we can try to improve, so it's 60/40 instead of 50/50, of course, and try to do that, but I mean that...

I: Or link it to the, the persons themselves, like their age, their gender, their interested. Like all the...

PL: Individual data, ja. And say ok, but then, and you know those person that is sitting there and then you can look at all the profiles and say, ok, seems like it's all for action movies. All those that are sitting there. So, now we'll...advertisement, which is about advertisement.

I: Demographics.

PL: Something like that, maybe.

I: Ja, because they are already segmenting a little bit and now they could do it more precisely. And also in regards to other kinds of commercials.

PL: They already do some kind of segmentation there?

I: Ja, a little bit.

PL: How do they do it? By asking people?

I: No, they basically look at like the main segmentation for the movie that is coming out and they're looking at what kind of trailers would be possible for this movie. So, that's a different kind of approach, right?

PL: Ah ok, ja. Ja, because the users are not involved there.

I: Exactly! And in this way, it would be an opposite way of doing it. And...

PL: But then users is involved and that's, I mean the target in the end, so that's probably a good idea.

I: And also, for recommendation systems, as you actually mentioned. If let's say I've been to the movies, if they over time can tell me exactly what profile I would like to see...

PL: Yes!

I: That could be a good way to make good movies and marketing.

PL: Ja, ja, ja, ja. The only thing is, you need to use a majority. You cannot do individual adaption, that will not be possible, of course. So, but of course, maybe if you can get a higher score, that's better than a lower score, of course. 100 people instead of 50 people is better that like the movie and so on and so forth. Ok, so that what you'll use it for. Because I was in doubt. I think, ok, because you use a lot of effort to collect some data. I mean, what's the outcome then?

I: Ja, but...

PL: Is it worth it?

I: I get there's...also the whole pre-process of them going to the cinema and like catching people when they go in and also their buying of snacks and whatever. Like this kind of processing could be different. And they could more easy say, ok, we need 40 popcorns for the next showing, because these people have already been pre-paying, so the percentage will...

PL: Pre-pay...Ja, ja. So, it's pre-paid, so they...but use the staff simply, because you just need to prepare in good time and put it on the counter and then people can pick it up.

I: Ja, in practice, ja.

PL: Ja, ja, ja. There's some benefit to that, actually. Ok. Ok. Nice! Where were we?

I: One other question: what role do data analytics platforms in a scenario like this?

PL: So, how should it look? Was that what you meant with...

I: No, like...

PL: That's question...

I: If it's recommendable to use a specific platform or how you would like handle the data intelligence in the network? Because it's somehow...

PL: In cinema environment?

I: Ja.

PL: Ok, so, how should this look in cinema?

I: Ja, but with a specific...ja, the whole set-up as well, but I think that's fairly similar?

PL: Ja...

I: The rooms are the seats, or the houses are the seats, depending on...

PL: Ja...that's...ja, it is pretty similar, actually. I just made a short one, but the only thing, of course, is that we need to have some extra step here at the entity of the user. Because if you have a smart home, we know who's living there, right? So, so...so that's more or less the same architecture I have drawn here. Ja. Ja, it is, it is.

I: Ja, but I meant the platform where, where people from Nordic Film then could see, ok, this happened, and this is how the data is analyzed. One that shows like nice stats and graphics and so on. Like Microsoft Azure, for example. Do you have any recommendations there?

PL: Ah, for those platforms? For cloud services platforms and so on?

I: Yes.

PL: Ja, of course, Azure is a nice way to go, it works pretty ok. But then Microsoft ist also collecting data there. And data is, you know, the money nowadays. The only company that claims at least they don't do it, that's IBM with Watson play. They say the customer's data is the customers. But

then you need to pay a little more for their service, because, you know, it should be paid somewhere or somehow. And IBM actually....so they had this Watson platform, which is very good actually, and then they claimed they have some privacy built into their concept and the do...they deal with you. So, that's one thing. And I think Watson is a good one, but it's also an expensive one. Then, of course, you have Alexa.

I: Ja, Amazon.

PL: Ja, Amazon's, ja. It's also a really nice one...platform and that's free, students can play with it and so on and do a lot of nice things. If you want to build something in the future, some prototype, there it's actually free. Then we have Siri...

I: Ja, Siri.

PL: That's also a nice one, ja. Apple's, ja. So, there's many of those platforms out there, but that's probably the ones that is able to do what you'd like to do. Because, you need, if you need to extract for example the person's mood out of the blood pressure and skin conduction, then a lot of things is need to be processed there. And you need some powerful AI system to do that and that's those today that can do that.

I: Ok, do we have more questions?

I: There's only one thing I don't think we actually talked about was like: when can we expect all these solutions? If you had to fantasize.

PL: Oh, be careful. Hahahaha. Yeah, when we will have it?

I: Ja, when it will be readily available and of the shelf basically, ja?

PL: That depends on what kind of things you're thinking about?

I: Well, for example this scenario we are making.

PL: Cinema.

I: Could you imagine this being built?

PL: With the present technology?

I: Ehm, maybe future technology? I don't know, it depends on how long...

PL: Ja, a few years. The perspectives is there. Ja...yes...I mean, what you suggest can be more or less done with a mobile phone today in an app. Because, if you use that the way we discussed and if you ask a...the user you can give them a price and say, if you're student and do some ratings after the movie, then build a profile of the users where you can recommend those things.

I: But all the things in the seat then?

PL: Ja, the things in the seat. I'm not sure, if you can actually detect the heartbeat, the heart rate, I don't know. But if you have seen some papers there, then maybe you can. I don't know. But you have to look that up.

I: Ja, your point with the connected was a very good one, I didn't think about that. Seats can detect the heart rate to some extent.

PL: No, no, no. Then you need to rebuild the seats and so on. And, and the same thing with the skin conduction. You cannot do that in the seat. The moisture from if you're sweating, yeah...

I: But heat also is...

PL: Not sure you can measure that really. Because I think, if people are moving, you know, the air that conducts, if you're sweating, right? They have a conductor around us, it's not linear flow. Because there's lot of people in the same time, it will be [inaudible]. So, it can easily be that the

person next to me has actually putting the wind to my sensors, so to speak. And I'm sitting here. That would...Ah, I don't think that can done, but I can be wrong there, because I don't know.

I: But you think it could be done in the future then? In any...

PL: Building into the seats...ah...

I: Like do you think some day we could have like intelligent smart sensors that actually could do this in...ja.

PL: Yes. The answer is absolutely yes. Because, for example, let's take this sweating thing, the moisture. I don't think you can build something in the seat, but that's a thing I can be wrong. I don't know it. But from at [inaudible] I don't think, no. But what you could do or will come in the future is actually intelligent clothes. That will come. And that will say us...

I: Ja, [inaudible].

PL: Ja, exactly. And technology build into...into...to, to, to, for example moisture. And say, oh, you're sweating, wash me and so on, right? And those things maybe you could maybe use. Because, if, if you have it in a seat, in your clothes, actually and it says it needs to be cleaned, then that could be used. I mean in the seat you can have an [inaudible] that asks your shirt and say, ok, it seems like a lot of sweating right now, so the movie was good here. Something, or very exciting, or whatever, right? So, absolutely yes, it will come. Because that is things people are looking into right now, doing intelligent clothes. Body area network it will be the absolute best thing, because the you have sensors' position. But I think that'll take some time, because I can't really see why should people do that. They will only do it, if they have good services out of it.

I: Is it like five years, ten years, 20 years? What are we talking?

PL: Ach, that's also hard to guess that one. But I think we will see a lot in ten years' time.

I: Ten years, ok.

PL: Ja of those things. Because the technology is there, as we discussed earlier, for most of what we discussed here. The problem is finding good services. But what you're doing here is good services, so maybe it can be done in a combination [inaudible] and there's actually a market who looks into for it. So, ja. It is possible in the future, absolutely.

I: Ok, I think that all, right?

PL: Ok, great.

[Participants thank each other and say goodbye.]

10 Interview Guide Samant Khajuria

His role: Assistant Professor at AAU CPH

General GDPR questions:

- What does the new GDPR mean for internal sharing of data in larger corporations like Nordisk Film?
- Do you think we will see a change in consumer behaviour with regards to keeping data more private?
- What challenges do larger corporations like Nordisk Film face when they have multiple division that operate separately from each other?
- What restrictions will GDPR mean for tracking, sensing and recording data of consumers with or without their knowledge?
    - i.e. mobile services (e.g. Nordisk Film cinema app)
    - What if the data is anonymized after the collection?
    - Assuming Nordisk Film would change the way they analyze and use consumer data, do they need to change their regulations accordingly and notify existing users about the change?
    - How far does it go in regards to privacy when public institutions utilize technology to track, sense, and record data about regular people's whereabouts, actions etc.?
    - Do the same rules apply for public and private institutions?
- Will the new law restrict development in media and technology?

STOF Model questions:

- In a world where the consumers are demanding more personalized media products and more on demand products, do you think GDPR will change the technology that companies use to provide that service?
- Do you think it will be harder to create technological advanced products such as IoT solutions after the GDPR is enforced?
- What type of financial issues do you think companies will face as prevention against non-disclosure issues and data safety?

Questions about the cinema in the future:

We work on the concept of the cinema of the future, where multiple IoT services and optimization to their services will help provide more personalization and a seamless experience. However, during our research it has come to our attention that many things are difficult to implement and the consumers are not necessarily willing to share private data.

- Do you think the GDPR will increase the public's' trust towards data usage or will it create more mistrust? And which implications could that have for the future creation of applications and new technological solutions?

11 Interview Samant Khajuria

Date: 01.05.2018
Audio Length: 33 minutes 55 seconds
Speakers: Samant Khajuria [SK], Sofie Krog [I], Caroline Weimann [I]

SK: First thing, I would like to...I mean, it's not only me talking. So, I'm also asking you guys: how much of an understanding do you have about GDPR?

I: I work a little bit actually with GDPR at the firm I'm at. To a degree though, because I'm working at Djøf, which is a union for economists and lawyers, and we offer courses, of course, in GDPR and I'm the main responsible for that course. So, I know a little bit. But...and then also I am in the middle of a digital change where we have to have a lot about the data, personal data politics, and...brugervilkar, where we give them to the users so they know about how they can use the platforms and how the data is going to be used for future purposes and so on. Ja.

I: And I just know theoretical stuff about it. I wrote a small paper about it last semester, so.

SK: Everyone knows only the theoretical stuff until now. I mean...

I: Yes! Cause that's the difficult part, you...I read that, and I think I can understand it, but then I don't know how companies put it into practice kind of.

SK: So, basically right now it's all a big mess, because everyone is planning to be compliant before 25th of May and then they are hiring different kind of people to do the job. So, for example, we have lawyers who are doing the job in Denmark. So, one part, where the rule is not very clear, if they are good data protection officers or not, but because they are legal entities. So, it's a very safe bet for a company to hire lawyers and lawyers are the ones who are also teaching the course about GDPR. Then comes the IT consultants, like for example Deloitte, KPMG, and NIT and so on and so forth. Ja, exactly. So, this is actually about cyber security. So, eh...and they think they are the ones who are supposed to do. Because all the challenges that we face today are the technical challenges, not the non-technical challenges. GDPR is not something new, it came...

I: In 2016 there was the last time there was a new.

SK: Even before, if you go it's from 1995.

I: Ja, but it changed early...

SK: That's a data protection directive, the difference is only that it changed from directive to regulation. Because now, if people in 1995 started following the regulation, those people do not necessarily have any problem today. And if they are ISO compliant, ISO27001 compliant, they also do not have any problem. So, the problem is only because people have to pay fines, so that's why people are very worried, because fine means that they're money goes down. So, this is how the timeline looks like for directive to regulation. So, first EU data protection directive in 1995 and 2018 GDPR will come into force. And then this is the timeline what happened during the period of time. This is how it works like. The biggest thing is like when we talk about GDPR, at least last year when we discussed with many [inaudible] and all this kind of people, this is what we came up with where we have a GDPR and ISO compliance, the 27001. And we try to find the overlap, because we want to reduce the cost of GDPR implementation. So, it is not something that is very expensive and a small [inaudible] guy will have to pay a lot of money to do this kind of things. So, these are all sorts of things that we look into. There six principles in GDPR, bla bla bla. We can go into those kinds of things. But first thing first, we you...now going back to your case. So, in your case you have a big company and then you have subsidies, or you have smaller companies. Now, one needs to understand, like, who is the first entry for the user. So, for example, if it's via or is it via IoT devices: which company is in the forefront who interacts with the user?

I: Nordic Film in general, I think.

I: But then again, the application is mostly cinema, right?

I: No, it's not only for the cinemas.

I: No, that's true.

SK: So, I mean the reason why...from a GDPR perspective the way we look into things is like...we say 'user', we say 'controller', and then we say 'processor', right? Now, most of the categories we would like to fit into this one, because no one know what new entities will come after 25th of May, if there is some revision or something like that. But this is the broader understanding. Because GDPR was made for, I mean, if you look into the definition of GDPR, then it...the whole point of GDPR was...where is it? Ja, so ambition is to produce right incentives for the services to flourish by providing trustworthy infrastructure supported by the right regulation. This is something which is from the directive itself, which was written in the regulation, too. So, then what we do is, like, we look into these three main things: personal data, which means interaction between the user and the controller, what has been given to a controller, this entity, and a processor, which does on behalf of this entity some kind of processing of data. So, in your case what one needs to identify: number one - who is controller?

I: Nordic Film.

I: Ja, it must be.

SK: Let say...let's say for now Nordic Film. Ok. Then comes the subsidies and these are you said three.

I: Oh, there are actually seven, I think, isn't it?

I: Ja, I just named three.

I: But eh...like it, lot of them don't really talk so much with the others, there are like kind of separated from the rest.

SK: No, but then in this case, they will not play a role unless they are connected to Nordic Film.

I: Ok.

SK: So, if they're not taking the data from the user to do any kind of processing or any kind of service, then there is no problem. So, only thing that we need to see is: who? The game is all about data. The data which is personally identifiable data. So, that is the whole game. So, whoever gets this data is responsible here. So, you said it's P1 to P7, as in processor one to processor seven, but only P1 and P2 are the ones that are part of it. So this means, when the controller is using this user's data, then it needs to mention in the consent that P1 and P2 are the part of this and they have your data. And controller and P1 and P2 have to sign a contract.

I: Ah, ok.

SK: So, a contract needs to be signed between these guys and these guys that you're processing on behalf of me, that you are taking my data. This means that you have to be compliant with GDPR. Failing to be compliant with GDPR, I will not be liable, you will be liable, and you have to pay the fine.

I: What is they wanna share? The P1 and P2.

SK: So, controller gets the data from P1 and P1 gets the data from P2 you mean?

I: For example. Or P2 gets the data from P1, P1 gets the data from P2.

SK: Still in that case to make it less complicated, they should sign something from between the controller and the processors and then they have a box here, which they both can share. That would make more sense. And then you can do back and forth. Because P1 is good for data visualization, P2 is good for mining or artificial intelligence. So, this means both the separate companies would like to use the same data, but they should sign with the controller, because controller was the first entity who got the data from the user. So, that way it makes more sense.

I: How about, let's say the use an AI platform to analyze the data, so that, would that be a sub-processor?

SK: AI platform to...any of the processors need to use AI platform.

I: Ja, let's say they wanna use Microsoft Azure or so to analyze the data. So, in that sense, Microsoft gets access to the data as well. At least to some extent. So, how do they fit into that picture?

SK: Ja, then P2 have to sign with Microsoft.

I: But they're not called processor in that sense?

I: Or controller for that matter.

SK: No, they are some kind...this is where things get complicated. So, if P2 wants to do it, then P2 is giving it to a sub-processor. So, you can call it a sub-processor in that way. And then, then Microsoft becomes a sub-processor who needs to sign something with P2 that you will not use this data for any purpose than what it is intended for. And...this, this, and this needs to be mentioned here in the consent form.

I: How about, of the controller part, for example, they use an external source for creating the application, for example, to check the data. Would that mean...?

I: Haha, then they do a contract as well.

SK: Ja. But external application has in...ja, again the same thing.

I: Ja, a firm, that's usually how you do it.

SK: So, I mean, it's a lot more easier to do it like this. So, controllers have separate contracts with different processors, who will have access to the personal data of their clients or the users.

I: Would that mean then, let's say in the future this company starts making more contract with other sub-processors...

SK: Who, this company?

I: Ja....will have to update, they will have to update the contract with the user or...?

SK: Ja, and as you know, whenever you download an update of an app, so you also get this extra permission sometimes that you have to say yes to. It's exactly the same thing that you have to do. So, and then...

I: Ja, I was just thinking, if all companies need to do this and they never did it before, it's actually gonna be huge overload on the users.

SK: Ja, but I mean, every time you add a new processor or something, then I...this is where the lawyer comes in. Because then here the consent is also something, which is very interesting how the consent should look like. So, the person gives explicit consent to fulfill or prepare a contract. So, if you have already done a contract and then you add into this one, then it is not a problem. There is a legal obligation, medical situation, public function, and legitimate interest. So, these are the six ways of doing a consent. So, most from the users' perspective we fit here, are somewhat here sometimes. So. this means a consent could also be sometimes. Processors doesn't care about the users in that sense. Then processors what would say: "oh, by the way, I'm gonna go to Microsoft and I need this. So, controller, I am adding Microsoft in the tank, so we need to update our contract." So, they only do update our contract and the controller updates in their consent that there's a sub-processor who will be processing the data for the purposes of AI.

I: So, the user don't have to actually accept anything, any changes? They just have to know it.

I: They download the new app with the update...

SK: But, but...No, no, but this is...

I: Ja, there's something with the acceptance, right?

SK: This has also changed now. So this means, users have to accept, have to. So, for example...bla bla bla...where is it? Consent and transparency: any freely given specific informed and unambiguous indication of the data subject's wishes by which he or her, by a statement or by clear affirmative action. Affirmative action meaning, here. This is how it used to look, this is how it should look, this is wrong, and this is right. Meaning, before it was like: "if you do not wish to receive any further marketing information, please tick opt-out." So, it was like opt-in or opt-out and all these kind of things. Now, here it's very specific: special offers by post, by email, by telephone, by text, and by fax. So, something specific that the user can tick. And in this case, also, if the user says: "no, you cannot take my data and send it to Microsoft as a sub-processor" then they cannot do that.

I: But then that just means...let's say we're talking about the Nordic Film app in this case, that just means that the user would delete the app and delete the account.

SK: Why? But that is a thing, that is a normal thing that comes in mind, right? If you don't want the service, you delete the app. The way of looking into this is, the Nordic Film says: "ok, you don't want to share your data, you get less services in return".

I: But how should they use the app and Nordic Film would then just extract that single user's data and not process it, or?

SK: But that is the problem, and this is what right now people do not know how this will work. Because then this all fits into my very difficult parts here. The right to be forgotten, data portability, right not to be profiled. And this is where it gets really complicated, cause how the hell do you do 'right to be forgotten'? Given that the world has been working since 1970s with computers and people have running legacy systems and we have so many different systems right now, which have absolutely no possibility to delete the data.

I: I mean, you can probably delete a person's file, but you can't really delete all the analytics that are based on some of that data and all the results from that.

SK: Ja, exactly. What basically they want to is, like, they want to make people rethink how to design enterprise architecture where you can go and say 'delete anything about this person, delete'. So, that is the thing.

I: Hmm, ok, ja.

I: But how far are they in that process? I mean, it's 25 days left, so...

SK: But who are they? That is the case. Because if, last time I talked to people from Dansk Industri, we agreed on 15 percent in Denmark will be compliant and rest won't be. Or in some sense it will be hard, some situation will be like this. We talked to Microsoft, Microsoft is compliant now. At least that's what they say. Kommune, they are having a hard time, they are some kommuner which are, some kommuner which ar not. You can talk to KL, they are the one responsible for looking into those kind of things on behalf of kommune. Some schools have taken this independently. So, for example, I think it's Vallensbæk Højskole or something, they're where [inaudible] have started working on their own things. And some people have just lawyers to look into this thing, so how to take care of this. So...and many people what they have done from the past one year is simply implement the ISO27001, so this means at least the data is secure. So, you change the consent, secure the data, then you are almost there, but you cannot do all these things. That is the problem.

I: Ok. Where is the difference between public companies in that sense?

SK: Difference is private companies...well, the difference is where does the national law comes and where does the national law doesn't come. So, for example, if you are a private company like Novo Nordisk, then they are exempted from a few things, because they also do trials and they have patient data, but lots of the work is done for the research purposes. So, this means, they are allowed to do, they come under some special circumstances. Private companies are, like if

you're working with police, or if you're working with military, that means that you come under national law and GDPR have no influence on those things like that. Same thing goes with the medial data at the hospitals, because it is a completely different kind of certification. Our regulation that they have to follow, so...

I: But I heard private practices are actually having a lot of issues with GDPR.

SK: That would make sense. Because private practices have CPR number and CPR number is an identifier, a very unique identifier.

I: Ja, they have to change them all. I heard they were putting numbers on everything and putting people in different number groups to divide who they are, but they can't put CPRs, or names, or addresses, or anything.

SK: Ja, and this is something what they have, if you want to red a bit more about it, then you can read about HIPPA. HIPPA is one of those which is a regulation of the world for medical data.

I: How do you spell it?

SK: H I double-P A, I think, HIPPA. Just let me see...

I: I think I read about it a little bit before, because my parents were talking about it.

SK: HIPPA. Ja, so health insurance portability and accountability act.

I: Ja, ok, easy name.

SK: So, it's an American. But they have similar thing in Denmark, also. And also, at the European level, also, they have it. It's all about this patient data, child abuse or medical records, payment history and everything goes into this kind of thing.

I: Do you think that we will see a change in consumer behavior with regards to keeping their data more private?

SK: Not necessarily. Many people do not even understand what a GDPR is and many people do see it as a [inaudible]. Because there is something called privacy paradox. So, everyone wants to talk about privacy, they want to do something about privacy, but many times they are the ones who are making a mistake. Well like, oh not this time, maybe next time. I don't want to read what this application is asking. Even if it's a flashlight and asking for your microphone and whatever GPS coordinates. Still, people don't care. But they are very vocal about it, they talk, but they don't want to do anything about it. So that, so I'm not really sure. However, we have changed. We have done some studies in different countries right now, something called...we have written a paper it's published: "Millennial users in 5G context". So, it is together with Line, we have written this paper. We're...we would like to collect how the users...what are users' expectations about 5G future technologies. And privacy was one of the things the younger generation mentioned quite a lot that they would like to see. So, we went to gymnasium or university students here and the study was done in Denmark, India, now it's going in China, Finland, and so on and so forth. Some different countries, so we're doing the study. So, people show that they care...but.

I: But do you think, like, now you said Millennials, but what about for example Generation Y? Everybody is talking about that and their behavior in general in regards to anything technological is so different from anything we've seen before. Do you think we can expect the same from them?

SK: Hmm, that depends what we can offer them in the new one or two years. If we can offer them a privacy-oriented architecture of internet, then probably that will not be of concern. But, if we can't offer them and if it continues to grow the way it is growing, then, of course, privacy will be of concern. Privacy has always been of concern in any...we can see privacy since...for the past hundred years. But it's just the definition of privacy that has changed. So, in the past the privacy was curtains, locked doors, file cabinets. That changed to computer systems. Then apps came, then how much of data you want to share, how much you don't want to share based on the scare that you have. Tagging people on Facebook, for example, that has a different implication. So, that's why it's super vast right now. That's why no one is sure what it will turn into. The general

conception is like people are...do care about privacy to a certain extent. And there are lots of studies. One of studies I can mention is, like, you can look into Gartner.

I: Ja, I saw that already.

SK: That's the graph you can use for your report, if there's something there.

I: But would you say that a law like the GDPR increases the trust or that it's the exact opposite, because people are even more aware of the security breaches?

SK: I mean, it does bring some kind of ripples, but by the end of the day, after a certain time, it will increase trust. And this is the whole point. EU wants to do this for digital single market. They can see how much of money they've been losing and how data is being abused more and more and more. Given that the data is abused so much that people who are capable, they have moved from normal internet, social media, and they are doing other things. So, for example, my students are right now making a first asynchronous privacy aware chat system. So, that is one of its kind. Based on Thor networks where you cannot see who is who. And no one can check. So, these are the kind of projects what we can see. So, for example, instead of having your user name, you have special ID, it's called "Onion ID". So, that you have. So, your friends who want to talk to you, they just have the Onion ID. And there's no server in the middle. So, most of the chat systems have a server in the middle where the messages go and then it's being sent. But in this case, it's other people who will hold your data, but they do not know what they're holding. So, this is...This is a kind of paranoia you see that people would like to think, because they simply don't trust. Good services, there are some services, like, secure services and privacy aware apps, something called "Signal" or whatever, which have been hacked. Like Signal was hacked three times this month by hackers. So, that's why people keep on...they worry. And also, for example, this Facebook thing has created quite a lot. And this has also shown that, if they are capable of also reading your personal messages. So, something that people are not very happy about.

I: So, we also thought about a concept where you have sensors in the seat that track the physical response of someone that sits in the cinema while watching the movie. How would that relate to the GDPR, if the data is anonymous. I mean, you would only know about the demographics of the person and, of course, in the first step you know which person is sitting there, but then afterwards you would anonymize it.

SK: What do you mean by 'which person'?

I: Let's say I book the ticket through the app and the app knows who I am and knows where I sit. And the sensors are in the seat, so of course it's also connected to the seat itself. So, it knows it's me who's sitting there and it's me whose response is being tracked. But then, in the second step, the cinema would anonymize it, so that they only know it's a 25-year-old person.

SK: But what is the point of having persons' personal information in this case?

I: Well the main idea is that...there's a lot of different tests that show, that if you measure different levels of peoples' arousal, when, for example, they watch different content, that can give you an indication about what works and doesn't work when your produce a movie. So, that data could basically be used in the post-process, where you actually produce the trailers, you produce the movies and do the right cutting. So, you can produce more great content and more personal content in a way.

SK: Ja, but, but I mean what is the point of having users' personal information here? I mean...

I: Well, they have that already, that's the thing. You can't really stop that. They already have the app system where people order tickets, where that information is already logged in the system. The thing is, this is more like an add-on, we want to have...that can work for the whole process of creating movies, both before and after, basically.

SK: And what is your expectation from the user? Just because they already have it, doesn't mean that they should use it. This is the problem that has been created in the first place. What happened was like people got data for free and they were like: "what to do with it? Let's sell it, we'll make money out of it!" So, this is the problem. So, for example, unless/until a person sitting in the chair have some kind of influence on giving the better quality, if it's a male, if it's a female, if it's 15 to

20, if it's 20 to 35, if it's origin, if it's post code - all these kind of things. Unless until it has any influence, then one should not be using this data. Sometimes it is good to see, ok, male/female and age plays a big role. Because, let's say it's an action movie, there's a tendency that a certain age group and a certain gender would come more. Or comic or cult movies or whatever you want to call it, or it's a good romantic movie. Then it's a different kind of people who are coming. So, what's the difference? So, if the data is anonymized to this level that it's only male and age group, then that does not link the data to the specific citizen. This means it's not personally identifiable information.

I: But it could, I mean there is a possibility, because you know which person is sitting there. And, of course, you're only gonna register, ok, he's 25 and male, but you could do more.

SK: And that is what needs to be changed. There needs to be some kind of unlinkability that we need to have...unlinkability...Ok, I don't know where it is. But, for example, what we do here is like pseudonymization. So, for example, where we secure the data. But one of the things I/we do, if I can find...Hmmm. Where did I put it? Ja, but one of the things we do is, we try to make the data unlinkable. So, if you can make the data unlinkable, it's fine that they have the information about the person. But then, once the person sits there, that information is completely encrypted and completely not being related to the specific person. Then it's completely fine and then it's not a problem. So, for example, gender and age, for example, then it's completely fine to have that. If in the system there is a possibility to link that gender and age to a specific name, CPR or app or something, then it's an issue. Then this should be very much clear in a consent. By coming to the theater, we know that you are you and you can say either 'yes' or 'no' to that. So, that kind of thing, ja.

I: Do you think that the law will restrict development in media and technology, because there is...

SK: Yes, I mean, people mostly see that law will restrict development. It's only because people have not found a better way. It's, I mean, eh, people think these kind of things will bring issues, we will restrict the development, we will have less open data and all these kinds of things. But, on the other side, we argue that it would bring more trust in the society. Once people start trusting the systems and services, then there will be no problem. Then people will share data, if they know that their data is not been used for bad things. And in return of this data they share, they get better user experience for service. So, in that way. So, it...basically the whole point is being more transparent and more fair to the users. That's the most important thing and that is something what service providers have forgotten over the past ten years or 15 years. That is something that needs to be changed.

I: So, it's more difficult for the companies but you think in the long-run it pays off?

SK: Ja, ja I think so.

I: Can I ask an additional one to this one? For example, like this law have changed multiple times over the years since it came out the first time. Do you imagine every time it will come up again, it will affect the same kind of ripple effect, both in regards to the companies but also the users?

SK: Not necessary. But, I mean, this is a very drastic change what we are doing, going through right now. And I don't see that it will have more drastic than this one, but it's a good thing that the law changes or at least updates by itself. That has always been an issue. The last law what we got, or regulation, or, sorry, directive was in 1995. And from 1995 'til 2016 there was nothing. So, we...even if we have implemented 1995 in 2016, it's still outdated, it has not considered everything. So, they had to go back and change the definition of PII, personally identifiable information, and maybe over the period of to, three years this definition needs to be updated. And we...that's what we have seen with the privacy. Privacy, for example, privacy definitions have changed since the 40s. I mean, first definition I could find was from Benjamin Franklin, one of the first. And then I could see the nice progression in the 40s, 50s, 60s, 70s. And those who wrote these definitions, just the context changed, because the data changed. So, in that we got more digital.

I: What about the financial impact when preparing for the GDPR. I mean, I know about the penalties when they're not sticking to it.

SK: I mean, financial, there is a financial impact meaning that you have to re-...you have to do things in your systems and the more older company you are, the more difficult it is. Because they

run legacy systems, they do not necessary have the databases and servers which are very clean and clear. So, first thing first. What you need to do is sanitization of the data. Then you need to put the data in a proper structure and that takes some time, that takes some resources. And then people do not know how to implement GDPR. What does that mean? So, then, then comes, ok ISO27001 is one of the ways. If you follow this, then you are coming more closer, cause ISO tells you to be a bit more structured. Like ISO there are many other frameworks which you can also implement. For example, one of the frameworks is NIST, N I S T, which is exactly similar to ISO and that is also one way of looking into it. In most of the companies, big companies in Denmark, we see a...when they write their risk analysis or threat assessment, they do both NIST and ISO. Are we almost done?

I: I think so, ja.

I: Ja.

SK: Good, I have a meeting.

[Participants thank each other and say goodbye.]

12 Survey Questions

CINEMAS – NOW AND IN THE FUTURE

* Erforderlich

Welcome!

We, namely Sofie Krog and Caroline Weimann, are currently working on our Master thesis at Aalborg University in Denmark. In the course of our thesis we investigate how new technologies can be used to improve the cinema of the future.
We appreciate you're taking the time to answer our questions, the survey will take approximately 6 minutes.

AALBORG UNIVERSITY
DENMARK

Cinemas in the Present

1. **How often do you go to the cinema? Please select the one that applies best.** *
Markieren Sie nur ein Oval.

- ◯ more than once a week
- ◯ once a week
- ◯ more than once a month
- ◯ once a month
- ◯ once every 3 months
- ◯ twice a year
- ◯ once a year
- ◯ less than once a year
- ◯ very seldom or never

2. **If you chose 'very seldom or never', why is that?**

3. **Why do you go to the cinema? Please select the 3 options that apply best.** *
Wählen Sie alle zutreffenden Antworten aus.

- [ ] spending time with friends
- [ ] spending time with family
- [ ] going on a date
- [ ] I appreciate the big screen and good sound
- [ ] only when I don't have something else to do
- [ ] I want to see specific movies on a big screen
- [ ] I want to see a new movie as soon as it's released
- [ ] I want to relax
- [ ] I want to be entertained
- [ ] it's a cheap night out
- [ ] I'm a "movie fan" and always want to see the latest movies
- [ ] Sonstiges: _____

4. **Do you ever find it difficult to choose a movie when going to the cinema?** *
Markieren Sie nur ein Oval.

- ◯ yes
- ◯ no
- ◯ I don't know

5. **If you chose "yes" – why is that?**

_____

6. **How do you usually book your ticket?** *
Markieren Sie nur ein Oval.

- ◯ in the cinema at the cashier's office
- ◯ in the cinema at the ticket machine
- ◯ via the web page (phone ticket)
- ◯ via the web page (print out ticket)
- ◯ via a smartphone app (e.g. "NF Bio")
- ◯ Sonstiges: _____

7. **How long in advance are you usually planning your cinema visit?** *

Markieren Sie nur ein Oval.

- ◯ a week or more
- ◯ a few days
- ◯ the day before
- ◯ a few hours
- ◯ one hour or less
- ◯ I just show up in the cinema and see which movie is playing
- ◯ none of the above

8. **What do you like about cinemas?** *

_____

_____

_____

_____

_____

9. **What do you dislike about cinemas?** *

_____

_____

_____

_____

_____

Cinemas in the Future

Please indicate to what extent you agree or disagree with the following statements.

10. **When ordering cinema tickets with an app, I would prefer it, if the transaction of buying multiple tickets could be split between me and my co-cinemagoers directly inside the app.** *

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
strongly disagree	◯	◯	◯	◯	◯	◯	◯	strongly agree

11. **I would like to order snacks directly through the cinema app, so that I can pick them up right before the movie without having to stand in line.** *

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
strongly disagree	◯	◯	◯	◯	◯	◯	◯	strongly agree

12. **I would prefer to have direct personal contact with staff in the cinema.** *

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
strongly disagree	◯	◯	◯	◯	◯	◯	◯	strongly agree

13. **I would like the cinema app to give me recommendations for new movies based on my previous behavior.** *

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
strongly disagree	◯	◯	◯	◯	◯	◯	◯	strongly agree

14. **I would like the cinema app to recommend movies to me based on my current location (e.g. when walking past a cinema).** *

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
strongly disagree	◯	◯	◯	◯	◯	◯	◯	strongly agree

15. **I would be ok with having sensors in the seat that track my reactions/physical responses to the movie.** *

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
strongly disagree	◯	◯	◯	◯	◯	◯	◯	strongly agree

16. **If the cinema used sensors to record my reactions/physical responses, I would feel my privacy was violated.** *

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
strongly disagree	◯	◯	◯	◯	◯	◯	◯	strongly agree

More About You – Demographics

17. **Please state your year of birth (format: YYYY)** *

_____

18. **Which gender do you identify with?** *

Markieren Sie nur ein Oval.

- ◯ male
- ◯ female
- ◯ I do not wish to answer

19. **What is your nationality?** *

Markieren Sie nur ein Oval.

- ◯ Danish
- ◯ German
- ◯ Sonstiges: _____

20. **What is your highest educational level?** *

Markieren Sie nur ein Oval.

- ◯ no schooling completed
- ◯ elementary school
- ◯ high school graduate, diploma or the equivalent (for example: GED)
- ◯ trade/technical/vocational training
- ◯ associate degree
- ◯ Bachelor's degree
- ◯ Master's degree
- ◯ professional degree
- ◯ doctorate degree or higher
- ◯ other

21.

Please state your current employment status. *

Markieren Sie nur ein Oval.

- ◯ student
- ◯ employed
- ◯ self-employed
- ◯ unable to work
- ◯ unemployed
- ◯ retired
- ◯ other

22.

Do you have any idea on how to improve the cinema in the future?

_____

_____

_____

_____

_____

23.

Would you be willing to participate in a short phone interview, in case we have further questions regarding the survey or some of your answers are not clear to us? If so, please enter your email address or phone number below.

_____

13 Codes

Service Domain:

- Personalization/customization
- Recommendation systems
- Contextual data (e.g. GPS and personal information) → *has been merged with several other sections in the service domain*
- Consumer value propositions (e.g. way to toilet, offline)
- Consumer insights and demand (e.g. Generation Y, Z and their needs)

Technology Domain:

- IoT → *has been split in two sections*
- Mobile services and app
- Other technologies
- GDPR & Security
- Data (usage/intelligence) & analytics
- Technical infrastructure

Organization Domain:

- Innovation/change readiness
- Organizational structure
- Current innovation initiatives (exploration)
- Possible future innovation initiatives
- Operations → *has been merged with several other sections in the service domain*

Financial Domain:

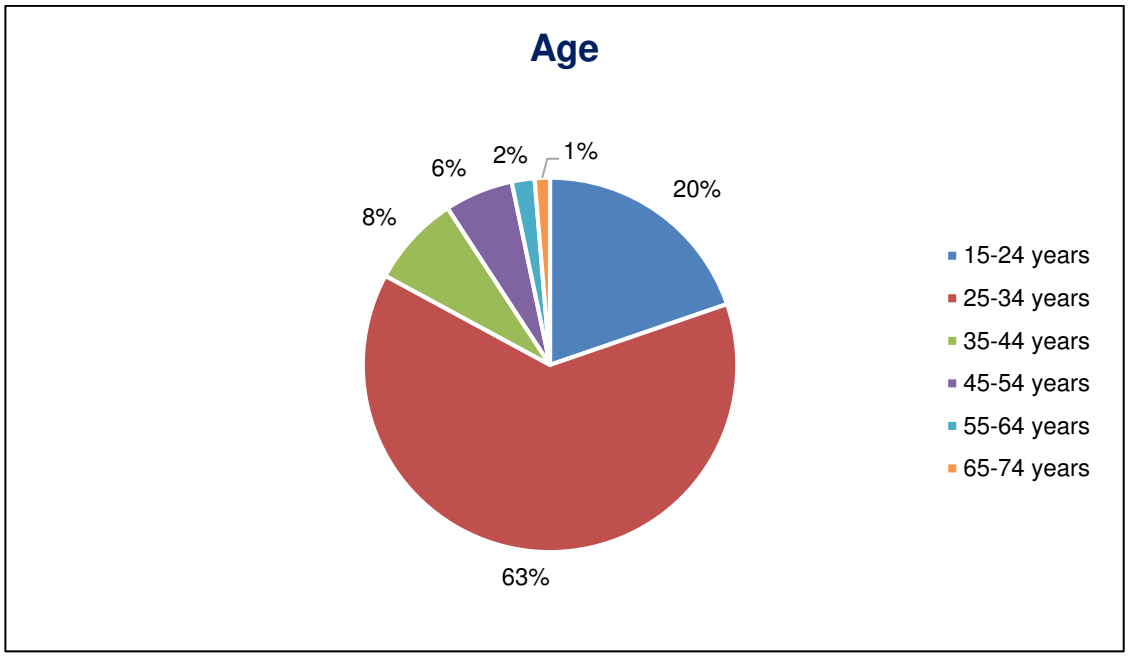
- Cost structure
- Collaboration partners
- Financial risks
  → *sections were reorganized*

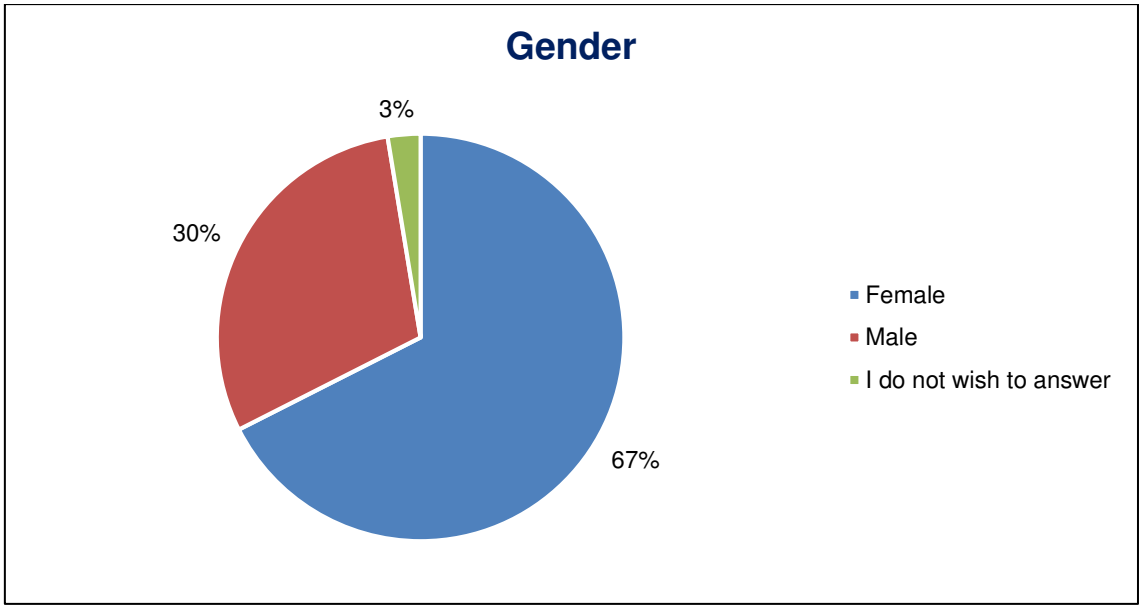
Other:

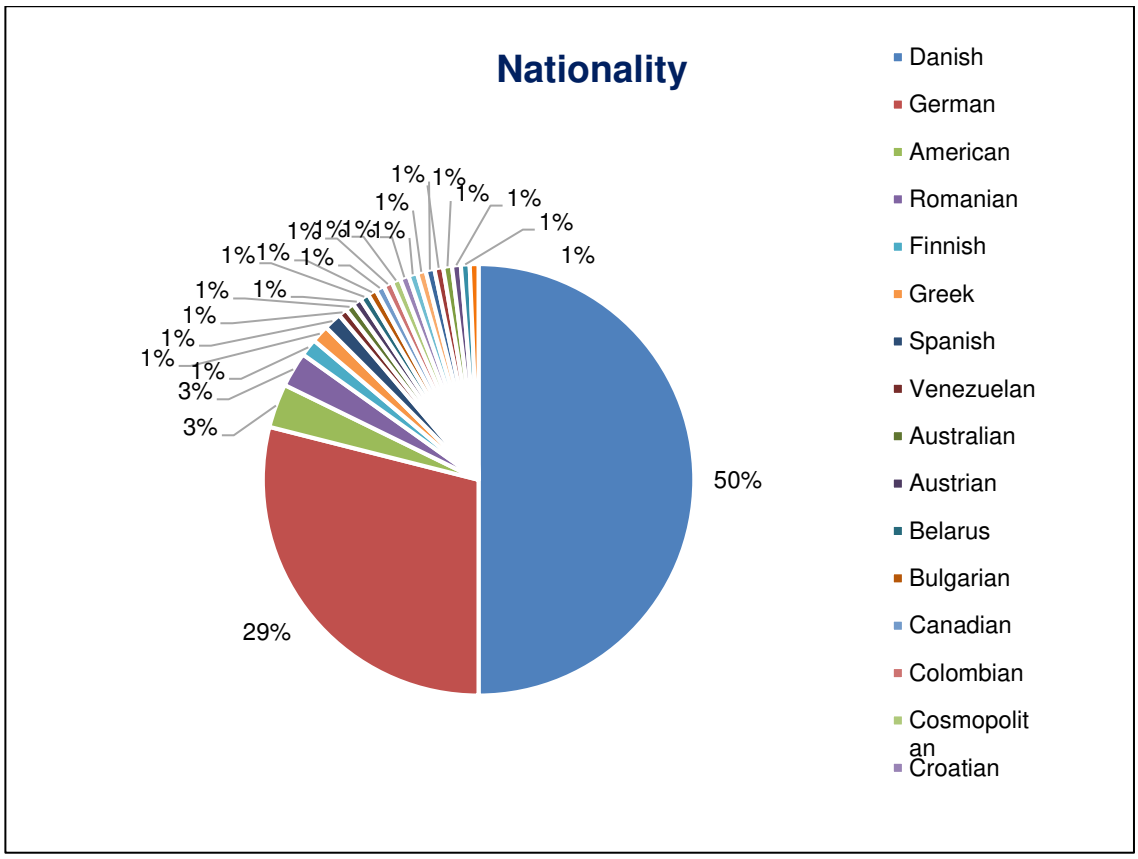
- Competition → *integrated in fiannce domain*
- Regulations, laws and restrictions (excl. GDPR) → *integrated in finance domain*
- The (current) value of cinemas → *integrated in service domain*

14 Quantitative Data Analysis – Extended

Demographic data






Nationality
50%
29%
3%
3%
1%
1%
1%
1%
1%
1%
1%
1%
1%
1%
1%
1%
1%
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Danish
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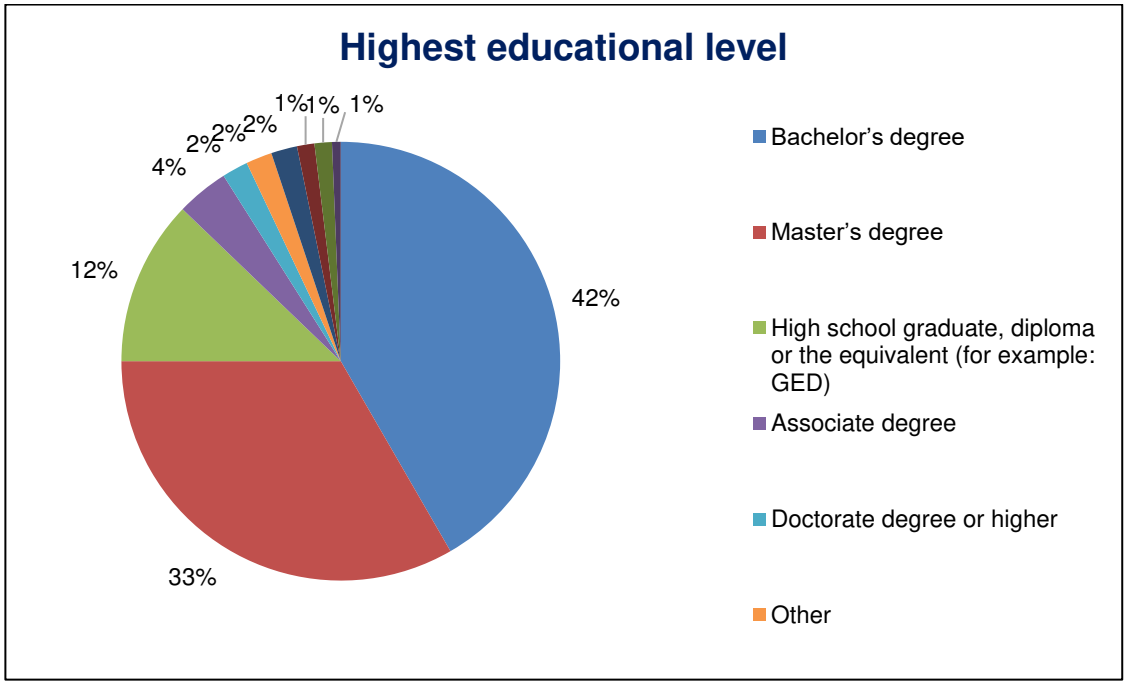
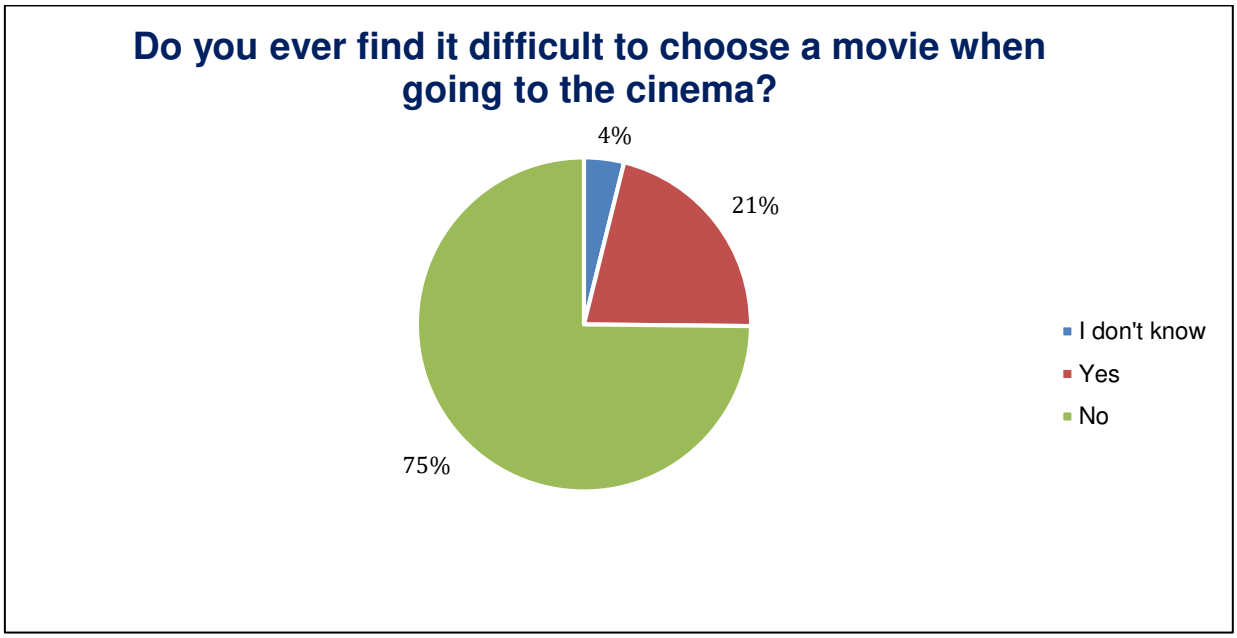
Venezuelan
Australian
Austrian
Belarus
Bulgarian
Canadian
Colombian
Cosmopolitan
Croatian


Highest educational level
42%
33%
12%
4%
2%
2%
2%
1%
1%
1%
Bachelor's degree
Master's degree
High school graduate, diploma or the equivalent (for example: GED)
Associate degree
Doctorate degree or higher
Other

Subjective measures



15 Follow-Up Interviews

Respondent: Kevin Vignola Ruder
Date of birth: 1990
Date: 25.04.2018
Speakers: Kevin Vignola Ruder [KR], Sofie Krog [I]

I: In the survey we've asked, if you would like to have personal contact with the cinema staff. What did you answer and why?

KR: I can't remember

I: Do you think the atmosphere would be more cold and impersonal, if you enter the cinema through automated check-in points (similar to the ones at airports)?

KR: Not really, you can build up a crowd by only allowing people in at a certain time

I: If you could speed up the process of receiving and paying for your snacks by using automated check-out points and therefore not have personal contact with cinema staff, would you change your answer?

KR: Not sure

I: In the survey we've asked, if you would like the cinema app to give you recommendations for new movies based on your previous behavior. What did you answer and why?

KR: I answered that I wouldn't really care too much.

I: Would you like to get recommendations based on e.g. your friends' behavior or other factors?
KR: I wouldn't care too much

I: In the survey we've asked, if you would like the cinema app to recommend movies to you based on your current location (e.g. when walking past a cinema). What did you answer and why?

KR: I wouldn't care too much

I: What do you think about location-based advertisements in general?

KR: don't have too much experience with them

I: In the survey we've asked, if you would be ok with having sensors in the seat that track your reactions/physical responses to the movie and if you have any privacy concerns. What did you answer and why?

KR: I think, I answered it would be sort of OK

I: Would you still say the same, if you knew the results would be completely anonymous (let's say they would only know your age, your gender and your nationality) and they use the results to make better movies in the future?

KR: yes

I: If the cinema offered you free tickets and/or free popcorn in return, would you do it anyways?

KR: Even more yes

I: If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?

KR: yes

I: Would you prefer to be completely offline while watching a movie in the cinema (e.g. phone off)?

KR: yes

I: Interesting you don't mind the sensors

KR: Yes, people are going crazy about the whole privacy thing lately. 'oh no they can measure my laugh" – I dont give a shit.

Respondent: Maria C. Krog
Date of birth: 1985
Date: 26.04.2018
Speakers: Maria C. Krog [MK], Sofie Krog [I]

I: In the survey we've asked, if you would like to have personal contact with the cinema staff. What did you answer and why?

MK: No - because it's mainly the big screen and the people I go to the cinema with that I enjoy

I: Do you think the atmosphere would be more cold and impersonal, if you enter the cinema through automated check-in points (similar to the ones at airports)?

MK: Yes perhaps, but that could be compensated for if the entrance was in a coffee shop/wine bar/place with other people.. I don't need to interact with cinema staff, just need a nice atmosphere. It would be a great idea to put the cinema, in the hall of a restaurant/nightlife kind of place

I: If you could speed up the process of receiving and paying for your snacks by using automated check-out points and therefore not have personal contact with cinema staff, would you change your answer?

MK: That would be nice - I hate queues and often don't buy snacks because of this

I: In the survey we've asked, if you would like the cinema app to give you recommendations for new movies based on your previous behavior. What did you answer and why?

MK: Yes that's nice - because I don't make that much research for new movies myself

I: Would you like to get recommendations based on e.g. your friends' behavior or other factors?
MK: Maybe, depends, as long as it is not a pain in the ass. If I can choose to see it or something like that

I: In the survey we've asked, if you would like the cinema app to recommend movies to you based on your current location (e.g. when walking past a cinema). What did you answer and why?

MK: No I think.. it's a bit creepy

I: What do you think about location-based advertisements in general?

MK: A little to much big brother society - but properly just something that we need to get used to, and then we love it

I: In the survey we've asked, if you would be ok with having sensors in the seat that track your reactions/physical responses to the movie and if you have any privacy concerns. What did you answer and why?

MK: No - too personal

I: Would you still say the same, if you knew the results would be completely anonymous (let's say they would only know your age, your gender and your nationality) and they use the results to make better movies in the future?

MK: That's alright I guess

I: If the cinema offered you free tickets and/or free popcorn in return, would you do it anyways?
MK: Don't know

I: If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?

MK: Yes

I: Would you prefer to be completely offline while watching a movie in the cinema (e.g. phone off)?

MK: Yes!

Respondent: Pernille Brita Müller
Date of birth: 1992
Date: 25.04.2018
Speakers: Pernille Brita Müller [PM], Sofie Krog [I]

I: In the survey we've asked, if you would like to have personal contact with the cinema staff. What did you answer and why?

PM: sometimes i like to have personal contact with staff as I provides a pleasant experience, if the staff is competent

I: Do you think the atmosphere would be more cold and impersonal, if you enter the cinema through automated check-in points (similar to the ones at airports)?

PM: Yes, a little

I: If you could speed up the process of receiving and paying for your snacks by using automated check-out points and therefore not have personal contact with cinema staff, would you change your answer?

PM: Yes, and no. It would be nice not having to wait in line all the time, but you would lose a lot of human interaction which is generally not a good thing

I: In the survey we've asked, if you would like the cinema app to give you recommendations for new movies based on your previous behavior. What did you answer and why?

PM: I said I would not. but that depends on the app. if I can go in and see the recommendations at my own time it would be nice. but if it came up as notifications I would not like it.

I: Would you like to get recommendations based on e.g. your friends' behavior or other factors?

PM: no. i feel that would be too "big brother" like, where someone is watching all the time.

I: In the survey we've asked, if you would like the cinema app to recommend movies to you based on your current location (e.g. when walking past a cinema). What did you answer and why?

PM: I would not like that. I find those types of spam annoying, when your phone sees where you are and automatically pops up with an advertisement.

I: What do you think about location-based advertisements in general?

PM: I find them highly annoying and a little invasive.

I: In the survey we've asked, if you would be ok with having sensors in the seat that track your reactions/physical responses to the movie and if you have any privacy concerns. What did you answer and why?

PM: I answered that I would not be okay with having sensors in the seats, simply because i feel as it is an invasion of privacy.

I: Would you still say the same, if you knew the results would be completely anonymous (let's say they would only know your age, your gender and your nationality) and they use the results to make better movies in the future?

PM: Yes, I would not like to be "monitored" while i was going out to have a good time.

I: If the cinema offered you free tickets and/or free popcorn in return, would you do it anyways?

PM: No I would not

I: If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?

PM: Maybe, I cannot say for sure. But I still feel weird about having sensor in the cinema.

I: Would you prefer to be completely offline while watching a movie in the cinema (e.g. phone off)?

PM: while the movie is running, Yes! before and after (while in the building), No.

I: Are you not even a fan of recommender systems on e.g. Netflix?

PM: Narh, not really, I am kind of indifferent about it. I do not use it really. Sometimes I check it out, but otherwise not so much.

I: I actually thought everyone used it to some extent, like the films are even ordered when you look at the front page.

PM: Oh, is that why it's always the same things I see when I go online. Now I am really tired of it. I want to have endless possibilities and a varied selection

I: So unfiltered?

PM: yes

Respondent: Pernille Julie Hansen
Date of birth: 1993
Date: 25.04.2018
Speakers: Pernille Julie Hansen [PH], Sofie Krog [I]

I: In the survey we've asked, if you would like to have personal contact with the cinema staff. What did you answer and why?

PH: Disagree. I don't think that contact with staff is an important part of the experience.

I: Do you think the atmosphere would be more cold and impersonal, if you enter the cinema through automated check-in points (similar to the ones at airports)?

PH: Yes, but I wouldn't mind it.

I: If you could speed up the process of receiving and paying for your snacks by using automated check-out points and therefore not have personal contact with cinema staff, would you change your answer?

PH: Probably not, but I like the idea of such snack machine

I: In the survey we've asked, if you would like the cinema app to give you recommendations for new movies based on your previous behavior. What did you answer and why?

PH: Neutral or slightly agree. I think it depends on what type of behavior is being recorded. I would be okay with recommendations, if they were based on basic data (e.g. which movie tickets I have purchased and how I have rated movies).

I: Would you like to get recommendations based on e.g. your friends' behavior or other factors?

PH: No. I don't think the cinema app should have that much information about me.

I: In the survey we've asked, if you would like the cinema app to recommend movies to you based on your current location (e.g. when walking past a cinema). What did you answer and why?

PH: Strongly disagree. I don't like the idea of the cinema app knowing my current location.

I: What do you think about location-based advertisements in general?

PH: I think it's creepy. In general I don't like sharing my location with apps, unless it is required for an important feature.

I: In the survey we've asked, if you would be ok with having sensors in the seat that track your reactions/physical responses to the movie and if you have any privacy concerns. What did you answer and why?

PH: Strongly disagree. I don't think the cinema should have access to that type of private information about me. I think the cinema would gain more from it than I would.

I: Would you still say the same, if you knew the results would be completely anonymous (let's say they would only know your age, your gender and your nationality) and they use the results to make better movies in the future?

PH: Yes. I wouldn't care about them being able to make better movies. I'm not sure that I would trust that the company anonymized the data.

I: If the cinema offered you free tickets and/or free popcorn in return, would you do it anyways?

PH: I don't think so. I think it depends on the size of the reward.

I: If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?

PH: Probably. I think it is important to make it clear what data is being collected and what it is being used for.

I: Would you prefer to be completely offline while watching a movie in the cinema (e.g. phone off)?

PH: Yes. I like that you have to stay focused on the movie. I think I would be less engaged in the movie, if I was using my phone during the movie.

Respodent: Mike Rosca
Date of birth: 1991
Date: 26.04.2018
Speakers: Mike Rosca [MR], Caroline Weimann [I]

I: In the survey we've asked, if you would like to have personal contact with the cinema staff.

What did you answer and why?

MR: Indifferent. The majority of the time going to the cinema is fairly straightforward - buy a ticket online, buy popcorn, watch movie. There isn't much that extra personal contact with the staff can help with, or add to the experience.

I: Do you think the atmosphere would be more cold and impersonal, if you enter the cinema through automated check-in points (similar to the ones at airports)?

MR: Maybe slightly, but it wouldn't concern me

I: If you could speed up the process of receiving and paying for your snacks by using automated check-out points and therefore not have personal contact with cinema staff, would you change your answer?

MR: Same answer, but I'm pro automated snack checkouts.

I: In the survey we've asked, if you would like the cinema app to give you recommendations for new movies based on your previous behavior. What did you answer and why?

MR: I can't remember the answer. Likely yes, because I like the feature on Netflix.

I: Would you like to get recommendations based on e.g. your friends' behavior or other factors?

MR: Yes

I: In the survey we've asked, if you would like the cinema app to recommend movies to you based on your current location (e.g. when walking past a cinema). What did you answer and why?

MR: No. I don't normally go to the cinema spontaneously because I'm walking by a cinema. If I want to go to a movie I usually research it online beforehand.

I: What do you think about location-based advertisements in general?

MR: They can be okay for impulse purchases e.g. 2 for 1 drinks from a nearby bar when out on a weekend

I: In the survey we've asked, if you would be ok with having sensors in the seat that track your reactions/physical responses to the movie and if you have any privacy concerns. What did you answer and why?

MR: I am ok with that, it could enhance the cinema going experience. Some privacy concerns if the data gets unsold to other companies/marketers.

I: Would you still say the same, if you knew the results would be completely anonymous (let's say they would only know your age, your gender and your nationality) and they use the results to make better movies in the future?

MR: Yes, I would be ok with it then.

I: If the cinema offered you free tickets and/or free popcorn in return, would you do it anyways?

MR: I would do it even without the free stuff.

I: If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?

MR: Yes, I like data
I: Would you prefer to be completely offline while watching a movie in the cinema (e.g. phone off)?

MR: Yes, always phones off when at the movies!!!

Respondent: Anna Nielsen
Date of birth: 1990
Date: 27.04.2018
Speakers: Anna Nielsen [AN], Sofie Krog [I]

I: In the survey we've asked, if you would like to have personal contact with the cinema staff. What did you answer and why?

AN: personal contact is important.

I: Do you think the atmosphere would be more cold and impersonal, if you enter the cinema through automated check-in points (similar to the ones at airports)?

AN: Yes

I: If you could speed up the process of receiving and paying for your snacks by using automated check-out points and therefore not have personal contact with cinema staff, would you change your answer?

AN: Nope

I: In the survey we've asked, if you would like the cinema app to give you recommendations for new movies based on your previous behavior. What did you answer and why?

AN: can't really remember, I think I said no. I think we are living more and more in a world in which an algorithm decides what we like, instead of just being curious.

I: Would you like to get recommendations based on e.g. your friends' behavior or other factors?

AN: Nope

I: In the survey we've asked, if you would like the cinema app to recommend movies to you based on your current location (e.g. when walking past a cinema). What did you answer and why?

AN: Nope. that would just be creepy

I: What do you think about location-based advertisements in general?

AN: Hate it

I: In the survey we've asked, if you would be ok with having sensors in the seat that track your reactions/physical responses to the movie and if you have any privacy concerns. What did you answer and why?

AN: I would hate it and feel watched all the time

I: Would you still say the same, if you knew the results would be completely anonymous (let's say they would only know your age, your gender and your nationality) and they use the results to make better movies in the future?

AN: Jep

I: If the cinema offered you free tickets and/or free popcorn in return, would you do it anyways?

AN: Yes

I: If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?

AN: Yes

I: Would you prefer to be completely offline while watching a movie in the cinema (e.g. phone off)?

AN: Yes

Respondent: Line Hansen
Date of birth: 1989
Date: 27.04.2018
Speakers: Line Hansen [LH], Sofie Krog [I]

I: In the survey we've asked, if you would like to have personal contact with the cinema staff. What did you answer and why?

LH: I would like to be able to talk to the staff in case the machines isn't working or I need assistance in another way

I: Do you think the atmosphere would be more cold and impersonal, if you enter the cinema through automated check-in points (similar to the ones at airports)?

LH: Yes, but I think we could get used to it

I: If you could speed up the process of receiving and paying for your snacks by using automated check-out points and therefore not have personal contact with cinema staff, would you change your answer?

LH: I am in favour of speeding up the process

I: In the survey we've asked, if you would like the cinema app to give you recommendations for new movies based on your previous behavior. What did you answer and why?

LH: Yes to some extend - great to be more informed about new interesting movies for me, but I might feel slightly surveyed

I: Would you like to get recommendations based on e.g. your friends' behavior or other factors?

LH: No

I: In the survey we've asked, if you would like the cinema app to recommend movies to you based on your current location (e.g. when walking past a cinema). What did you answer and why?

LH: No

I: What do you think about location-based advertisements in general?

LH: Can be great, but my concern is that I feel surveyed/monitored

I: In the survey we've asked, if you would be ok with having sensors in the seat that track your reactions/physical responses to the movie and if you have any privacy concerns. What did you answer and why?

LH: No. Privacy concerns.

I: Would you still say the same, if you knew the results would be completely anonymous (let's say they would only know your age, your gender and your nationality) and they use the results to make better movies in the future?

LH: Yes

I: If the cinema offered you free tickets and/or free popcorn in return, would you do it anyways?

LH: Haha tricky. I would decline.

I: If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?

LH: Yes

I: Would you prefer to be completely offline while watching a movie in the cinema (e.g. phone off)?

LH: Yes

Respondent: Madeline Aakard
Date of birth: 1999
Date: 30.04.2018
Speakers: Madeline Aakard [MA], Sofie Krog [I]

I: In the survey we've asked, if you would like to have personal contact with the cinema staff. What did you answer and why?

MA: I'm rather indifferent because checking in through a machine is quicker.

I: Do you think the atmosphere would be more cold and impersonal, if you enter the cinema through automated check-in points (similar to the ones at airports)?

MA: I already check in via. machines at the cinema (when paying for the tickets).

I: If you could speed up the process of receiving and paying for your snacks by using automated check-out points and therefore not have personal contact with cinema staff, would you change your answer?

MA: I answered yes, so I wouldn't change my answer.

I: In the survey we've asked, if you would like the cinema app to give you recommendations for new movies based on your previous behavior. What did you answer and why?

MA: I answered yes because I'm not good at staying up-to-date with new releases of movies, but on the other hand, I'm not the biggest fan of "cookies" and my life being tracked by others.

I: Would you like to get recommendations based on e.g. your friends' behavior or other factors?

MA: No

I: In the survey we've asked, if you would like the cinema app to recommend movies to you based on your current location (e.g. when walking past a cinema). What did you answer and why?

MA: I think I answered no, I'm not the biggest fan of my position and other personal data potentially being shared with third parties.

I: What do you think about location-based advertisements in general?
MA: I feel ambivalent about it. I see the advantages, but I think it could be misused.

I: In the survey we've asked, if you would be ok with having sensors in the seat that track your reactions/physical responses to the movie and if you have any privacy concerns. What did you answer and why?

MA: I answered no because I think it should be a personal experience to go to the cinema, I would at least feel like I was a part of a science project.

I: Would you still say the same, if you knew the results would be completely anonymous (let's say they would only know your age, your gender and your nationality) and they use the results to make better movies in the future?

MA: I think it's interesting for sure, but I think that movie producers know which buttons to press in order to get physical responses from the audience already.

I: If the cinema offered you free tickets and/or free popcorn in return, would you do it anyways?

MA: Maybe, but I would feel like it was bribery in order to get personal data then.

I: If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?

MA: Maybe.

I: Would you prefer to be completely offline while watching a movie in the cinema (e.g. phone off)?

MA: I would because you can easily lose focus when you're on the phone.

Respindent: Siarhei Pilat
Date of birth: 1989
Date: 25.04.2018
Speakers: Siarhei Pilat [SP], Sofie Krog [I]

I: In the survey we've asked, if you would like to have personal contact with the cinema staff. What did you answer and why?

SP: Yes, because interaction with a living human being will soon become an obsolete luxury

I: Do you think the atmosphere would be more cold and impersonal, if you enter the cinema through automated check-in points (similar to the ones at airports)?

SP: Could be, but I'm not sure

I: If you could speed up the process of receiving and paying for your snacks by using automated check-out points and therefore not have personal contact with cinema staff, would you change your answer?

SP: Probably not, but I like the idea of such snack machine

I: In the survey we've asked, if you would like the cinema app to give you recommendations for new movies based on your previous behavior. What did you answer and why?

SP: Yes, because I am missing out on lots of movies and don't keep up with latest trends, that could save me time so I won't need to research it myself

I: Would you like to get recommendations based on e.g. your friends' behavior or other factors?

SP: As a separate recommendation "feed", yes

I: In the survey we've asked, if you would like the cinema app to recommend movies to you based on your current location (e.g. when walking past a cinema). What did you answer and why?

SP: No, because I don't see how geolocation can be relevant here

I: What do you think about location-based advertisements in general?

SP: Interesting idea

I: In the survey we've asked, if you would be ok with having sensors in the seat that track your reactions/physical responses to the movie and if you have any privacy concerns. What did you answer and why?

SP: I'd be okay - for science!

I: Would you still say the same, if you knew the results would be completely anonymous (let's say they would only know your age, your gender and your nationality) and they use the results to make better movies in the future?

SP: I am not too concerned about privacy in general, so I'm okay with both

I: If the cinema offered you free tickets and/or free popcorn in return, would you do it anyways?

SP: Of cause

I: If you knew details about the data usage and analysis, would you be more willing to share your data/be tracked/recorded?

SP: Don't care, take my data for free, as long as I don't notice it

I: Would you prefer to be completely offline while watching a movie in the cinema (e.g. phone off)?

SP: I think that this should be encouraged, not enforced

I: So your not afraid of getting your data recorded/tracked?

SP: Yeah, I don't care about data privacy.