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User awareness of privacy regarding user data in Mobile Health applications and wearables:

- Do you know what you are sharing?

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Abstract:
Big data and the Internet of Things are certainly one of the hottest topics of today in the business world. One controversial topic within this area is data mining from mobile applications and wearable devices. This topic is controversial because these applications and wearable devices store and allow the mHealth companies to mine sensitive data about its users. So how aware are users of what sensitive data is collected from them and their usage patterns? The awareness level of the users is what this thesis aims to empirically study. Based on Endsleys (1995) Situational Awareness model and a literature review the authors of this study have modified this model to suit a users situation and decision process. The empirical evidence shows that from an individual perspective, the average user doesn't grasp the different types of personal data that can be mined from their usage pattern. The total sample provides a comprehensive understanding, however it does not affect their decision on acting.

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When we first started out with the thesis back in February 2016, we thought we knew exactly what we were going to write about. As we soon noticed, we found ourselves quickly lost and having problems with progressing our work.

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Lund, May 2016

Peter Grabowski & Jacob Samfelt

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List of abbreviations

BI	Business Intelligence
CPU	Computer Processing Unit
DNT	Do not Track
EULA	End User Lisence Agreement
FTC	Federal Trade Commission
IoT	Internet of Things
KDD	Knowledge Discovery in Databases
mHealth	Mobile Health
SA	Situational Awareness
SLA	Service Level Agreement
QoS	Quality of Service

1 Introduction

The introduction chapter intends to provide background to the topic of the study to the readers. The chapter includes problem area, purpose and delimitations as well as the research question of the thesis.

1.1 Background

We live in a world where technology has changed the way we conduct our business, run our private and social lives, to the extent that in the past two decades, information has taken the role as one of the most valuable assets (Moody and Walsh 1999). In other terms, information has become a raw material, a source that can be used and analysed for economic and social value (Tene and Polonetsky, 2012). One way for enterprises to use all this information that exist in the world to make better decisions for the future of the company is Business Intelligence (Negash, 2004). The idea behind Business Intelligence (BI) is to use this by presenting the information to knowledge workers (executives, managers and analysts) and giving them knowledge so they can base decisions on hard facts (Chaudhuri, Dayal and Narasayya, 2011). The author Negash (2004, p.177) defines BI as: "*Business Intelligence systems combine operational data with analytical tools to present complex and competitive information to planners and decision makers".*

This means that BI uses data to give planners and decision makers in companies the information needed to make operational decisions for the future of the organisation. The objective as Negash (2004) puts it, is that BI is used to improve the quality and timeliness of inputs to the decision-making process. According to Chaudhuri, Dayal and Narasayya (2011) BI has become so essential for companies that it is difficult to find a successful enterprise that has not leveraged BI technology for its business. BI technology can be found in many parts of an enterprise from manufacturing to financial services and even more areas (Chaudhuri, Dayal and Narasayya, 2011). BI can use both structured and semi-structured data, where the former is much easier to search but the latter often contains the valuable data for analysis and decision-making (Negash, 2004). However there is a third option of data, which can prove even more valuable for companies if it can be used properly: the unstructured data. Chen, Mao and Liu (2014) state that the term Big Data is mainly used when describing enormous data sets, and big data typically includes masses of unstructured data. Recently industry has become very interested in the use of unstructured data and big data, and that is because they have seen the high potential in big data (Chen, Mao and Liu, 2014). The potential of using big data in an enterprise is astounding, according to Tankard (2012) and the McKinsey Global Institute, enterprises that properly harness big data has the potential of increasing their operating margins by 60% by gaining market shares over their competitors by taking advantage of customer data.

Fan and Bifet (2013, p.2) stated that Gartner summarizes their definition of big data as: "*high volume, velocity and variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making*". Big data as previously stated consists of large amounts of unstructured data, but moreover it also consists of structured and semi-structured data. These structured or unstructured data sets can consist of all kinds of raw data however they are mainly based on user/ customer data, sensor data, and medical- or enterprise data (Saraladevi et al., 2015). The amount of data in the world is steadily increasing, for example in 2012 about 2.5 Exabyte (2.5 trillion bytes) of data were created each day, and that number doubles approximately every 40 months. More data cross the Internet every second than was stored in the entire global Internet 20 years ago (McAfee and Brynjolfsson, 2012). Advances in data mining and analytics as well as the massive increase in computing power and data storage has made use of this massive information source possible for enterprises (Tene and Polonetsky, 2013).

Despite all these advances in technology data mining from big data can be quite a challenge considering the large amounts of data that need to be handled. Additionally the most fundamental challenge is to explore the large volumes of data and extract the useful information and knowledge for future use. In many situations this data mining and extraction has to be conducted in a very efficient way because storing all the observed data is nearly impossible, therefore data mining /aggregation of useful types of data from a source is an important topic for enterprises. (Wu et al., 2014)

Another very important topic for enterprises concerns the data after it has been collected. As previously mentioned big data consists of many different things but mainly what enterprises collect and use from big data concerns are for example: user data, enterprise data or competitor data (Saraladevi et al., 2015). What these have in common is that they can contain sensitive data as well as intellectual property, trade secrets and financial data so therefore it will have to be protected (Tankard, 2012). As enterprises collect data from ever wider areas and storing them in one place they can according to Tankard (2012) become vulnerable to attack. Moreover there are legal ramifications considering data protection laws to consider for enterprises that store data as well as keeping it safe. Therefore security has become a major concern for most enterprises, the firm International Data Corporation claims in Chen, Chiang and Storeys (2012) article that large companies under 2012 alone were expected to spend 32.8 billion in computer security. Moreover they claim that small and medium sized companies are expected to spend more on data security than on any other form of technology (Chen, Chiang and Storey, 2012). From this we can tell that security has become a major concern for enterprises and that it is central in the organisations agenda to ensure that the mined data is safely stored and handled.

1.2 Problem

During the millennium shift the amount of data had a massive increase, which for businesses meant a problem as the computer processor units (CPU) of the time couldn't handle and process the quantities provided (Russom, 2011). Today, technological advancements has led organisations capable of collecting and analysing data in many forms and in even much larger quantities, commonly known as big data. Through advanced analytics of the data sets, businesses venture on journeys to gain insights on undiscovered facts for competitive advantages (Russom, 2011).

Data mining has the possibility to create problems for the data's original owners. The aforementioned advancement of big data capabilities has made it possible for a gap to be created for what is possible and what is legally allowed (Chessell, 2014). Since consumer's information is getting more accessible to gather, privacy and security of consumer's information is harder to uphold (Wall, Lowry & Barlow, 2015). Information such as location through mobility traces can in 95% of cases be identified to a unique individual through usage of four randomized spatio-temporal points, making re-identification of individuals or their location an existing problem (Zang & Bolot, 2011; de Montoye et al., 2013).

Adding a famous example of data re-identification, a study by a group of Harvard students wanted to show the timeline of friendships and how these develop over said time (Lewis et al., 2008). When researchers used this study after it was published, it became evident that the dataset the original authors had created for their study could be re-identified and traced to unique individuals, putting the privacy of the subjects at risk (Zimmer, 2010).

As the data collection moved on to mobile devices, consumers might not be aware of the privacy issues that are to be found in applications. In mobile health (mHealth) applications, studies show that of the 600 most popular mHealth applications, only 30,5% has privacy policies (Sunyaev et al., 2015). Associated information from other studies show that 749 participants were not able to fully comprehend the privacy policies of a business in any format provided to them during an online study and that only 26% of users agreeing to privacy agreements read the actual information (Jensen, Potts and Jensen, 2005; Mcdonald et al., 2009).

To address the issue further, why would organisations break externally governed privacy and security rules, upheld as laws. Studies show that possible reasons are economic strain, employee slack or malicious intent (Wall, Lowry & Barlow, 2015).

From our own experience along with people close to us, there has been a pattern of misunderstanding and unawareness of what the integrity and privacy policies are, and what is given away when confirming them. The same goes for trending fitness wearables such as wristbands or smart watches. According to Bin, Yuan and Xiaoyi (2010) The Internet of Things (IoT) refers to the next generation of Internet, which will contain a very large amount of connected devices from small sensor devices and wearables to large servers and supercomputer clusters. Ukil, Bandyopadhyay and Pal (2014) state in their article that most IoT devices face some kind of privacy issues, they state the following: "… privacy measurement and user's privacy awareness issues are yet to be addressed".

1.3 Research Question

The lack of awareness in users of connected IoT devices indicates that this is a problem area in which further research is needed to bring light to the awareness issue. With this in mind we have decided to base our research question on this topic and aim to provide more awareness to users about this situation. The question derived for this paper is:

How aware of data collection are consumers when accepting Privacy & Integrity policies (in Fitness applications and wearable devices)?

1.4 Purpose

The purpose of this study is to examine the awareness of the mined data from the usage of mHealth applications and wearable devices. How well are the privacy agreements read by users when installing and using fitness applications or wearable devices. Moreover how well does the mHealth companies notify their users on how they use their mined and collected data for. In order to achieve this purpose, we will measure the awareness level of the users by using an extended and modified situational awareness (SA) theoretical model based on Endsley (1995). We will also conduct qualitative interviews with users to get an understanding on their perceived awareness level and which applications or wearable devices are used by the consumers. Then we will analyse the privacy policies to compare the users stated awareness to measure the actual awareness level of what is claimed to mined from their usage patterns.

By conducting this study, our aim is to bring awareness to users about what information are collected from them when they press "I Agree" on a privacy agreement document (EULA). Moreover we want to investigate how the privacy agreements affect the users, do they convey the necessary information to the users? As our problematization concerns big data, data mining and to a certain degree the internet of things (wristbands) we want to contribute to the understanding of how data is collected from users, how well the companies state what they collect and how the enterprises state what information they use and most importantly how aware are the users of these facts.

1.5 Delimitation

Firstly we decided to look into the area of mHealth organisations, specifically fitness applications. We started by limiting ourselves to these fitness applications even though it would be interesting to look in to how the privacy and mining awareness issues are handled in other application categories. We chose fitness application companies because IoT and data mining from usage patterns are very much a rising topic in today's society. From this we wanted to look into the awareness level of users what they agree to be collected from their usage of applications/wristbands and this is our main focus. However we will not take in to consideration all the legal paragraphs and the topics that the companies claim they do not take responsibility for.

We will not go into specifics on how algorithms in data mining works or how specifically the mining process operates. We will only provide an overview to provide the readers of the needed knowledge to comprehend the context of this study.

Another delimitation that we have in this study is that we will not indulge ourselves in the ethical perspective of collecting sensitive data or using sensitive data from customers. Even though the ethical perspective of data collection is quite interesting and maybe should deserve attention in this study we chose to leave it aside. It is too complex and comprehensive to fit into this study along with the rest and we think that it could have a study all by itself. Nor will we go into the topic of security of the sensitive data when mined. These are several interesting topics, which could be used as follow-up studies to look into the step after the mining of user data has commenced.

We will not enter the psychology behind choices for the user such as feelings towards a certain brand or device.

2 Frame of Reference

In this chapter we discuss the relevant literature and models for this thesis. This literature is summarized, basic concepts and theories are discussed. Moreover they are presented and explained to give an understanding to the reader of the topics discussed.

2.1 Data mining

Although the data mining topic has been around for quite some time, it has gained a new focus in recent years with the rise of big data and IoT (Fan and Bifet, 2013). As the amount of data grows rapidly so indeed does also the amount of data available to mine. According to Fayyad, Piatetsky-Shapiro and Smyth (1996) data mining refers to the application of specific algorithms for extracting patterns from data. They further state that the overall process of discovering useful knowledge from data is called knowledge discovery in databases (KDD). Although this process is a number of years old it gives insight to the process of knowledge extraction from data as well as where data mining fits into the process and moreover Tsai et al. (2014) states that KDD has been the foundation of information systems for a long time. An overview of this process is provided and described in figure 2.1 (Fayyad, Piatetsky-Shapiro and Smyth, 1996).

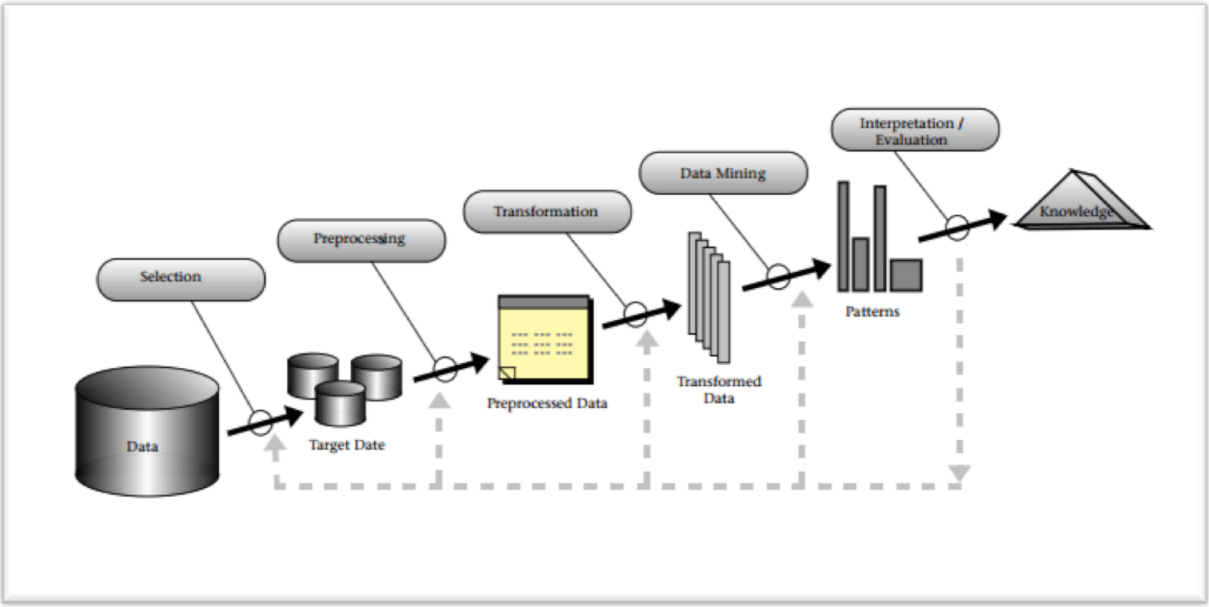

Figure 2.1: Overview of data mining and the process of turning data into knowledge (Fayyad, Piatetsky-Shapiro and Smyth, 1996).

The KDD process is an interactive and iterative one, involving several steps and with involvement and decisions from the user along the way. A summary of the basic steps as follows: The first step is to develop an understanding of the application domain and the relevant prior knowledge as well as identifying the goal of the process. Secondly the target is to create a target data set: selecting a data set, or focusing on a subset of variables or data samples, on which discovery is to be performed. The third step is data cleaning and pre-processing. This means filtering the data, removing noise or accounting for it and deciding on strategies to handling missing data fields. Fourth comes data reduction and projection: finding useful features to present the data depending on the goal of the process. Fifth step is matching the goals of the process to a particular data mining method. Sixth step is exploratory analysis and selecting data mining algorithms as well as selecting methods to be used to search for patterns in the data. Seventh step is the data mining itself: searching for patterns of interest in the particular set of data, this can be for example; clustering or classification rules etc. Eighth is interpreting the mined patterns, possibly returning to any previous steps to iterate the process. The final and ninth step is acting on the gained knowledge: using the knowledge in another system, another process or to document it and present the findings. (Fayyad, Piatetsky-Shapiro and Smyth, 1996)

The KDD process involves the whole process from discovering useful data and turning it to knowledge whilst data mining concerns only the application of specific algorithms for extracting patterns from data. The data mining step within the KDD process involves iteratively applying data-mining methods. These methods are based on tried and tested techniques from machine learning, pattern recognition and statistics, which are: clustering, classification rules etc. The array of different algorithms under each of these headings can be uncountable to the degree that both novice and experienced data analysts can be bewildered by these amounts of data. (Fayyad, Piatetsky-Shapiro and Smyth, 1996; Kantardzic, 2011)

Since this process was presented in 1996 the Internet and technology has been through some major development. One example of this is that the next revolution after the computer and the Internet is according to Bin, Yuan, and Xiaoyi (2010) the Internet of Things, which has already begun. In addition to the progress in computing and technology IoT business has grown rapidly and is expected to continue doing so. Tsai et al. (2014) writes that in 2011 IoT were worth $44.0 billion and are expected to grow up to $290.0 billion by 2017.

Here in IoT, data mining has had its rise in importance again due to the large quantities of data available, as well as the changeable and stored data are such complex things (Tsai et al., 2014). KDD is still applicable to IoT however; one problem that arises is that most traditional mining algorithms cannot be applied directly to process the large amounts of data in IoT. According to Tsai et al. (2014) the data mining technologies will have to be redesigned to fit to the tremendous amount of data in big data and IoT. So with a change in these, the following process is possible as seen in figure 2.2.

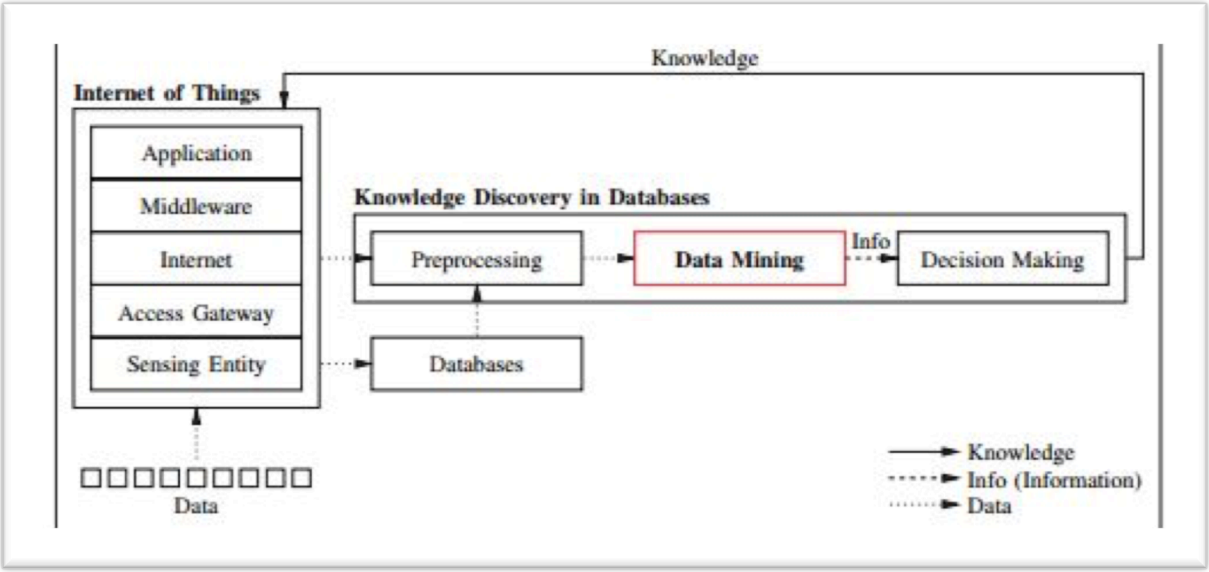

Figure 2.2: The architecture of IoT with KDD (Tsai et al., 2014).

IoT collects data from different sources as seen in fig 2.2. When KDD is applied to IoT it will convert the data into useful information, which can then be turned in to knowledge. The data mining step in this process is responsible for extracting patterns from the output of the data processing step. Then it feeds the patterns into the decision making step which transforms the input into useful knowledge. (Tsai et al., 2014)

How to best extract knowledge and gain benefits from the analysis of data in IoT is, one of the hot topics of today according to Gartner (Columbus, 2016). This hot topic is what connects KDD and IoT. Because according to Tsai et al. (2015) by using the data mining algorithms in a KDD process, IoT can be made more intelligent and thus provide smarter services i.e. increase profitable outcome for companies. The Internet of things is the connected masses of physical objects who can exchange data and communicate with each other via the internet (Tsai et al. 2015). One example of this technology can be glasses that connected to IoT and your GPS can show you the way on the inside of your glasses (Swan, 2012).

One of the most characteristic components of IoT is the wearable; it is a device, which can be worn directly on a person's body (Wei, 2014). These devices can be used in many different areas; some examples of these are the personal health wearables or personal tracking devices. Fitness tracking devices have promised to, and are already on the way of, transforming the field of personal electronics. They calculate numbers of steps walked during a day, calories burned or hours slept. Naturally electronics and computers are getting smaller and slimmer and moreover gadgets for self-tracking can be seen as the next logical step after the development of the smartphone. (The Economist.com, 2014)

2.2 Mobile Health Applications

Advancements in ICT technology and capability during early 2000's were what lead the ways for new development in healthcare monitoring and information architecture (Pattichis et al., 2002). Medical monitoring through the use of wearable computing were a direct result of these advancements. The opportunity for patients to wear devices that monitor their health rate, give medical staff the opportunity to constantly observe the development of the subjects health (Raskovic, Martin & Jovanov, 2004). As devices decreased in size and increased their wireless capabilities, the concept of data acquisition was re-defined without suffering from timely integrations. Simultaneously was a continued development of network technologies that paralleled with the wireless advancements created a new impact on the already existing e-health systems. The keywords of mHealth give a definition that consists of medical sensors, mobile computing and ICT for health care (Istepenian, Jovanov & Zhang, 2004). A study by Research2Guidance shows that the amount of mHealth apps published on the leading app stores, iOS and Android, have doubled in 2,5 years landing on a number of 100.000 apps published during the first quarter of 2014. Within the category of mHealth applications, over 30% are fitness applications (reasearch2guidance.com, 2014).

2.3 Privacy & Integrity of mHealth applications

2.3.1 Privacy Policies

To inform users of how their information will be treated and stored, applications require privacy policies for the users to make informed decisions on purchase and use (Sunyaev et al., 2015). Countries can have elected government agencies that regulate the privacy policies such as the US based Federal Trade Commission (FTC). In the United States mobile devices are the primary way to access the Internet and with the evolving ecosystem they require better regulations for privacy concerns (Begany, 2013). To ensure privacy for users, the FTC has created guidelines for mobile application developers where they recommend that the developers have provided privacy policies that are easily obtainable through the app store (Begany 2013). In a report from the FTC, the privacy issues should start at the platform and OS providers, moving down to app developers and finally third parties (Federal Trade Commission, 2013):

OS & Platform providers

These subjects are the providers of user data to app developers. This is done through means that are already a part of their application programming interfaces (API) and are included through the means of photos, contact lists, calendar information and geolocation information (Federal Trade Commission, 2013).

For platform providers, the FTC suggest that there should be just-in-time disclosures for the consumers so that these can give consent for the use of their sensitive information. This should also be a requirement for content that isn't usually considered "sensitive" such as contacts or calendar entries. There should be a consideration for development of one-stop dashboard approaches. Letting consumers seeing the application intent for what content it will be

able to access. In a similar fashion, there ought to be icons describing the transmission of the consumers data. The platform providers should be reviewing applications prior to letting them on to the app stores, with a clear disclosure to the consumers as to how this application passed the compliance checks for privacy. A Do not Track (DNT) mechanism is also mentioned to help users prevent tracking from third parties while navigating through the phone or using applications. Finally, to help app developers, the platform providers should create best practices for the developers or make requirements for privacy disclosures. (Federal Trade Commission, 2013)

Application Developers

The application developers are the ones developing an app and putting it on the platform providers official app stores for users to download. The FTC has some specific considerations the organization thinks application developers should follow (Federal Trade Commission, 2013).

Having privacy policies and making sure that these are accessible through easy means such as the app store should be a necessity. Much like the platform providers consideration for just-in-time disclosures so should app developers try to have these installed as for receiving consent from the users before collecting and sharing their sensitive information. By having a better communication with their third parties, the app and its developers can give a more accurate disclosure for their users. The app developers should also consider being a part of self-regulatory programs and trade associations that can give them better insight on how to create short-form privacy disclosures. (Federal Trade Commission, 2013)

Third Parties

The third parties are organisations or networks that use the information an application gathers, usually paying the developers a sum for its usage. The FTC recommends for third parties to have an open communication with the app developers so that the users have a transparent disclosure. They should also work with the providers, ensuring a DNT implementation for smartphones. (Federal Trade Commission, 2013)

2.3.2 Service Level Agreement & Terms of Service

A service level agreement (SLA) is an agreement between the service provider and the consumer that states the minimum required amount of the service the provider has to be able to give to their customers. This is usually done by having a specific limit or amount that has to be achievable by the consumer when using the specific service but can also be a guarantee for quality of the services (Chase et.al. 2006).

Adding to the service level agreement is the fact that it can be multi-tiered. If that is the case a SLA might also include a necessity to identify minimum quality of service (QoS) levels. These have to be maintained while the service is being provided to the users of the service as they have been established in the SLA's through QoS terms (Chase et.al. 2006).

2.4 Theoretical Background

Along with the development of technology many complex systems and processes has emerged. In this context Endsley (1995) has conceptualized a model of 'Situational Awareness' (SA) regarding how people operate and make decisions in these systems and processes. Endsley (1995) introduced this model in 1995 based on his own previous work in the area. This model describes as stated the process of decision making and this process is influenced by a number of different factors such as environmental factors and individual factors and how they apply in various domains. Endsley (1995) himself defines Situational Awareness as: "*Situation awareness is the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future*" (Endlsey, 1995 p.36).

The concept of situational awareness has a long history, especially in the military where it has been used by crews of military flights as far back as World War I. Since then it has grown in importance for other fractions as well such as civil and commercial flights, air traffic control, large systems operators, police units, fire fighters and more. According to Endsley (1995) it can also apply to many everyday activates and moreover he states that the need for SA applies in a variety of environments. As the complexity and dynamics of the environment increase it becomes increasingly difficult to maintain SA. The decisions in complex and dynamic environments are difficult and becomes increasingly so as the person tries to make sense of the situation itself and of the factors affecting the situation. The situational awareness model seeks to shed light on this complex situation, it takes all the factors and inputs that affect the decision maker and creates an descriptive and understandable overview of the situation. (Endsley, 1995)

2.5 Situational Awareness

Endsleys (1995) model (see figure 2.3) is divided into three levels: perception, comprehension and projection, these lead to a decision, which in turn leads to action. The model describes a person's perception of the relevant elements in the environment as seen in the situation, either from a display or the person’s senses and forms his or her SA. From this the person comprehend the current situation and from there project what will happen if a certain decision is made. Once this is done a decision is made and an action will be taken from the decided course of action. The person will then find him or herself in a new situation and environment that requires a new perception, comprehension and the process iterates itself. However while this iterating process is on-going there are several important factors that affect the outcome and the decisions. One of these are individual factors, which are that the person may possess some preconceptions or objectives (goals for example) that can filter and interpret the environment in forming the persons SA. Other influential things are environmental factors that can include stress, workload, complexity etc. We will go through all these factors in detail below. (Endsley, 1995)

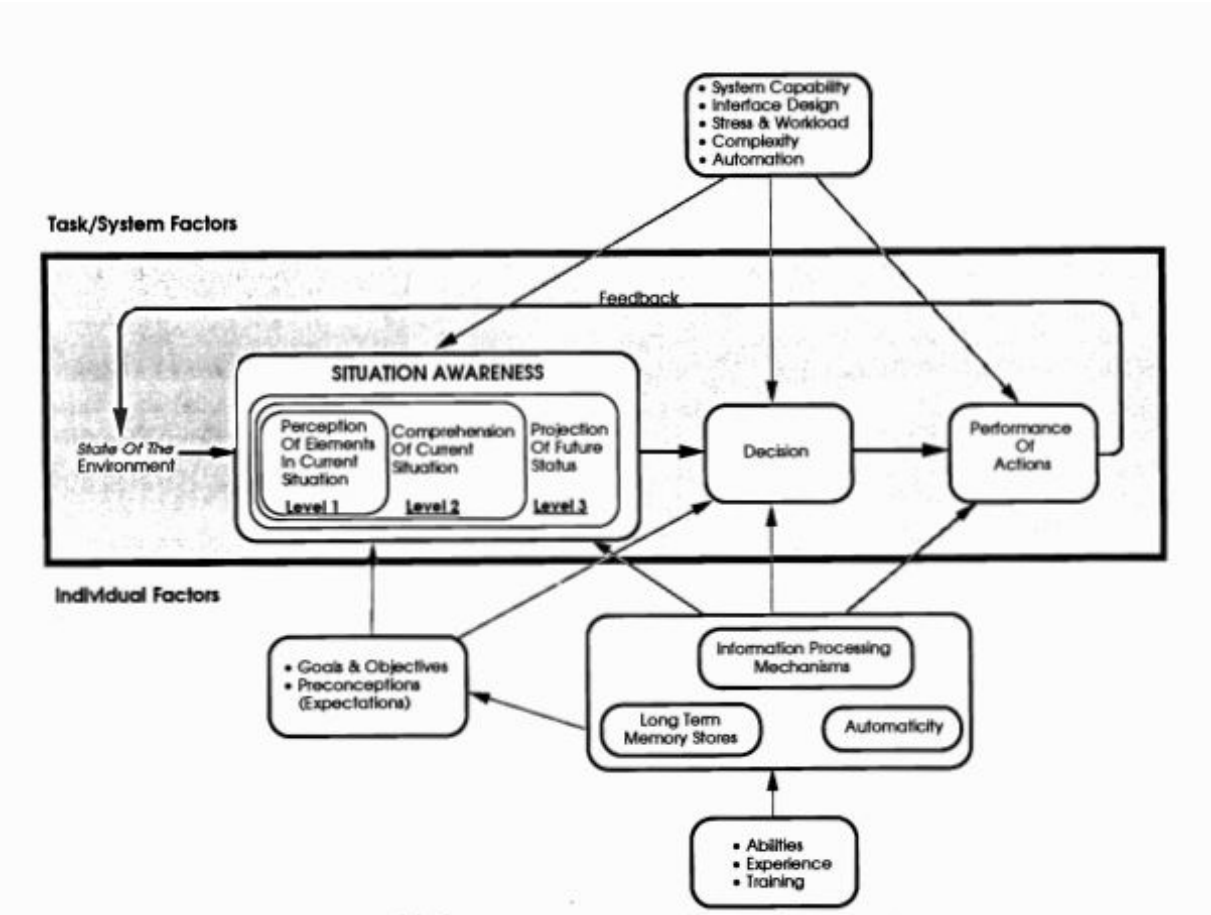

Figure 2.3: Situational awareness theoretical model (Endsley, 1995).

2.5.1 Perception

According to Endsley (1995) the primary part in SA is the factor of perception, specifically of the elements in the environment. With the example of pilots there are numerous elements that are perceived by them during flight such as mountains, the aircraft, and towers with lights on them. These are also accompanied with specific characteristics that are relevant for each element e.g. size, speed, colour and location. In the same way as a pilot needs all the information (data) on types, numbers and capabilities of both friendly and enemy forces to make a point of reference, manufacturing systems operators require information on the status of machines, their parts and flows. This can be drawn further to other examples such as drivers that require information on where other vehicles and obstacles are along with the status and dynamics of their own vehicles (Endsley, 1995).

2.5.2 Comprehension

The comprehension of the current situation is built up from the composite of disjointed elements in the perception. While perception gives an awareness of a situation, the comprehension is the understanding of the elements necessary for the operators goal. Dependant on the prior knowledge of the perception elements, an operator can create a holistic view of the environment through the comprehension of the distinct elements or events (Endsley, 1995). Going

back to the pilot example a fighter pilot has to comprehend that if a specific amount of enemy aircraft arrive at a specific geographical location it will have a certain meaning for their objective e.g. intercepting bombers. An operator of a system needs to be able to see the contrast of the different types of data for individual system variables and how they affect the system components operational status. Endsley (1995) further explains, a novice operator can within these types of environments achieve the same type of perception as a veteran operator, however being able to integrate the different data elements for applicable goals to understand the situation might be hard. (Endsley, 1995)

2.5.3 Projection

The projection of future status is when the person is able to project the future actions of the elements in play of the environment, albeit in a short time span. When perception and comprehension is combined, pilot can know that due to the enemy being on the offense in a certain location, the enemy is likely to attack in a specific manner. Through the use of projection, the operator is given a timeframe and knowledge on how to respond (decision-making, act) to the situation at hand and thus find the easiest way to achieve their goal. If we compare this to an operator of a manufacturing system, the operator needs to be able to foresee bottlenecks that can arrive at future times and the unused machines for an effective scheduling. (Endsley, 1995)

2.5.4 Decision

These three levels of the SA-model are the basis for decision-making. However, the SA itself can affect the process of a decision due to how a person characterizes a situation. The end result is that this will determine what decision process is chosen as a solution for the problem. Depending on a situations specifics an operator will be influenced on how to use the appropriate mental-model for selection of strategy towards problems solving. (Endsley, 1995)

2.5.5 Performance of Actions (Acting)

The theory underlying the SA is that the performance of actions will be poor if the SA is not properly adapted during the all of the stages prior to the act. This means that if the SA is incomplete or inaccurate and the identified situation is unknown the performance will drop. All five levels of the SA model are affected by both individual factors and system factors. (Endsley, 1995)

2.5.6 Feedback and State of the Environment

Feedback from the last decision will have a role in the new process and build on the experience the person takes in to the perception and comprehension of the new state of environment. (Endsley, 1995)

2.5.7 Environmental factors (Task and System factors)

Endsley (1995) mentions a select few of task and system factors that have an influence on how an individual is able to gain SA. The *system design* is a factor that influences the access to information. Due to the relevant risk of transmission error, in other words the loss of information when a system presents data to a human operator is always a possibility. When a system acquires information it doesn't necessarily mean that the information will be displayed in a complete way. This can be dependent on the interface's set up or that only a specific subset can be displayed at a time. There is also the factor of the human operator not taking in a complete transmission due to perception, attention and working memory constraints (Endsley, 1995).

The *interface design* is how the information is presented to the operator. This also has a great impact on the SA depending on the amount of data that can be gathered, how accurate it is and the compatibility to the operators SA. The design needs, in general, to be able to transmit needed data to the operator without cognitive effort. (Endsley, 1995)

Stress is a factor that influences SA through physical factors such as noise, heat/cold, vibration, fatigue and social factors as fear, anxiety, importance or consequences. The way stress impacts SA is that due to stress the operators might narrow down the attention, resulting in limited amount of central aspects. This is the most noteworthy of stress results as it leads to favouring specific elements in front of others. (Endsley, 1995)

Workload is also a stress factor that has such an importance; it is included as a measurement for SA. Endsley (1995) says that depending on a operators effort to gain SA and the limitations that arrive through the capacity of the operator are what will affect a decrease in SA.

Complexity is the factor that impacts negatively on the operators mental workload and SA (Endsley, 1995). It is hypothesized that system complexity's negative impacts are made through increase in system components, interaction between these components and dynamics of change within the components. (Endsley, 1995)

When there is a lack of SA due to *automation*, it is a lot harder for operators to notice system errors. If operators lack SA, it takes them a considerable larger amount of time to re-establish themselves for what parameters are relevant to a system so that a manual proceeding can be done at the moment an automation fails. This is hypothesized to happen due to factors such as being a passive receiver of information during automation instead of an active processor during manual processing. (Endsley, 1995)

2.5.8 Individual factors

Perception is also affected through how our long-term and working memory works for perceiving information. If we have a continuous experience within an environment an operator can develop expectations for future events. The working memory is where the information gets stored after being perceived. This is where the active processing of new information takes place along with being combined with old knowledge to gain comprehension. Further, the working memory is responsible for projection and the decided course of action. The *long-term memory* works around the limitations of the work memory through the usage of schemata and

mental models that provide integration and comprehension of the data and further gives the projection for upcoming events. Model-usage for achievement of SA depends on the user's ability as an individual when it comes to recognition of the features surrounding the environment such as critical cues that are mapped for the models key features. Through the usage of this model, a higher level of SA can be achieved, especially the parts of comprehension and projection without any the use of working memory (Endsley, 1995).

Training is according to Endsley (1995) defined through comparisons of predictions based on their internal model versus a systems states. This training gives individuals a progressive refinement of the models, which in return develops categorization functions for future predictions that can be become more accurate. These predictions are based upon better transition functions or an objects detailed characteristic.

Another individual factor is that of *automaticity* that arrives with *experience*. This factor is the automatic processing that require almost no thinking as it is fast, effortless and unavailable to conscious awareness due to the fact that a operator makes this process without having to think. This affects the SA in regards of functioning automatically albeit with features from cognitive processing. An example of how decision-making is done through no conscious SA is when drivers take the same road home from the work. After a larger amount of time of driving back and forth each day through the same stop signs, lights, speed limits, the driver can drive with the flow of the traffic without recollecting the trip. (Endsley, 1995)

Goals & objectives along with *Preconceptions* (expectations) are the final individual factors that have an influence on the SA. For decision making regarding systems or tasks, the SA is connected to a persons goals. A decision is made upon how the person wants an event to unfold. What is also important is that there can be multiple goals working simultaneously, which can also conflict each other. Moreover a person often has preconceptions towards the environment and expectations concerning future events. When these expectations are in line with what is observed all is well. However when they do not match because of a parameter which should occur does not or a parameter occurs which shouldn't, the person is aware that something is amiss and indicates that a change of goals or plans is needed in this situation. (Endsley, 1995)

2.6 Adapting the Endsley (1995) model

In order to translate this theory model into a useful framework for this thesis we have chosen to modify the model and adapt it to our specific problem area and research question. First, the main levels of the model and the decision and action part will remain the same (will be adopted) because, if we compare a pilot and a jogger for example, they go through these same steps in a decision process. They both must first perceive the situation, then understand it, then project a possible solution and ultimately take a decision. This part of the model can be applied on almost any decision process, whether it is a pilots decision process landing a plane, an operator of a large manufacturing system or a jogger deciding to download an application (Endlsey, 1995). However there are also some things that are different in these decision processes, these differences are the affecting factors both the individual and environmental. The ones that don't fit into the jogger's decision process are primarily the ones concerning the systems such as: system capability, stress and workload, training, automaticity and automation. Moreover we also excluded Information Processing, Mechanisms, and Long-term memory stores. In some factors cases however we can adapt them to fit into a jogger's perspective, this applies to: goals and objectives, complexity, preconceptions (expectations), abilities, experience, training and interface design. Moreover to make this model adapted to our problem area and research questions we will have to introduce some factors of our own to get a holistic picture of all elements affecting a jogger in the decision process. We have decided to include: disclosure, determination, self-satisfaction, competitiveness and price. These will be described in 2.6.2.

Table 2.1: Factors for the modified model.

Incorporated factors from Endsley (1995)	Introduced factors by authors
(Goals) Objectives	Disclosure
(Preconceptions) Expectations	Price
Complexity & Interface design	Determination
Experience	Self-satisfaction
Abilities	Competitiveness
Excluded factors from Endsley (1995)	
System capability	
Stress and workload	
Information processing	
Mechanisms	
Long term memory stores	
Training	
Automaticity	(In parentheses is the original phrasing of the factor)

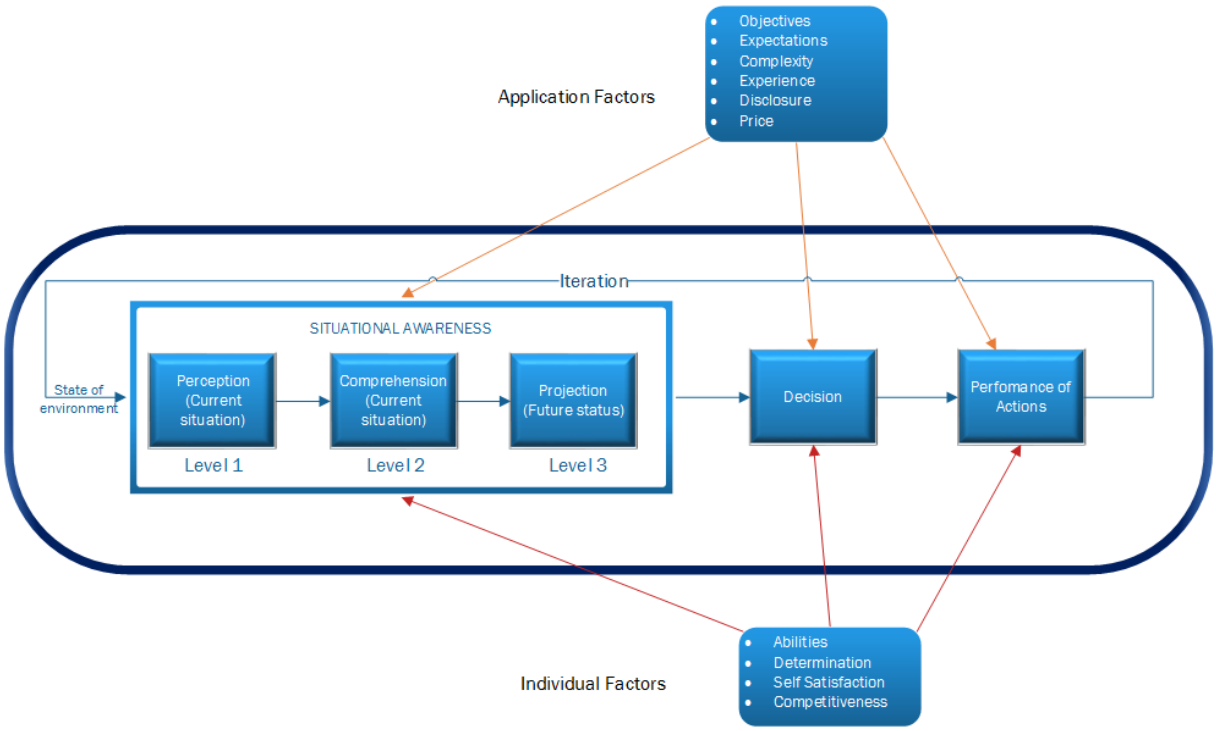

Figure 2.4: Modified situational awareness theoretical model.

2.6.1 Modified factors

Some of the factors in the original model by Endsley (1995) are still applicable to our modified version of the model but need some small changes in order to give us an output, which can be used in our study. We will describe these here and why we decided to change them.

First off we renamed the environmental (task/system) factors, in order to explain that in our new model these factors concern the application or wearable. We named these application factors.

Systems complexity is according to Endsley (1995) a challenge for the operator of a system, the increase of complexity in a system increases the amount of parameters an operator have to take into consideration in a decision process. Each parameter added increases the mental workload required to achieve a given level of SA. In our study we had to modify this factor in order to measure the impact of an applications or wearables complexity to the decision process for a user to purchase these products.

According to Endsley (1995) interface design is one factor that determines how much information, how accurately this can be comprehended and to what degree it can be used by a person using SA in a decision process.

One thing we noticed during the pilot study was that for the users, complexity of a technology and interface design are very similar. For a user the complexity of the interface design is the same as the complexity for the technology to use, therefore we decided for the main study to avoid this misinterpretation incorporate interface design into the factor complexity.

Experience according to Endsley (1995) concerns one's experience towards handling information and information uptake in a specific situation. He means that if a person has been in a situation before they will process the information of the situation faster and with more accuracy. In our study we want to know if previous experiences of applications or wearables have had any impact on whether they want to purchase or use an application or wearable again.

Endsley (1995) describes preconception as a warning for a person when something is going amiss or that the observed environment is showing something it shouldn't. To fit the concept of the our study, this factor had to be modified. The Preconception (expectation) factor was changed because we wanted to look into the users expectations towards using the application or wearable, not what the user have in terms of preconceptions towards the use of applications, wearables or specific brands. By looking in to the expectations of users we gain a picture on what the users think that the application or wearable should do for them in a future state.

As defined by Endsley (1995) in chapter 2.5.8, the factor of abilities was an explanation of how the operators abilities through recognition of features in the environment influences model-usage for achievement of SA. For the sake of users in mHealth applications, the abilities are defined as the users physical abilities and their influence on the purchase of applications or wearables.

Goals & Objectives is described by Endsley (1995) as how a person wants a certain event to unfold. However in our study we want to understand the users objective to why an application or wearable is purchased in order to gain knowledge on the reasoning behind the usage. Therefore a modification is this factor was needed in order to fit our study. We have decided to only name our factor "Objectives" to clarify what we want the users to answer. We also changed it from a system factor to an individual factor because it refers to the users own objectives to download or purchase an application or wearable.

2.6.2 Introduced factors

As previously stated we have decided to introduce some new factors into the model to get a holistic view of the affecting elements for a jogger deciding to download an application or not. The original model as we have mentioned can be applied to many different decision processes but with our amendment to this model we think that it better describes the factors affecting this particular decision process.

Our first addition is the factor: Disclosure. Disclosure describes the willingness of the users to (if awareness is present) disclose their personal information and allow it to be data mined/collected and stored. According to Jensen, Potts and Jensen (2005) privacy concerns are one of the most frequently cited reasons for users not to engage in using a particular technology. They also state that the increasing prevalence of data collection, sharing and storing data about users could affect the willingness of adoption and put the users in a prudent position. Colnan and Armstrong (1999) as well as Jensen, Potts and Jensen (2005) address this issue regarding users that are unwilling to adopt technologies because they are concerned about that the organisations can collect from their personal data. Moreover in Colnan and Armstrongs (1999) study they conclude that if organisations are explicit and clear in what data they are collecting from users and that this data is fair, they can gain customer retainment and through this a business advantage.

Another factor that we added to the model is: Determination, it describes the determination of a jogger to increase his or her own performance. Edmunds, Ntoumanis and Duda (2006) has identified in their study that in obligatory exercise some degree of self-determination towards the exercise is present. This means that in order for a person to conduct exercise, some measure of determination and motivation towards the completion of the exercise is needed.

Self-satisfaction is the next introduced factor in our model, it incorporates several parts such as health benefits, personal satisfaction, relaxation, stimulation, and enjoyment. Health benefits are mentioned by Edmunds, Ntoumanis and Duda (2006) as the primary reason for exercise adoption for new participants and enjoyment is the primary reason for continuing the physical activities. Smith (1998) states that a large amount of people see exercise as a "body maintenance" activity, this means that they do it for extrinsic motivations such as: lose weight, keep fit or to look good. These are all linked to personal satisfaction so we put them in this category.

Competitiveness is another factor we have introduced to this model. According to Smith (1998) competitiveness and personal reputation within the running community is an essential motivational factor for elite runners. These runners could even skip a certain race because another runner that can beat them is participating to avoid getting beaten, suffer a defeat and lose reputation.

Price is the last factor we have introduced. For applications and wearables as for other products a simple law is applicable: as the price of a good goes up demand usually goes down. (Landsburg, 2013)

2.6.3 Excluded factors

The reasoning behind exclusion of the factors mentioned in Table 2.1 is their non-applicability to the modified model. Endsley's model (1995) is built around situational decisions for example for fighter pilots and the environmental factors affecting them. The fighter pilots factors for the model were made practically in use, which doesn't apply, to this research's users. Some of the individual factors had some striking similarities and were thus incorporated to this papers model. However in order to fit our problem area and research topic for this study we had to remove the following factors: system capability, stress and workload, automaticity, automation, Long-term memory stores, information processing, training and mechanisms.

3 Research Methodology

In this chapter we will describe how this study was conducted in order to give the reader knowledge about the methodology behind it. We also motivate and describe certain decisions made in order to gain validity and reliability to our study.

3.1 Research Strategy

Firstly the author of a research paper must come up with an area of interest in order to know in which field to conduct the research. We (the authors) have always been interested in the disclosure of personal data. One of the authors to this study has had a part time job in the IT-department of an international Swedish company and at this company these questions were part of the job description, so therefore we have some personal experience in the problematization of this topic. Also we wanted to write our study in an area close to BI and big data because this is also an interest of ours.

When the area of research is decided, according to Bhattacherjee (2012) the first phase when conducting research is exploration of this area. Three iterative steps are included in exploration; forming research questions, conducting a literature review and searching theory that will support your research (Bhattacherjee, 2012). We used the technique mentioned by Alvesson and Sandberg (2011) called gap spotting in order to find an area within our zone of interest which we could study, and we started initially with step one and wrote our research question (see chapter 1.3). The next step for us when we knew in what area to conduct our research, and we had our question formed, was to conduct a literature review. We went to Google scholar and LubSearch to see what research had already been conducted in this area. The purpose of conducting a literature review is three-fold: to understand the current state of knowledge in the area of inquiry, to identify key-, authors, articles, theories and findings in the area, and to identify gaps in the knowledge of the area (Bhattacherjee, 2012). This part helped us confirm that the gaps we spotted in the first part were valid to continue studying; moreover it gave us further knowledge in the study area. Once step one and two was done we searched for and analysed theories that could support our research. After step three was completed we iterated the whole process and after some iterations phase one was finalized.

The next phase when conducting research is, according to Bhattacherjee (2012), the research design phase (see figure 3.1). In this phase a plan on how the research will be conducted is designed and evaluated. A well-designed plan will give us a valid and insightful way to answer our research questions and conduct an academic study. This second phase of conducting research is divided into three steps, which should be simultaneously conducted: operationalization, research method, and sampling strategy (Bhattacherjee, 2012). Operationalization is the process of designing precise measures, which will be used to measure constructs. Next is the choice of research method, which is chosen by the researchers, based on what type of data they want to collect and the topic of the study (Bhattacherjee, 2012). Different types of re-

search methods are for example qualitative, quantitative, experimental or mixed methods (Bhattacherjee, 2012). In our case, in order to answer our research question we chose to perform a qualitative method. We chose this because it will give us the opportunity to conduct quick semi-structured interviews with users in order to gain knowledge of their awareness level concerning the data mining done from their usage patterns. The sampling strategy concerns choosing the appropriate population for the interviewing (Bhattacherjee, 2012). For this part we will interview a number of different users in order to gain insights from different users angles into the same problem area.

After these two preparation stages, having decided what, who and how to conduct the study the next step is the actual execution phase of the research. This phase consists of three steps: 1) Pilot testing, 2) Data collection and 3) Data analysis. (Bhattacherjee, 2012)

Pilot testing is an important part of research according to Bhattacherjee (2012), it helps to detect any potential problems in the research and it helps to ensure the validity and reliability of the measurements of the study. After a successful pilot study, the researcher can continue to the data collection phase and engage the selected population from the sampling strategy stage e.g. in our case conduct the semi-structured interviews with the users. Following the data collection comes the data analysis, the interpretation and analysis of the sampled data. In our case compare and evaluate the awareness level of the users and analyse the privacy policies stated data collection for the companies to measure the real awareness level of the users. (Bhattacherjee, 2012)

The final phase of this whole process is the research report, documenting the process and its findings in a research report. (Bhattacherjee, 2012) This is the approach we have decided to use when conducting the research process. (See figure 3.1)

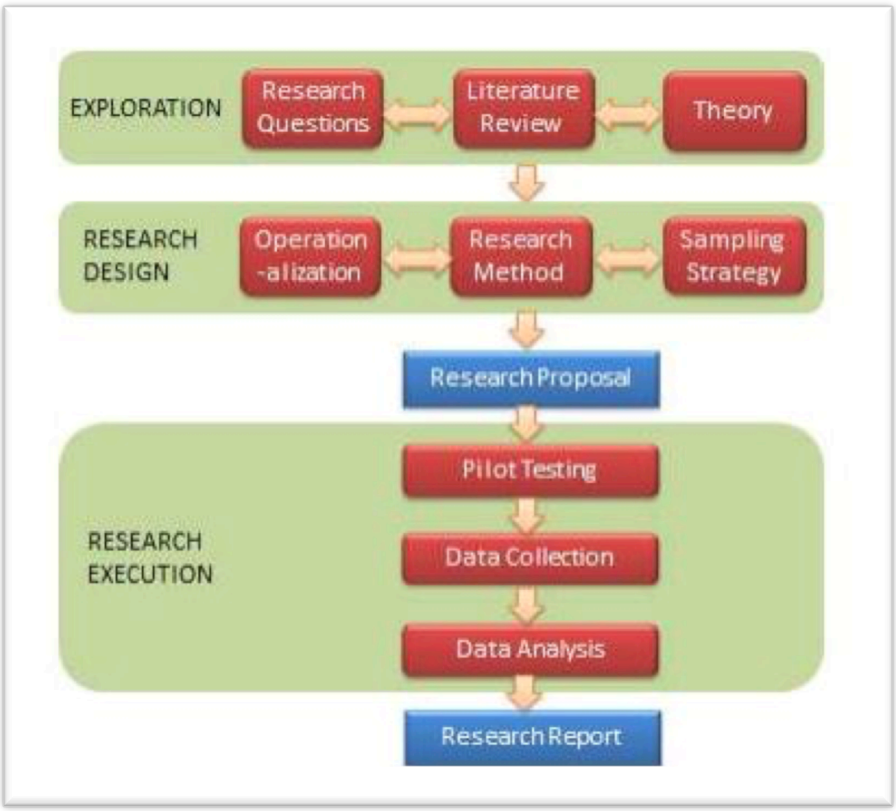

Figure 3.1: The Research Process (Bhattacherjee, 2012, p. 20).

3.2 Data collection

According to Bhattacherjee (2012) data collection methods can be broadly grouped into two categories: positivist and interpretive. Positivist methods are aimed at theory building and employ a deductive approach to research. Interpretive on the other hand employ an inductive approach and tries to derive a theory about a phenomenon of interest. With our research question in mind, an interpretive approach is well suited for the task as the base the assumptions of the question that it is not objective neither singular. We need to study the sites of runners using data collections and thus the theoretical sampling strategy used by the interpretive research is of great use. The theory sampling not only suggests for studying the sites, but also respondents or cases that are chosen because of how the fit to the studied phenomenon (Bhattacherjee, 2012; Recker, 2013).

To collect the data we stated above that an interpretative method was needed and Bhattacherjee (2012) states some examples of interpretative methods, which are case research, phenomenology and ethnography. In our case we have used a case research design with a positivist approach, which is suitable to test theories (Bhattacherjee, 2012). Case research is an intensive longitudinal study of a phenomenon at one or more research sites for the purpose of gaining an understanding a dynamic process in a phenomenon of interest (Bhattacherjee, 2012). The phenomenon studied in our case is the awareness of users, the case site which we are conducting research within is the area of mHealth applications and wearables. Moreover the

phenomenon of interest is in our study the decision process behind choosing to download an application or buying a wearable and thus choosing to disclose usage patterns to interested parties.

The primary way of collecting the data would be through face-to-face interviews. Since our method of approach is a two-step method, the way we gather data will be through interviews with different subjects. Given the devices that are being used by the interviewees we will conduct an extensive analysis of the privacy policies incorporated in these devices. A semi-structured interview is a common method used for data gathering in qualitative studies. This technique gives an approach for data that is meaningful and rich with context (Myers & Newman, 2007; Bhattacherjee, 2012; Recker, 2013).

When conducting interviews with users (runners), we will only have face to face interviews as we have to find these users at the specific sites for investigation (Recker, 2013). Using our theoretical framework we aim to create an interview guide to develop the semi-structured interviews in a investigative and scientific manner based on our research question.

3.2.1 Two-step method

To conduct our research, we have come to the agreement that a two-step program would be the best way for collecting relevant data from subjects and areas involved both in data collection, usage and analysis.

1. Talk to users (runners)

The first step of this two-step method is to conduct interviews with the users. Using our theoretical framework as basis for our interview guide questions, we will interview users of mHealth applications to gain further data on what influences them to download and how the users situational awareness is reflected upon agreeing to terms of service and privacy policies. We aim to conduct a number of interviews to get a broader spectrum of answers to analyse and categorise. Furthermore we aim get some different applications and wearables. Although this is a fact we cannot control, as we do not ask which application or wearable an interview prospect has before the interview, we only make sure that they in fact have one or have used one in the past.

2. Analyse apps in detail (privacy policy)

For the second step in our method we have decided to analyse the data in the privacy policies and compare it to the interviewees stated knowledge. We will then analyse and discuss the outcome from the users awareness of the applications and wearables, along with their privacy policies. Our approach to this is to download the applications to our smartphones and read about the wearables at the manufacturers websites. When an application is not available to this research due to monetary constraints or availability such as wearables, the manufacturers have both product and privacy information available online. If we aren't able to have an application at hand we can still analyse the information provided at the companies websites. We will then analyse the privacy policies and the answers from the interviews in order to compare them to each other and through this empirically compile the findings.

3.3 Interview Guide Development

The first step of developing the interview guide (see table 3.2), consisted of analysing our modified SA theory based on Endsleys (1995) SA theory. This modified model and the literature review served as base for formulating the interview questions. These interview guide questions then seek to answer the research question stated in 1.3 and to follow the purpose of the research stated in 1.4. Based on the literature review and the modified model, factors have emerged. On each of these factors a question will be asked to the users in order to determine how much influence these have on the decision process when downloading a mHealth application or buying a wearable. The questions were developed with an iterative process by the authors through multiple revisions and discussions with the supervisor of the thesis. Moreover a pilot-study with three interviews was conducted and further revision of the questions followed in discussion with the supervisor in order to receive the highest possible quality of the questions. The interview questions are in themselves of a rather more open characteristic in order to let the respondent clarify their answers and in line with Kvale and Brinkmann (2009) this gives us the potential to find new findings or aspects. However the interview as a whole is in a semi-structured interview form because the questions are already formulated in advance and we will follow this predefined structure in all interviews (Recker, 2013).

We start with some general questions to get a picture of the interviewees frequency of exercise, duration and brand of product as well as age and gender. After these general questions we start to ask about the decision process in the SA theory from Endsley (1995) and our model (2.4) perception, comprehension, projection, decision and act. Then we move on to the application factors as visualised in our developed model (2.4) and lastly we move in to the individual factors from the same model (2.4).

Each of the questions are developed from some part or factor in our model (2.4) except for the general questions. Down below in table 3.2 it is described from which factor the question is developed from and also where the origin is in the literature.

Table 3.1: General questions in interview.

General Questions	Answer Categories
Gender	Male / Female
Age	< - 18 - 25, 26 - 35, 36 - 45, 45 - 60, 60 - >
Frequency of running	< - 3 month, 1-2 week, 2-4 week 4-5 week, 6 week - >
Duration	< - 15 mins, 15 mins - 30 mins, 30 mins - 1 H, 1 H - >
Distance	< - 2 km, 2 km - 5km, 5 km - 8 km, 8 km - 10 km , 10 km - >
Terrain	Flat, Slope, Hilly, Mixed
Weather	Rainy, Cloudy, Sunny, Cold, Warm, Intermediate, All
Brand of Device	On either application or wearable

Table 3.2: Interview guide.

Factor	Origin	Interview Question	Origin
SA Levels			
Perception[1]	Endsley (1995)	What makes you download or buy a wearable?	Developed for this study.
Comprehension	Endsley (1995)	Do you understand what information the apps collect from your usage patterns?	Developed for this study.
Projection	Endsley (1995)	What do you think is the companies intended usage after data collection? If no => Can you give an assumption of what you think happens with the data?	Developed for this study.
Decision[2]	Endsley (1995)	What influences your decision to download an mHealth app / buy a wearable?	Developed for this study.
Performance of Act	Endsley (1995)	(Wrap up of level 1,2,3,4) You still decided to act? (Upon download)	Developed for this study.
Application Factors			
Objectives	Endsley (1995)	What are your objectives with using this application / wearable?	Developed for this study.
Expectations	Endsley (1995)	What do you expect the application / wearable to do?	Developed for this study.
Complexity	Endsley (1995)	Do you consider the technologies complexity (interface design)?	Developed for this study.
Experience	Endsley (1995)	Do your previous purchases influence any potential purchases?	Developed for this study.
Disclosure	Culnan and Armstrong (1999); Jensen, Potts and Jensen (2005)	What influence does an applications or wearables disclosure (privacy policy, SLA) have on you?	Developed for this study.
Price	Landsburg (2013)	How does price influence a potential purchase?	Developed for this study.
Individual Factors			
Abilities	Endsley (1995)	How do your athletic abilities affect your choice of purchasing an application /wearable?	Developed for this study.
Determination	Edmunds, Ntoumanis and Duda (2006)	Does your motivation / determination to exercise affect your choice to purchase an application / wearable?	Developed for this study.
Self-Satisfaction	Edmunds, Ntoumanis and Duda (2006)	Is your personal satisfaction an influence for you when you purchase?	Developed for this study.
Competitiveness	Smith (1998)	Is competitiveness a factor in regard to the application / wearable?	Developed for this study.

[1] Reflection on premature understanding of wearable or application
[2] A concrete understanding of buying

3.4 Pilot study

To ensure the validity of this study we decided to conduct a pilot study to test out our interview questions and assess which ones would fit and if there were any complications. Bhattacherjee (2012) argues that the pilot testing has the possibility to detect potential problems within the research design. The findings from the pilot study showed us that conducting a strict structured interview wasn't the most preferred due to how the subjects answered. With this in mind we adapted and started using a semi-structured interview.

The pilot study had two major purposes for us;

1st: To make sure that the interview guide was designed correctly and establish the need for any potential changes to the interview questions,

2nd: To get a general opinion of the actual research question we have (through testing its validity)

After we had finished our pilot study it was evident that not only did we have to change some of the factors, but also we had to change to a semi-structured approach. The reasoning behind a semi-structured approach was that it would allow us more flexibility through the conversational form (Recker, 2013). This then gave us the ability to have follow-up questions in case we had to rephrase the question, however this wasn't used to any larger extent (Recker, 2013).

The questions we asked in the pilot that had to be modified or adapted looked like this, prior to their modifications:

- *Perception: How do you perceive the situation (purpose), when downloading an application or buying a wearable?*

This question had to be remodified, as the question was to abstract for the interviewers to understand

- *Performance of act: Have you ever had any complications afterwards?*

Compared to Endsleys (1995) examples with fighter pilots having complications with the act, this question was instead modified due to the act only being a push of a download. Instead, by going through the interviewees answers in the SA levels before the Performance of act, a question of them going through with it was instead more appropriate.

- *Interface design: Is interface design important?*

Was removed as it already was a part of a technologies complexity and thus caused a redundancy in the answers.

Down below in table 3.3 is a table with a summary of the pilot study interviewees.

Table 3.3: Summary of pilot study participants.

Name	Gender	Age	Language	Interview time	Brand of device/app
A	Woman	18-25	Swedish	17 min	Endomondo (app)
B	Woman	36-45	Swedish	13 min	Nike fuel plus (wearable + app)
C	Male	18-25	Swedish	7 min	Runtastic

3.5 Sampling Strategy

When finding candidates for our interview, we had to make use of a criteria. This criteria was that the users had to have either type of a mHealth application or wearable or have used one in the past. Given the criteria standing we had to go with a lighter form of non-probability sampling. This type of sampling is for excluding some units of the population on some type of non-random criteria (Bhattacherjee, 2012). Since we can't get the answers we need from runners who don't use either wearables or applications we had to exclude these, leading to a form of convenience sampling (Bhattacherjee, 2013). This type of sampling strategy proved itself to be useful for our research and worked well to get the answers we needed from the runners. The approaches we had to sample our interviewees were through different strategies. For example in the pilot study we made use of the convenience sampling as we asked people we knew had applications or wearables. As for the further study we mixed our strategies for finding our interviewees between asking acquaintances and finding new interviewees by the non-probability sampling, still excluding users without mHealth applications and wearables.

3.6 Main Study

For the main study we conducted 13 interviews with runners to get their perspective and understanding of the topic at hand. The interview time varied from 4.36 minutes to 17.12 minutes but in the table they are rounded off to the nearest whole minute to make the table clearer. Most of the interviews were conducted in Swedish after asking the respondents their preferences. The questions asked were the ones stated in the interview guide in table 3.2. Down below in table 3.4 is a summary of the respondents in the main study.

Table 3.4: Summary of pilot study participants.

Name	Gender	Age	Language	Interview time	Brand of device/app
D	Male	18-25	English	8 min	Runkeeper
E	Male	18-25	Swedish	17 min	Runkeeper
F	Female	18-25	Swedish	13 min	Runkeeper
G	Male	26-35	Swedish	4 min	Runkeeper
H	Male	26-35	Swedish	6 min	Runkeeper
I	Male	26-35	Swedish	8 min	Runkeeper
J	Male	18-25	English	10 min	Runkeeper
K	Male	26-35	English	14 min	Runkeeper
L	Male	18-25	Swedish	8 min	Runkeeper
M	Male	18-25	Swedish	7 min	Runkeeper
N	Male	26-35	Swedish	8 min	Runkeeper
O	Female	18-25	Swedish	11 min	Garmin 220 watch + funbit
P	Male	18-25	Swedish	6 min	Runkeeper

3.6.1 Introduction to empirical applications

Runkeeper is an application developed by the corporation FitnessKeeper Inc, based in the USA, owned by ASICS, a Japanese athletic equipment company (Gibbs, 2016). Runkeeper is one of the most popular mHealth applications both on App Store and on Google Play (former Android Market). When searching on health and fitness applications on Google Play Runkeeper is the top listed application. On App Store it is on 5th place on the top lists but is 1st when it comes to applications devoted to running. Runkeeper is a free to download application but offers in app purchases to unlock certain features. We chose to look closer into this application because the majority of the interview respondents claimed this was the application they used for their exercise.

Endomondo is a Danish application developer company owned by Under Armour, which are also owners of the MyFitnessPal, a very popular calorie counting app (Endomondo.com, 2016; McGrath, 2015). Their application is the 9th on the top list of the Health & Fitness category at the iOS App Store and 16th on the Google Play store as of May 2016. This application is a free to download and offers in app purchases in line with the previously investigated application. We decided on this application to gain another perspective into the information collection by companies and since we did not have a second most used by our interviewees we chose the second most popular on App Store and Google Play. In addition it is one of the most application popular on the app stores but more importantly it is owned by a large corporation (Under Armour), which means also that they have an extensive amount of information about the privacy policies and their practices, making it ideal to investigate.

Runtastic is an Austrian application developer that launched their app in 2009 and was acquired by Adidas in 2015. The free version of the application stands as of May 2016 at the number 6th place on the Google Play store and at 47th place at the iOS App Store. The version that is mentioned in the appendix is the pay-version and is at 34th place in the iOS payed categories for fitness. Since the user has the payable version the information is still relevant however the majority of our users (13) have free apps.

Nike + (Fuelband) is a fitness application developed by the company Nike. It is currently the 28th most popular fitness app on the Google Play store and the 42nd most popular on iOS App Store. Similar to the other fitness apps, Nike + has all the standard functionalities such as tracking of distance and time, where one is running and comparing against others. The runner that uses this application in the empirical part uses it solely for the Fuel band, which is a wearable that synchronizes the steps they take to the application.

Garmin Connect is an application by Garmin for synchronizing data from wearables or smartphones towards the application. It is currently the 18th application on the fitness section of Google Play and the 19th on the iOS App Store. The interviewee uses the application for creating fitness schedules that synchronize towards their Garmin 220 watch, however they upload it to a 3rd party site.

3.7 Qualitative Data Analysis

According to Kvale and Brinkmann (2009) a researcher should plan and reflect in advance on how they will conduct the analysis of interviews. They recommend that this is done before the interviewing commences because the analysis should overlap with the data collection, it then offers the advantage to adjust the data collection process if needed (Bhattacherjee, 2012). Moreover this helps the researchers to keep track of things said in interviews instead of it becoming lost in the large amounts of transcribed empirical data (Kvale and Brinkmann, 2009). In our thesis we began the analysis of the empirical data when we analysed what answers we might get from our factors already at the modifying phase of the SA model, in order to ask the right questions.

After we've conducted interviews, we will have large amounts of transcripts that we have to go through and analyse. Kvale and Brinkmann (2009) describes transcribing as an interpretive process, it is a process where oral language is translated into written form. It falls upon the researchers to transform the oral language into written with the structure and meaning intact when transcribing and erasing incoherent or repetitive parts from the interview (Kvale and Brinkmann, 2009). Kvale (1996) argues that the intention of how to go about with analysis of transcripts should never be done after an interview and instead be the groundwork for how the preparation, process and transcription of the interviews will be conducted. It should also be noted that instead of just of the transcript giving means for an analysis, will also have to narrate the story for the reader. The method one choses to analyse the empirical data with will guide the preparation of the interview guide, and end after the transcription of the interviews (Kvale and Brinkmann, 2009). We have chosen the technique of coding data, this technique helps reducing empirical data into meaningful information (Recker, 2013). We did this simply by dividing the answers of the questions into categories and from there analysing any patterns or anomalies. Through this we could easily see and get a good overview on the respondents views on which factors influenced them and which did not. All empirical findings are based on the interview guides (table 3.2) link to the theoretical framework (the modified SA model, fig 2.4).

The coding procedure has been conducted by reading in detail each interviewee's responses, so we could identify patterns among their understandings that we could group into categories. To explain how we have completed the coding procedure, we refer to Table 4.2 (Perception),

in the category of "measure time and distance". We highlight this category as a sample to explain the finding of all categories. We do so by underlining the responses of all the respondents that have discussed the aforementioned category. Please refer to Appendix A and B, interviewees A, B, C, D, G, H, J, K, L, N, P, to see the patterns of the coding.

3.8 Quality and Ethics

To have a report that's of good quality is built around numerous key components. The way we acquire scientific knowledge is according to Bhattacherjee (2012) made through the satisfaction of four characteristics of which two are applicable to this thesis, these are:

- Precision: We need to define the theoretical concepts in such way that others can use these as a way to test the theory.
- Falsifiability: Our theory has to be built in a stated way that can be disprovable.

What is necessary for building a theory is both best practices for quality as well as for interviews. According to Myers & Newman (2007) there are a couple of guidelines that can provide support when conducting a qualitative interview. The most important of these guidelines to have in mind are the context, confidentiality and how everyone is an interpreter.

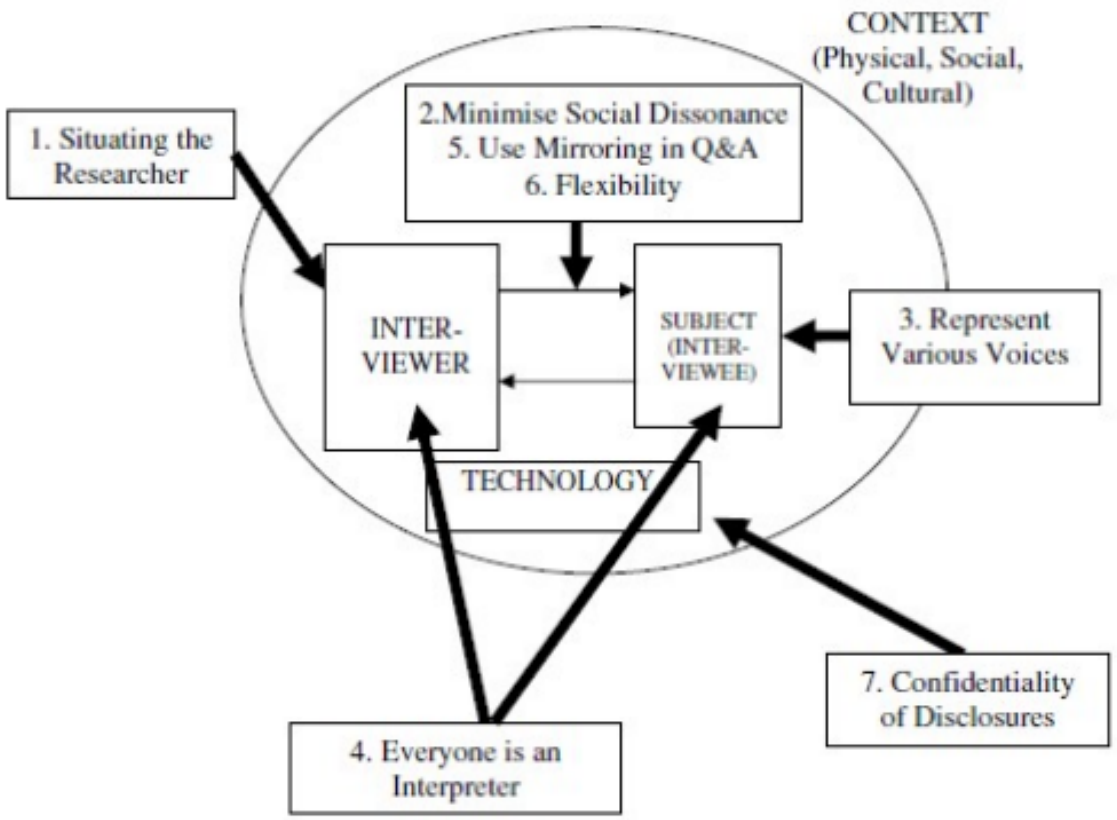

Figure 3.2: Guidelines for the qualitative research interview (Myers & Newman, 2007. p.16).

Similar to gaining ethical and quality for one's research are the principles for interpretive field research (Klein & Myers, 1999). A very fitting set of principles for our research are the principles for interpretive field research, which consist of:

1. The Fundamental Principle of the Hermeneutic Circle
This principle underlines how humans, through the means of iteration, gain a understanding of what a interdependent part means and what will form it as a whole.

2. The Principle of Contextualization
Contextualization is the context behind a current situation, which the interviewer gains through a reflection of historical- and social backgrounds.

3. The Principle of Interaction Between the Researchers and the Subjects
There are ethics to consider the researchers interaction with the interviewee. For this, it is important to consider the interactions based on power dominance, manipulation, voluntarily participation and one-way dialogue (Kvale, 2006).

4. Principle of Abstraction & Generalization
This principle highlights for the researcher to see the connection between the application of theories and concept and the ideographic details.

5. The Principle of Dialogical Reasoning
Dialogical reasoning requires from the researcher to be cautious of what our preliminary assumptions are for the theory that will build the research design and the contradictions in the findings.

6. Principle of Multiple Interpretations

The interpretive approach means that we must remember the different interpretations that each interviewee might have.

7. The Principle of Suspicion
With every answer, the principle of suspicion suggest to be sensitive of bias in how we present the assemble the information and narratives collected from the sample.

3.8.1 Validity

There are two concepts that you measure a study's reliability, authenticity, accuracy and validity with; these concepts are simply named validity and reliability. The concept validity describes to what degree the study actually measures that which it claims it ought to (Bhattacherjee, 2012; Recker, 2013). Further they argue that the concept of validity is about the study's validity of the claims made in the text, for example, how accurate are the claims made, how well are they measured, and how the results of a study can be generalized against similar studies. In our study, we have tried to focus on getting a strong validity, both internal and external. Our interview questions are constructed so that the internal validity shall be ensured.

For the external validity, we have ensured this by conducting a number of interviews with various users of fitness applications to get more than one person's point of view on how aware

the users are on what information is collected from them while using the application. Moreover we have conducted, as previously mentioned, a pilot study to insure that the questions we are valid, relevant and not misinterpreted.

3.8.2 Reliability

Reliability, according to Bhattacherjee (2012) and Recker (2013) is the degree to which the measurement from a study is consistent or reliable. Reliability also means the degree to which another researcher can repeat an already conducted study and get the same results (Jacobsen, 2002). To estimate the reliability a researcher can choose among several different approaches: 1) inter-rater reliability, 2) test-retest reliability, 3) Split half reliability and 4) internal consistency reliability (Bhachattacherjee, 2012).

For evaluating this study's reliability we think that the test-retest reliability is the most applicable. In order for us to conduct this on our study however it would be time-consuming and that is why we use a pilot study, on a fewer number of interviewees, to ensure that our test results are reliable. (Bhattacherjee, 2012)

4 Empirical findings

The empirical findings will be presented in this chapter. They will be categorized in the way they are presented in the modified situational awareness theoretical model (fig 2.4).

4.1 Participant table

The selection of participants was based on a number of criteria through the proposive sampling techniques. This table will give an overview of the respondents' personal information in order to give a perspective and understanding to the reader about the diversity of the interviewees. All respondents will be anonymous and are therefore given names in an alphabetical order.

Table 4.1: Interview participant summary.

Name	Gender	Age	Frequency of running	Duration	Distance	Terrain	Weather	Brand of device
Pilot								
A	Female	18-25	1-2 week	15-30 min	2-5 km	Flat	All	Endomondo
B	Female	36-45	2-4 week	30- 1 H	2-5 km	All	All	Nike Fuel (plus)
C	Male	18-25	1-2 week	30- 1 H	5-8 km	Flat	All	Runtastic
Empirical	---------	--------	----------	----------	----------	---------	----------	----------
D	Male	18-25	< 3 Month	15-30 min	5-8 km	Flat	All	Runkeeper
E	Male	18-25	1-2 week	30- 1 H	5-8 km	Mixed	All but rain	Runkeeper
F	Female	18-25	1-2 week	30- 1 H	2-5 km	Mixed	All but rain	Runkeeper
G	Male	26-35	< 3 Month	15-30 min	2-5 km	Flat	All but rain	Runkeeper
H	Male	26-35	1-2 week	30- 1 H	2-5 km	Flat	Varied	Runkeeper
I	Male	26-35	3-4 week	1 H >	10 km >	Flat	All	Runkeeper
J	Male	18-25	< 3 Month	15-30 min	5-8 km	Flat	All	Runkeeper
K	Male	26-35	1-2 week	30- 1H	8-10 km	Mixed	Sunny	Runkeeper
L	Male	18-25	3-5 week	15-30 min	5-8 km	Flat	All but rain	Runkeeper
M	Male	18-25	2-4 week	30- 1H	5-8 km	Flat	All	Runkeeper
N	Male	26-35	< 3 Month	30- 1H	8-10 km	Flat	All	Runkeeper
O	Female	18-25	6 week >	30- 1H	8-10 km	Mixed	All	Garmin 220 watch + funbit
P	Male	18-25	2-4 week	15-30 min	2-5 km	Flat	All but rain	Runkeeper

4.2 Situational Awareness

4.2.1 Perception

When asked about the first perception about why the interviewees considered buying a wearable or downloading an application, a clear majority just want to measure time and distance, which is one of the basic functions in the applications. A total of 11 out of 16 participants agreed on this factor.

Moreover 8 of these were influenced by other users to try the application or read user reviews and through them saw that the mHealth application or wearable was worth trying. Examples of ways for them to get influenced were to see other users on Instagram use it or become involved with other users at the workplace. One user (**E**) stated that he got influenced to download it because he saw the app on a commercial. Two interviewees stated that ease to access the application on App Store was the influence for them besides hearing about it from other users. Another interviewee (**G**) stated that motivation was the key factor for him.

Table 4.2: Perception answers by category.

Category	Respondents
See/hear from other users about the application. (colleagues use it on the job, see it on Instagram)	A, E, F, H, I, K, M, O
See it on a commercial.	E
Measure time and distance.	A, B, C, D, G, H, J, K, L, N, P
Motivation.	G
Easy to access. (download)	I, M

4.2.2 Comprehension

When asked if they understand what information is collected from their usage patterns within the application or when wearing the wearables, only 4 out of 16 interviewees responded that they understand what is collected but they also state that they don't care about it. **Interviewee J** considers his personal progress being more important than the privacy concerns. Furthermore 6 persons state that they have a small or some understanding of what is collected / saved. An equal number of persons (6) say that they don't have any comprehension if it. For this category 4 of the respondents think that the mined usage data is used for statistics, and further to develop demographics for the company. **Interviewee E** is the only one to think that the company gathers location data from the users.

Table 4.3: Comprehension answers by category.

Category	Respondents
No, I don't know. (No comprehension)	A, F, G, H, M, O
Comprehend but don't care.	E, I, J, P
Small comprehension.	B, C, D, K, L, N
Demographics / statistics.	B, D, F, L
Location data.	E

4.2.3 Projection

Concerning what the companies use the collected data for only 4 interviewees think that the data isn't that valuable and that they don't do that much with it. The majority of the interviewed persons think that the data is used for directed sales towards the users based on their usage patterns and that it is collected for statistics. Moreover 5 persons think that the data can be used for feedback on the applications or wearables to make them into better products. Out of the 16 interviewed participants only 4 thought that it is a viable option for the companies to sell the data to an interested third party. One participant clearly stated that he doesn't care what happens to his data.

Table 4.4: Projection answers by category.

Category	Respondents
I don't think they do that much with my data.	A, B, E, L, O, P
Look into which parts of the app is used and then get feedback from usage.	B, F, H, J, K
Directed sales towards user.	B, C, E, G, I, J, M, N
Sale of data to third party.	C, J, K, N
Statistics.	D, F, G, I, L, M, O
Location data.	F, L, O
Don't know, don't care.	P

4.2.4 Decision

When it comes to the concrete underlying factors to take the decision of downloading or purchasing. A majority of the interview participants (9 out of 16) mentioned the functionality of the program such as measuring time and distance or check results in general. Also here as in perception a few (6) mentioned that they were influenced by other persons using the program and that they have heard good things about it before downloading. Further 4 persons stated that user friendliness of the application or wearable was a factor, which was important for them. One person stated that he was only influenced by the companies marketing to download the application.

Table 4.5: Decision answers by category.

Category	Respondents
User friendliness. (simple to use)	A, C, E, O
Functionality.	A, B, F, G, H, I, N, O, P
Recommended by users.	D, E, K, L, M, N
Influenced by marketing.	J

4.2.5 Performance of Act

For this question we got inconclusive answers and we discuss more about this in part 5.3.5 in the discussion.

4.3 Application Factors

4.3.1 Objectives

The objectives behind using an application or wearable were almost unanimously answered by our participants. 13 out of 16 users thought that keeping track of distance and time on the exercise is important and 11 out of 16 thought that follow-up or monitoring the exercise was important. Further 4 participants explicitly mentioned visualisation that they wanted to be able to visually see their training progress or to get an overview of it. For example **anonymous E** said: *"I can visualize on the map that I'm on the same track as last week, and then I can run right instead of left. A little easier overview for me to have a little variation"* [3]. What **User E** meant was that the visualisation or cartography of ones historical runs, show new areas to run in. However all of the participants thought either keep track of distance and time or follow-up was important.

Table 4.6: Objectives factor answers by category.

Category	Respondents
Keep track of distance and time.	A, B, C, D, F, I, J, K, L, M, N, O, P
Visualtity.	C, E, O, P
Follow up. (monitoring)	A, D, E, F, G, H, I, J, K, L, O

[3] See appendix B, interviewee E, Objectives for original quote.

4.3.2 Expectations

When asked about the expectations the interviewees had on the mHealth applications or wearables they stated 12 out of 16 that keeping track of distance and time was expected which is in line with the previous questions except for one respondent on objectives and two on perception. Furthermore 6 respondents think that extra features beside these basic ones (time and distance) are expected from the applications. **Respondent O** states, *"My goals are mostly to be able to see how fast I run, pulse zones and interval"* [4]. Which are a bit more than the average just distance and time measuring most state that they want and **respondent I** said: *"....functions that I liked were that they gave me feedback after every kilometre"* [5]. This is also an extra feature included in some applications. Moreover 5 of the respondents mentioned the statistics, they want to be able to go back and compare with their previous runs and see the saved historical statistics. Three participants also expect the application or wearable to be reliable.

Table 4.7: Expectation factor answers by category.

Category	Respondents
Keep track of distance and time.	A, C, D, F, G, J, K, L, M, N, O, P
Historical statistics.	A, J, K, L, O
Reliability.	B, D, H
Extra features. (voice each kilometre, welcome screen, charts etc.)	C, E, I, K, O, P

4.3.3 Complexity

On this question 13 of our respondents did not think about the technologies complexity when downloading an application. However 5 respondents thought that the application should be easy to use and that easy interface design was a factor for them. Incorporated in this we noticed that both our respondents that have bought wearables did consider the interface design. Finally one of the wearable using respondents thought that there were to many extra features in a negative way that she doesn't use.

Table 4.8: Complexity factor answers by category.

Category	Respondents
Easy interface design.	A, B, C, L, O
Extra features not used. (too many, negative)	B
Don't think about complexity.	C, D, E, F, G, H, I, J, K, L, M, N, P

[4] See appendix B, interviewee O, Expectations for original quote.
[5] See appendix B, interviewee I, Expectations for original quote.

4.3.4 Experience

10 of the respondents did not have any previous experience of mHealth applications. 4 of the interviewees had made some investigation about the applications available or in the case of respondents **B** and **O** about the wearables they were interested in purchasing. Three compared different applications before deciding to download a certain one, and respondent **A** were here as well as before influenced by friends to download. **Anonymous person E** stood out from the rest by stating that he got dis-influenced by inApp purchasing. He said the following *" I have spent a pretty amount of money on inApp purchases and am currently a couple of thousands in... so it is a little dangerous with inApp-purchases as it gets easy to make applications more expensive. The worst part is when applications make it that you have to buy your way out from getting your data collected"* [6]**. Anonymous O** stated that she had some previous experience as well but apart from **E** she got dis-influenced by certain features in the previous applications instead.

Table 4.9: Experience factor answers by category.

Category	Respondents
Comparison between application in same category.	A, J, L
Influenced by friends.	A
Influenced by own investigation.	B, F, J, O
No previous application.	B, C, D, G, H, I, K, M, N, P
Dis-influenced by inApp purchases or features in the application.	E, O

4.3.5 Disclosure

An interesting finding was when we asked our respondents about the disclosure of their personal usage information, we found that only 1 out of 16 thought and got influence by this when deciding whether to download or not to download an application. 6 out of 16 stated that they did not get influenced by the privacy policies (disclosure) but they had reflected over them. For example **anonymous F** said *"I'm bad at reading that kind of stuff so it obviously feels good when there is a agreement that the data is treated in a good way. On the other hand I don't feels like this type of data is so private, so it's not a big deal for me if it were to leak..."* [7]. She has reflected about it but it doesn't influence her choice. Then there were 9 respondents who claimed that they had neither gotten any influence by the policies nor reflected about them at all. **Respondent I** said something quite interesting *"... had it been written in the policy that 'give us five million' then I would've still clicked yes, as I wouldn't have read it."* [8]. This implies that he doesn't read nor not care about reading the policies at all.

[6] See appendix B, interviewee E, Experience for original quote.
[7] See appendix B, interviewee F, Disclosure for original quote.
[8] See appendix B, interviewee I, Disclosure for original quote.

Table 4.10: Disclosure factor answers by category.

Category	Respondents
No influence. (no reflection)	A, C, G, H, I, L, M, O, P
No influence. (with reflection)	B, D, F, J, K, N
Yes it is an influence with reflection.	E

4.3.6 Price

Price was the question with the most evenly spread answers, according to the respondents 8 of them stated that they got influenced by price because the application was free to download and use. The other 8 and respondent **E** which thought both think that price influences because it should give value for the money spent. Not quite surprisingly both the wearable users are found in the category where they think that the product should give value for money because they spent more money than the free to download and use respondents did. One interesting finding from this question is that all respondents in some way are influenced by price regardless of their objectives or other factors behind downloading/ purchasing mHealth applications or wearables.

Table 4.11: Price factor answers by category.

Category	Respondents
Influence because it's free.	A, D, E, G, H, I, M, P
Product gives value for money.	B, C, E, F, J, K, L, N, O

4.4 Individual Factors

4.4.1 Abilities

First out of the individual factors was the question if the interviewee's individual athletic abilities had any impact for the decision for them to download or purchase an application or wearable. Here 7 respondents claimed that their abilities influenced them to choose a specific app or wearable that suited their athletic level. Further 5 respondents speculated that increased athletic abilities leads to further incentive to buy more complex applications or wearables, as **anonymous B** states "*I don't think that you would want to have one of these if you run a lot then I think you would want one with a pulse detector on it.*" [9]. Finally 6 interviewees stated that their athletic abilities does not have an impact at all for them when taking the decision.

[9] See appendix A, interviewee B, Abilities for original quote.

Table 4.12: Abilities factor answers by category.

Category	Respondents
Increased abilities gives influence.	A, E, H, J, O
Abilities influence specific choice of application.	B, E, F, I, K, N, O
Gives no influence.	C, D, G, L, M, P

4.4.2 Determination

We found that this question could be miss-interpreted by the respondents (we discuss this in 5.5.2) so it gave us two kinds of answers from some respondents. Firstly 12 interviewees stated that the application actually gives them motivation to exercise or that it is a consequence of downloading that the get more motivation because of notifications for example. Two stated that they get no influence at all from the application. The other interpretation of the question was if the individuals determination to exercise provided influence to download an application or buy a wearable. Three respondents claimed that it did and we can see here that this includes both of the wearable respondents only one respondent said that it did not have any influence for him.

Table 4.13: Determination factor answers by category.

Category	Respondents
Gives motivation. (increases determination to exercise)	A, B, D, F, G, H, I, K, L, N, O, P
No influence or motivation from the application to exercise.	E, M
Gives influence to buy a specific application.	B, J, O
Gives no influence to buy an application.	C

4.4.3 Self-Satisfaction

Concerning what influence a person's own self-satisfaction has on the decision to download or buy a wearable we got the following response from our interviewees. 6 out of 16 stated that they don't think that it is any influence at all for them. On the other side of the spectrum 5 respondents (including the two wearable buyers) thought that it was a directly influencing factor and that the application or wearable can help them feel satisfied about their training. **Respondent B** said when asked if the wearable helps her self-satisfaction and motivates her to exercise "*Yes, it helps me to spur towards training*" [10]. We also have some respondents that did not consider it when downloading but rather feel the indirect influence because it becomes a "side-effect" of exercising regularly.

[10] See appendix A, interviewee B, Self-Satisfaction for original quote.

Table 4.14: Self-Satisfaction factor answers by category.

Category	Respondents
Indirect influence of purchase.	A, F, I, N, P
Direct influence to purchase.	B, C, K, L, O
Gives no influence to purchase.	D, E, G, H, J, M

4.4.4 Competition

The last question on our interview guide concerned how much influence competitiveness is a factor for the respondents. Here 8 respondents answered that they get motivated to exercise by competing against themselves and that competitiveness has an direct influence for them. 4 out of 16 was so competitive that they think it has a direct influence for them to be able to compete with others and themselves. Only two respondents think that it is an indirect influence and not something they openly considered before download or buying. Lastly 5 interviewees said that it had no influence for them to exercise whether it concerns competing toward others or themselves.

Table 4.15: Competition factor answers by category.

Category	Respondents
Direct influence of purchase.	A, F, I, O
Indirect influence through self-competitiveness.	B, C
Direct influence through self-competitiveness.	D, F, H, I, K, L, N, O
No direct or indirect influence.	E, G, J, M, P

4.5 Privacy Policies

4.5.1 Runkeeper

<u>Information Collection</u>

- **Registration to and use of services:** Runkeeper collects personal data in the form of inquiries, responses to surveys, registration for access towards services and the use of certain services as long as the user has provided their consent voluntarily. This data may include such things as names, contact information, gender, birth date, weight, and height and also information about friends you have invited to the app. (Runkeeper.com, 2016)

  The application may combine previously mentioned data along with other information from either the app, wearable and online services that are connected to Runkeeper such as exercise activities e.g. distance, pace, heart rate and calorie burns. Runkeeper state that they will cease to use this personal information once a registration is cancelled or terminated. (Runkeeper.com, 2016)

- **Location Data:** As fitness applications require a geographical location from the devices connected to them for tracking where a user is running, the location data of Runkeeper maps outdoor fitness activities. To be able to administer these services, FitnessKeeper (parent company) along with their partners and licenses may collect, use and share the precise location data that includes real time geographic location of the users mobile devices. Some third-parties like Google, will be given this data automatically while partners such as Facebook will only obtain this information if the user has explicitly given their permission to share their data. (Runkeeper.com, 2016)

- **Other Information:** The utilization of the applications services may at times give the company additional information about the user's themselves or their usage patterns of the services. This is claimed by the company to not be used as a method of identifying people. This information may be gathered passively through various technologies or a submissions from the users fitness devices that the user has configured to work with the services. Runkeeper may store this information for themselves or in databases maintained by affiliates and/ or third parties. This information may be used and pooled with other information that will make it able to track numbers of visitors to the services, amount per page and domain names. (Runkeeper.com, 2016)

  Runkeeper states that they automatically receive and record certain information about the users and the use of the services from the device used (e.g. computer, phone). This information may include IP address, pages visited or features used within the service, date and time of usage, URLs from websites before and after navigating the services, general geographic location derived through the IP address (e.g. country, region, city) and more similar information about the users. (Runkeeper.com, 2016)

- **De-Identified Personal Data:** Runkeeper states that as they want to better serve their users of the services, they might conduct research on end users demographics, interests and behaviour that is based on the Personal Data and Other Information previously mentioned. The claim is that this research does not identify users personally however they may share the de-identified data with affiliates, agents and business partners. Disclosed aggregated user statistics that are also non identifiable may be in order to describe the services to current and prospective business partners be disclosed. (Runkeeper.com, 2016)

<u>Usage of personal data</u>

Runkeeper aims to use the consumers personal data with a consistency in regard to these privacy policies. As users decide to provide personal data for a certain reason, this data will be used in connection with that specific reason. This means that when sending in technical support tickets via e-mail, this personal data will be used to provide answers or solutions to the problem. Personal data used in regard to accessibility towards services, will be used in a manner to provide access to such services and monitor the consumers use of these services. Consumers non-identifiable information gained from personal data collected through services may also be used to improve these services functionality and gain a better understanding of the users and what they want to be improved. This information can be used to contact the us-

ers in the future to tell them about services of interest and which include targeted online interest-based advertisements. (Runkeeper.com, 2016)

Disclosure of personal data

When it comes to disclosure of personal data and other information, Runkeeper have a couple of policies depending on the area of interest. If Runkeeper proposes to use Personal Data that are not like those described in these policies during sign up, they will provide an effective way of opting out of usage of one's personal data. (Runkeeper.com, 2016)

If a company would merge or buy the FitnessKeeper franchise, the personal data and other information may be a part of transferred assets. Since Runkeeper hires third parties for business related functions such as mailing information, maintaining databases and processing payments, the personal data or other information might be handed to them as a necessity to do the tasks. These acquisitions of personal data for third parties will only be in the sense of that specific function. (Runkeeper.com, 2016)

Runkeeper also partners with third parties to collect other information so to work with analysis, auditing, research and reporting. This means that the third parties have access to web logs, web beacons, set and access cookies and use similar tracking methods on the device used. (Runkeeper.com, 2016)

The services have had enabled third party tracking for collection of users other information in regard to online interest-based advertising. This means that they can use the fact that a specific user visited Runkeeper or used their application to target online ads. It also means that third parties can use the information to target non-FitnessKeeper advertisements based on a user's online activity in general. (Runkeeper.com, 2016)

Profile visibility

Runkeeper state that it is possible for a user to use the service without providing any personal data, however this will limit the features usable for the user on the service. (Runkeeper.com, 2016)

The company states further that they will ask you about personal data when signing up for the service (registration). They are very clear that personal information in a public profile is not private, it is free for anyone to use but they do not mention how or if a profile can be made private. (Runkeeper.com, 2016)

4.5.2 Endomondo

Information Collection

Endomondo collects multiple types of information. Primarily they collect Personal Data that they consider being used directly or indirectly to identify an individual person. This personal data is divided into:

- **Registration**: To register for Endomondo, a user has to give out their name, username, password, email address, date of birth, location (country) all of which will be collect-

ed. Endomondo claim that they may also collect other personal data from the users such as postal code, contact number, and information on the users device. Furthermore to tailor some services to the user's needs they might also collect age, gender, fitness and physical characteristics and sport preferences. (Underarmour.com, 2016)

- **Using the service**: When using the service the application also collects personal data through the forms of performance data and location data. Endomondo claims that these collections are for helping track of the users fitness, nutrition, activity levels, sleep, goals and progress, feedback and to help them run their business. The **performance data** is collected either through:
    - The users manual input of data to the service. This data includes height, body measurements, weight and age.
    - When they employ features in the services designed for capturing data (route trackers). Examples of this are type of activity, exercise frequency and performance goals.
    - Leverage technologies that connect with their services such as wearables that share performance data. Examples are activity, speed, distance, cadence, hydration and heart rate.
    - Calculations of additional information from the performance data that the users have provided historically. Some of the examples stated are information about nutrition's and conditions impacting performance e.g. hours of sleep, calorie intake and more. (Underarmour.com, 2016)
- **Location data:** This type of data is according to Endomondo collected as a part of their functionality to the services. The way this data can be collected is from the users wireless carrier, through a wearable or other connected devices and straight from the device that the consumers use such as a mobile or website. The collection of the users data may occur even when the services from Endomondo are not active and running. Unless the users have not given their consent to the collection of data this can potentially occur. (Underarmour.com, 2016)

- **Additional Information:** Some of the information that the company collects is based on how the consumers use the services. For example the device type, carrier provider, browser type, operating system, Internet domain and host name, date and time and numerous other activities are being monitored for a recognition of usage patterns such as clickstream patterns. Endomondo may also depending on a registered account obtain demographic information about the consumer that will give the company better feedback and consumer insights to improve their business. This means that the company might buy third-company marketing data that they will add to their database in order to direct their advertising traffic for offer making towards the consumers. (Underarmour.com, 2016)

- **Social Media:** Depending on the users choice of connecting their application or wearable to various social media or networking services (Facebook, Twitter) the company may collect data that has been provided to that social networking service. For example with Facebook the company might collect data from the users Facebook Profile, as

long as they give consent, such as pictures, friends-list and email-addresses. (Underarmour.com, 2016)

Usage of personal data

Endomondo uses the data they collect as a fuel for operating their business. This data is used for advertising and providing their products and services. Furthermore, the provided feedback from the data they collect and analyze can be used to improve and develop existing products and services along with personalizing the experience the consumers have with interacting towards the company. (Underarmour.com, 2016)

Endomondo can use the personal data collected to personalize the experience with the services provided. This will allow the company to present products and information tailored to the user and his or her preferences as well as location. They might also use the personal data to gain a better understanding of the users which allows the company to design new products, features and functionalities that the consumers either need or want. (Underarmour.com, 2016)

The company uses personal information to assist in advertising and marketing campaigns, to provide the user with information about product and services that they think will be relevant to the user and moreover they use it to measure the success of the marketing activities. (Underarmour.com, 2016)

Disclosure of personal data

Third- Party: Some of the personal data collected from users when interacting with third-parties through the Endomondo services are name, email address, city, fitness preferences and payment information along with the registration for access to these services. The company uses this data to provide the third parties fulfilment of the products and services that the users want or have requested. This data is shared for all Under Armour affiliates of the company, in order to run the business more efficiently and gaining a better understanding from the statistics of the users. This data may also include partners, vendors, distributors and suppliers, however their accessibility to the data will only be to the extent necessary for them or when they provide products and services to users or Endomondo. (Underarmour.com, 2016)

There are also third parties that Endomondo do not own or control where the privacy policies do not apply to. The example stated is much like given in 2.3.1 where the Operating Systems and Platform providers have different policies that are outside of the jurisdiction of the application developers. This means that for example, Apple (smartphone provider) can have other types of policies for collecting information through the smartphone that applies to their own policies and practices. Endomondo encourages to read the privacy of all devices, website and services that the consumers use. (Underarmour.com, 2016)

Profile visibility

Endomondo does not provide a privacy setting that you can have your profile private. They have two different settings either Public or only Endomondo users. For the public setting anyone can view the profile but the visible information is in accordance with your other privacy settings (e.g. set weight to only me). The second option hides the personal data from everyone that is not a signed in Endomondo user and influence what is displayed when the account is searched from a search engine. They will not be able to see profile page, workout page, statis-

tic page or the users name in comments etc. but Endomondo does state that they cannot hide a user's account because of some search engines cache information which they cannot control. (Endomondo.com, 2015)

4.5.3 Other applications and comparisons

Understanding the functionality of Runkeeper and Endomondo in terms of their privacy policy, we progress to explain the rest of the applications that our interviewees have been using at the time of the interview. Considering that the two above mentioned apps are the biggest and the most popular (despite that Endomondo's frequency in our study was fairly low), we describe the rest of the applications and their privacy policy effects in this section, in a comparative mode, mostly highlighting their similarities and differences.

All of the applications mentioned in these empirical findings have the same standardised type of privacy policies that follow the exact same template. The reasoning behind Runtastic not having their entire policy defined in this section is that it was the only application a user (**C**) had paid for, thus not of the same value for comparison. However we did go through the policy showing that it is in the sections mentioned for Runkeeper and Endomondo similar.

Examples of this are **Runtastics** collections of:

- First and last name;
- Home or other physical address, including street name and name of city or town;
- Email address;
- Miscellaneous workout data, such as length and type of workouts, pulse rates, etc.(Runtastic.com, 2016)

The same goes for both Nike + and Garmin since the users upload their wearables information to a third party site, such as interviewee **O**'s Funbit. Both these application users wear wearables and also two different ones, which makes them interesting, however the applications policies are also very similar to the ones from Runkeeper and Endomondo. Examples of this are the same types of data collected such as:

Nike

- Contact details including name, email, telephone number and physical address
- Login and account information, including screen name, password and unique user ID
- Personal details including gender and date of birth
- Payment or credit card information
- Images, photos and videos
- Data on physical characteristics, including weight, height, and body measurements (such as estimated stride and shoe/foot measurements or bra size) (Nike.com, 2016)

Garmin

- Name,
- Mailing address,
- Phone number,
- Email address and contact preferences
- Payment card information and related payment and account information (If provided for during payment) (Garmin.com, 2016)

These companies also have very similar uses for the data such as except for Runtastic that never really disclose what how they intend to use the data:

"By registering, the user explicitly agrees that Runtastic shall have the right to use all automatically collected personally identifiable information, in accordance with the privacy settings of such user, for purposes of the Runtastic applications" (Runtastic.com, 2016).

Garmin used the Personal Information for "(a) for internal statistical, marketing or operational purposes, including generating sales reports and measuring and understanding demographic, user interest, purchasing and other trends among our customers, (b) to notify you of certain changes to this Privacy Statement, and (c) for any other purposes for which we notify you specifically at the time of collection or as otherwise described in this Privacy Statement or as permitted or required by law, rule, regulation, subpoena or other legal process." (Garmin.com, 2016)

While Nike uses it for providing the features of the apps and services requested by users. They have marketing of products and their services along with events. They also use the information for improving their business and products and for analysis along with protecting themselves. (Nike.com, 2016)

5 Discussion

In this chapter we discuss the thesis's empirical findings in the context of the theoretical framework. We discuss the modified model and its positives and negatives and further we discuss the factors from the empirical study one by one and then compare them to the stated privacy policies by the companies to determine the users actual awareness.

5.1 General discussion

In the section 1.1 Background, we mention how it's rare today to find successful enterprises that have not made use of business intelligence (Chaudhuri, Dayal and Narasayya, 2011). In the similar area of big data and analytics we see numbers of 2,5 Exabyte being created each day back in 2012 (McAfee and Brynjolfsson, 2012).

The use of business intelligence as a decision-making tool and big data as information gathering becomes prevalent for fitness applications when reading through their privacy policies. The empirical findings 4.5 show that Runkeeper, Nike, Garmin and Endomondo all use analytical tools for improvement of their products and businesses according to their policies. Examples of this are how Endomondo uses analysis for improving their existing products or services and personalizing the experience for users. Big data comes in the picture as all of the companies mentioned in the empirical evidence gather personal data and through the use of data mining they are able to gather this data from the users. This is for their own use, to sell to third parties or towards agents and affiliates working with their services. When looking over the combined downloads of all the applications just on the Google Play store, we get an estimate between 41- 250 million downloads for five applications (Play.google.com, 2016). Considering these large amount of users and adding the many different types of personal information that can or is gathered according to the privacy policies, big data is a large factor for these companies.

A noteworthy part we noticed when investigating these applications is their life cycle. It seems as many of the companies started somewhere between the pre- to early 2010's before being bought up by large companies in the later decade. This could be attributed to the value of this type of data as very large enterprises now own all of these applications such as Under Armour, Nike, Adidas, Asics and Garmin.

The following parts of the discussion will pin the theoretical work against the empirical findings and discuss our findings from the policies, the interviews and the users awareness.

5.2 Privacy policies discussion

Considering the recommendations by the FTC in chapter 2.3 we notice that the companies found in the empirical evidence tend to follow the just-in time disclosures for gathering of consent when it comes to personal data collection. For example, these companies requires the users to accept and give their consent to collect location data before said application can retrieve this information.

Unless the privacy policies have been read we highly doubt that the users are aware that this location data can still be collected even if the services are not active and running, as in the case with Endomondo. This argumentation stems from the fact that only interviewee **E** mentioned location data as a part of the comprehension factor and **F**, **L** ,**O** mentioned it during the projection and the only argument as to why the companies collect the location data, was for statistics or demographic mapping.

As for the companies' privacy policies, we took note of some of the parts that stood out for us as researchers. Runkeeper states that they will cease to use personal data after a registration has been cancelled. However this claim seems to be more of a "good trust" statement rather than a guarantee because the data provided during the registration probably won't be deleted or doesn't have to be.

A lot of data may be shared between companies such as Endomondo and Runkeeper with their affiliates, agents and third parties for each service that they deem requires it. Not only is this information at times stored by third party affiliates managing the databases, but also for specific directed sales from these third parties. For example, Runkeeper has third party tracking installed so that these companies can collect users information for online interest-based advertising. This means that depending on how a consumer uses the applications, services or what type of merchandise they buy through the application or website this can make third parties send directed advertisement based on the tracked information.

We thought that this was reasonable as long as the directed advertisement is made of fitness products/services from Runkeeper or directed within the theme of exercise but it clearly states in the policy that third parties can use the data gathered to target non-FitnessKeeper advertisements on the users overall online activity. Digging further into this topic we summarized that even though these third parties don't get that much description they are often mentioned in subsections of the policies, showing that they can gain very large quantities of information about a specific user.

The data that third parties either have, can or may gain and use from just Runkeeper are: all data from a merger, location data, demographics, interests, behaviour, web logs, web beacons and set and access cookies. More importantly, since FitnessKeeper uses third parties to manage their databases these companies have in possession almost all-personal information. FitnessKeeper claims that they are only allowed to use this information the way they deem necessary. Throughout most of the policy, it is stated that this information has to be used since the third parties do analysis, handle data for ticket responses which in return requires for them to know who to respond to, location data etc. With all this combined we thought that the policy didn't serve any purpose towards third parties since it seems as if they can use most of the data, even though FitnessKeeper says that they use the data in manners they deem feasible.

Since third parties are responsible for actually maintaining the data, large amounts of data seem to be under their control.

The situation looks very similar for Endomondo as they also state a sharing of personal information towards third parties and affiliates in a manner they deem worthy. There is however an addition of third party usefulness towards the company as Endomondo have actual purchases of third-party data as an addition towards their databases. This is made to advertise offer makings to the users in what we believe is a deal between the company and the third party for a type of provision-based sales. The reasoning behind Endomondo's third party data acquisition is never stated in the policy other than the direct marketing towards their consumers.

5.3 Situation Awareness

According to the empirical evidence provided from the interviews, we can tell that all the constructs in our model have some influence for users. In all of the factors cases at least a few of the respondents stated that the factor did influence their SA. We will go in to this further in each factor down below. Moreover we can acknowledge that situational awareness is a model that can be modified and adopted into almost any situation. Endsley (1995) states himself that SA is applicable for example to the police tactical units, pilots and more. He states that there is a need for SA applies in a wide variety of environments. We think with a bit of modification to the factors as we have done in this thesis, that Endsley is correct in his statement. The model can to a degree be applicable even to a runner's situation when deciding to download an application or purchase a wearable.

In this particular situation the situational awareness model was adopted into a quite different scenario than it was designed for and it is still, with some modification, relevant and applicable. We can conclude from the factors included in our model along with the answers that it is very individual what influences a person's decision process. Moreover the decision process can range from being a very complex process to being a quite simple one. Therefore we cannot conclude with any certainty what factors would influence an individual at a certain time. We can however state as we have proven here, that all these factors in some way influence runners when downloading applications or buying wearables.

These factors can influence a person in a direct or indirect fashion as the **self-satisfaction** factor proved with 5 persons stating that they got direct influence from it and 5 answered that this indirectly influences them. These answers got us reflecting upon the possibility that the other factors may have an indirect affect as well on the respondents that they do not consider themselves. Or are there other factors we have not asked? In any case as stated earlier we can conclude that this is a very complex decision process. There could be factors that a person does not consider openly but unconsciously and indirectly influences a persons choices, but which these are, would need another study to empirically test.

Our adoption have been successful in the sense that none of our factors has been rejected, however we also realized that we should have asked the respondents if there were any other factors they wanted to mention. This would have been made to further gain knowledge if

there are any more factors that influence them in their SA and to further extend the modified SA model if needed. In this form we can only test the actual incorporated factors.

5.3.1 Perception

The first factor we asked the respondents was how they perceive the situation before downloading. The question (see table 3.2) was asked in order to understand the underlying perspective for each person why they wanted to download this application or buy a wearable. We wanted to gain knowledge on the thoughts behind the initial thought "I should buy this wearable or download this application". What we finally noticed from the empirical evidence was that 11 out of 16 respondents had the same initial thought, to measure time and distance while exercising. This seems to be the fundamental reason or thought behind it. Two persons stated that it was because the application was easy to access but surely there is more to it than that. So if you look into respondents **I** and **M**s further answers, respondent **I** states in decision that measuring distance is a factor. In the case of interviewee **M**, he states that in the question about objectives measuring distance and how fast he runs them are factors that influence him. If we continue this thought and look into the three persons left that did not state that measuring time and distance is a reason. Interviewee **F** states in objectives that measuring time and distance is important for her. Respondent **O** tells us that her how fast she runs a certain distance is important because she want to increase her running abilities as a competitive runner. The only one sidestepping from this goal of measuring time and distance is interviewee **E** whose thoughts towards running is for the fun of it and he just wants the tracking so he will be able to run different routes for enjoyment.

With this thought ended we can see that all the respondents in some way thought about or considered measuring time and distance important except for one leisure runner. This is perhaps stating something a bit obvious because the main function of these applications and wearables is to measure time and distance but now we can conclude that this is the primary factor behind the start of the decision process towards downloading / purchasing these kinds of devices / programs.

5.3.2 Comprehension

The comprehension factor is a vital part of the empirical findings considering that this factors shows if the interviewees actually have an awareness regarding data collection within the fitness application. Comparing to the Projection, comprehension was thought to solely have answers reflecting just the awareness, however some of the interviewees would end up still mentioning parts of the projection or what they think was being collected as a part of their answer to the awareness. We think the reason for this being because of the nature of following up one's claim with examples of the answer.

Another noteworthy question to mention within the comprehension factor are the users that answer with *No comprehension*, yet have *keeping track of distance and time* in the objective factors. One could argue that since the users want to have a possibility of tracking time and location, which means the disclosure of location data, gives an indirect answer towards comprehension. We argue that the lack of awareness remains, due to the fact that some interview-

ee's might not know the technical requirements of the application to be able to provide this type of services.

5.3.3 Projection

When we asked the participants about what they think the companies can do with their mined data from the usage of these programs, we got a surprising amount of suggestions and opinions. First of all almost all the participants started saying "I don't know" followed by some guess or stating that they cannot do that much with my data. We thought this was quite interesting that the participants said I don't know and then when they thought it through, they could come up with several things that they 'know' the companies can use their data for. Furthermore the clearly most stated things that the participants think the companies use their data for, is directed sales towards the users and statistics. In the case of directed sales towards the users the participants speculate that they use the data to look into the exercise habits of the users and then direct sales towards them, based on the data. Half of the interviewed participants thought sales was the thing companies do with the data, quite surprisingly surpassing feedback from the usage. Only 5 of the respondents thought feedback was the main use of the mined data.

In the case of statistics, respondent **G** summarizes the speculations from the respondents *"... foremost I think that they use it to map the usages of as many users as possible. Use our friend-lists and so on*" [11]. A speculation from three users further builds on this and concerns how the applications or wearables can save the location data to get statistics on where they are and how far they run. We think that these are one of the most common data mined for statistical use together with gender, frequency of running and age. When it comes to the usage of the statistics the respondents had some ideas what it could be used for. For example 4 respondents stated that the companies could sell the data to a third party, which can use it for different reasons. Other than these speculations the respondents did not state any other usages for the data, the rest of the interviewees thought that they companies couldn't do that much with the data. The last respondent however stood out from the rest he (respondent **P**) stated that he doesn't know and he doesn't care. Which is for us a surprising and an interesting approach to all the data mining and integrity issues, there are some people that simply do not know and don't care about it all.

5.3.4 Decision

The decision question was designed to get an understanding of the concrete underlying factors for a person to take the decision to download or purchase an application or wearable. Not quite surprisingly functionality of the product topped the list of answers by the respondents, which goes back to the perception question where there the respondents stated that measuring time and distance was the primary factor. As discussed some in perception (5.3.1) this is one of the clearest findings and quite obvious, that the majority of users download or purchases wearables for the reason of measuring time and distance when conducting their exercise. Then

[11] See appendix B, interviewee G, Perception for original quote.

there can be other underlying factors as well but this is the "basic" reason for most of the interviewees.

Being recommended to use the application by friends or family is also a powerful reason at least for trying it out and starts measuring the exercise frequently. Recommendations from people we know have big impact on what we try and what we think about things; therefore according to these numbers this is something that could be used more in advertising to gain new customers or users. If we compare the findings here, we have 6 out of 16 that got recommended by friends and only one that got influenced by regular advertising.

Another important reason for users to try out or to start using mHealth products regularly is that the interface and functionality is easy to use and understand. This fact was proved to be important in the empirical findings as 4 out of 16 thought about this factor. Some of our interviewees clearly state that they bought / downloaded the product that was easier to use and to understand because of the functionality. We think that this is something important when a user tires an application because if the user doesn't understand the interface or how to use the functionalities, he or she will try one of the other countless products in the area instead. Therefore user friendliness is quite important for the application developers and also for the wearable selling companies. In their case this can be extra important because they usually have both a device and an application to connect it to.

5.3.5 Performance of act

The last step of the SA 5 level process is the performance of act. This step measures the actual act on which all the other levels and factors influences and becomes the "end product" of the SA model. If we consider the example of an airplane pilot all the previous steps in the SA level process and the factors influence the act the pilot is about to make. For example if the pilot is about to land the airplane and needs to course correct to hit the airfield the performance of act (course correcting) is affected by all the other steps and factors for the act to become as initially perceived and the corrected course to be correct to insure a successful landing. (Endsley, 1995)

With this example in mind, the Performance of Act question was phrased in such a way that it summarized the previous answers of the interviewee and asked the question if they still went through with the download, considering their knowledge of comprehension and projection (see table 3.2). However this step was in our case not that simple to measure in a concrete way because there is quite the difference in the act of a pilot and the act of user to download an application or purchase a wearable device. In the pilots case the act is easily seen and measurable but for a user in our case the act itself is pressing the download button or buying the device in some way.

In the pilot study the question was phrased as "have you ever had any complications after a download" (see 3.4). The answers aren't of relevancy for the question as it is in the regular study, due to it being changed after the pilot study. When we conducted the interview for the regular study we found the new developed question to be a bit redundant and therefore the interviewees in some of the interviews did not answer the question (interviewee **H, I**). The respondents that did answer the question gave us the following findings as seen in table 5.1.

Table 5.1: Performance of Act factor answers by category.

Category	Respondents
Have had complications after download. (Pilot)	A
No complications after download. (Pilot)	B, C
Summarized SA answers. Still decided to act. (Regular)	D, F, G, J, K, L, M, N, O, P
Summarized SA answers. Decided not to act. (Regular)	E

As the respondents of the pilot study answered a different question they are in their own categories. The regular study's respondents answered based on their previous stated understanding of what is collected from their usage patterns and what the companies can do with the mined data, and most of them still acted and downloaded the application or bought the device despite of the data collection. We think this can be because the interviewees still feel that they can trust the companies to take care of their data in a secure way and that the interviewees think the companies cannot do that much with the data as stated in projection.

5.4 Application Factors

5.4.1 Objectives

The two factors regarding the objectives that are the most popular answers were keeping track of the distance and time and being able to follow up on this information. We considered the follow up factor to be an indirect acknowledgement to keeping track of distance and time, as this already has to be a pre-requisite to be able to have a monitoring on. Considering the capabilities of the applications like sharing and comparing your runs on social media through the application or creating food plans and run-schemes through a connection with other applications, the average user from these empirical findings wants the most basic functions from a fitness application.

For the users **C**/**E**/**O**/**P**, the visuality of where they have been running seems to be an objective with the application as interviewee **E** explains that it makes him run in different areas. The visuality is also and indirect answer to the category of monitoring, as you have to have a historical record of where you have been running to modify your current run.

5.4.2 Expectations

When it comes to expectations, it seems as the question formed the answer from our interviewees. This due to them assuming the application to be able to finish their objectives such as the keeping track of distance and time. However this can be attributed to the fact that a longer use of an application creates expectations of it.

As mentioned in chapter 2.5.8, the continuous experience within an environment provides development of expectations for future events. We argue that continuous users of mHealth applications will switch applications once their current ones can't live up to the expectations as the primarily factors consist of those mentioned in the objectives. The reliability factor fur-

ther proves the point of a consistent usage as long as objectives can be met. We also think that there is a factor of other applications being unexplored as some of the users mention extra features. For example respondent **I** mentioned other functions, which they liked, functions that weren't primarily reasons for that specific download. Considering this, we think that many users might settle just because they don't know better.

As for privacy, none of the interviewees mentioned this as an expectation. We were not surprised as the privacy is not of concern for a majority of users in the empirical findings. Considering what the interviewees have as objectives and expectations, if privacy was to be a goal it would conflict with the functionality they want from the applications as mentioned in chapter 2.

5.4.3 Complexity

When it comes to the applications or wearables complexity, it isn't a large issue or something to consider, according to a majority of our interviewees. All of the respondents from the pilot study thought interface design was important, but this might have been a possibility because it was a question by its own in the pilot and then incorporated within complexity in the regular study.

As previously discussed in 5.3.4, the simplicity to use and understand a product is a factor for some of the respondents and this certainly fit under the complexity factor.

5.4.4 Experience

Experience is a factor to consider due to its revealing of prior usage of similar applications. Unfortunately, no interviewee in the regular study (except for **O**) stated that they had used other fitness applications, which gave influence to the purchase of a new one. Instead, the answers we got were more focused on what influenced the choice of a specific application. The empirical findings show that 4 interviewees were influenced because of their own investigation comparing best in tests, blogs or app store ratings to make a specific choice. We believe that similar to expectations the interviewees are perhaps not exploring the category enough to make a better choice than to pick what has been recommended by others. We had three interviewees compare different application within the same category, showing that there is a willingness to explore the area but for a majority it might just be a comfortability question.

A noteworthy mention is interviewee **E** who is dis-influenced by inApp purchases in other types of applications stating that from an experienced point of view, free applications require inApp purchases to remove marketing and data collection. Our own reflection of this is that while we don't think it removes data collection it does remove marketing in apps of other categories.

5.4.5 Disclosure

This factor actually asks for the privacy policies influence on the interviewees. We received an almost 50/50 divide on reflection and no reflection when it comes to the privacy policies.

However, only one respondent was actually influenced by privacy policies. An interesting situation would be to see if those that had no reflection and no influence would gain an influence if they were to read or reflect upon privacy policies. When we look into the category of people that do reflect upon these policies, our interviewees still answered that it gave no influence upon their purchases. We reflected upon **Respondent I**'s answer as he mentions that he would've said yes to terms of agreements if it would make him pay 5 million Swedish Kronor, not because he reflects upon it but because he wouldn't have read the policy and it could say anything in it.

We think this is an issue not only in the category of mHealth applications but with any service or product that has service agreements and privacy policies due to the fact that people might give away much more than they would agree to if they read it. As we stated in 1.2, only 30,5% of mHealth applications have privacy policies and with statistics such as 26% of users actually reading these this is concerning. We noticed that some of these applications such as Runtastic didn't have privacy policies as well disclosed as other applications, they did the same things but did not explain as detailed as for example Runkeeper.

5.4.6 Price

The price factor was the question with the most evenly spread answers (almost half of the respondents on each) between the two categories we could place them in. From the respondents we gathered which application or wearable they used and we found that the free to download applications are the dominant ones. It's not very surprising then that many of the respondents stated that they were influenced because the application was free and that was why they downloaded it. The other category included the two wearable-buyers, which isn't very surprising either because if you are willing to spend money on a product you want to get a good product in return. However the other respondents responses is perhaps then more surprising because they have not purchased anything with money, on the other hand a person "invests" time, space on their phone and more to these applications. So a finding based on this can be that Landsburgs (2013) price theory is applicable in this case even without money. The price in this case would be instead effort and time spent on the application, and if time and effort increases to use it demand would go down.

5.5 Individual Factors

5.5.1 Abilities

The empirical findings about how the athletic abilities influences towards downloading and purchasing was divided into three categories from our respondents. 5 of the respondents speculated that increased abilities leads to more influence towards this than lesser abilities does. To build on that 7 respondents thought that the abilities you have influence which sort of application you purchase or download. If we take respondent **O** for example she is an elite runner and she has bought a wearable in order to try to increase her performance in running. If we compare to some of the more leisure runners they have contented themselves with free to download and use applications. As an example of this respondent **F** states that she doesn't

have the athletic abilities for special applications, she just runs and then Runkeeper is adequate for that purpose. One more example is respondent **I**, he states that he thinks that because he is on an amateur level a free application is enough but not if he was a professional.

5.5.2 Determination

We found that from the determination question we got two kinds of answers as the respondents interpreted the question differently. Firstly and most answered was the interpretation if the application would give the respondents motivation to exercise or increase their own determination to do so. We found that 12 stated that the application does this for them, and two respondents stated that the application does not have any such influence on them. However this was not our main intent with the question, we wanted to find out if their determination to exercise had any influence on their decision to buy or download an application or to buy a wearable. We got two respondents that did in fact say that this was the case, but we also received one answer that it did not have any influence at all. Two out of the respondents who said that it does have an influence to purchase was both of the two wearable owners. The respondent **O** stated that her will to get better in running had an influence for her to purchase this particular wearable. For respondent **B** she stated that she wanted a wearable that can track her everyday movement and thus enabling her to keep track of her everyday movement and possibly increasing it, if it is below a certain amount per day. We would like to conclude from this that there is a reason behind purchasing wearables but we do not have the data to support this fact. If we had received more respondents with wearables we might have been able to do so but for now the findings point in this direction.

5.5.3 Self-satisfaction

Self-satisfaction concerns the person's well being, health status, enjoyment when exercising, relaxation etc. These depend very much upon the individual and therefore they are a bit abstract. Nonetheless we felt that these were a factor that needed to be included into the study and based on the responses it certainly influences some of the respondents whether it does so directly or indirectly or even unknowingly. We think that even though 6 respondents state that self-satisfaction does not influence them when deciding to download or purchase, unconsciously it does affect them. Because we think there is a basic need for either satisfaction, relaxation or whatever a person has as a motivation for exercising that influences them to exercise. Therefore whether the person is aware of it or not, it does influence on some level and if they don't have it as a motivation it still affects them because it is a side effect of the exercise itself.

5.5.4 Competitiveness

Competitiveness is another complex and a highly individual factor, some persons are competitive and some are not. We still found from our empirical findings that there were 4 categories we could divide the responses into.

The most common response was that the respondent is competitive against him-or-herself and got influenced through this to download or purchase applications / wearables. We think this is one of the key aspects to why people download applications or buy wearables. Reasoning

behind this is to on some level be become better and get "results". If we connect to why they stated their reason to use these products, they (the majority) stated that measuring time and distance was a key factor. There were also some who mentioned that they want to follow up earlier results and compare with a new run in order to see if they are getting better results. Moreover two respondents stated that they get indirect influence through self-competiveness. This builds on the same principle but just that the interviewee is not as competitive as the others, he or she sees it as a side effect rather than a factor. Lastly 5 interviewees said that it had no influence for them to exercise whether it concerns competing toward others or themselves, which is logical because not everyone is competitive in nature.

5.6 User awareness vs. policies

As the thesis handles the topic of user awareness and privacy within mHealth applications, we wanted to have a section dedicated to the empirical findings on what were the interviewees stance regarding privacy policies and the companies intended usage of their data. This section analyzes whether the interviewees are correct in regard to what the actual privacy policies of the companies read.

The category of comprehension had some answers for the intension of data usage although not as extensive as in projection. 5 users mentioned specific data collection and usage which where demographics/statistics and location data. It is true that these companies gather personal information for statistical use as they mention this in their policies. For example, Runkeeper uses De-identified personal data for end user demographics and usage patterns for statistics to track numbers of visitors and users of their sites and services. In the same vein, Endomondo uses additional information from registrations for the demographic information. Interviewee **G** mentioned an interesting answer claiming that they might map his friendship, which is true, but only if consent is given to allow interconnection between the application and social media, such as Facebook.

The projection factor was the one where our interviewees mentioned what they either know or think the companies intend to do with the collected data.

Within the category of projection, there were 6 interviewees that thought the companies aren't able to do too much with the data as the data is not valuable enough. This answer is neither right or wrong as it's all relevant to whom this data would be considered as valuable. What we argue for is that in the sense of the company it is valuable information for demographics, statistics, feedback and sales. Considering these parts being a large portion of what a company needs to survive, we'd argue for that what the data mHealth companies collect according to their policies are valuable. The proof of value in this information is further provided with Endomondo as they might buy additional information from third parties which none of the interviewees seems to know of.

We had 5 interviewees mentioning that they think the intension of this data collection is to gain feedback that can further improve the services of the companies through tracking of usage patterns and other similar functions. This is correct as Endomondo for example, state that they track the user of the services to improve their businesses, the same with Runkeeper. However, the data they collect is the sleep, nutrition, goals and progress of the users, which

seems only beneficial for improvement of those specific functions. They also use additional information through the registrations for demographics, which not only is used as feedback but leads us to the point of sales to third parties.

4 users thought that the companies might sell personal data to third parties, which is also a correct statement. Not only to the companies sell this data to third parties, they can make the third parties gain access to the users usage patterns so that they can direct their sales towards these consumers. 8 users mentioned the fact of directed sales towards users however, nobody mentioned that this doesn't even have to be in the same category of e.g. FitnessKeeper marketing but towards all type of marketing. We believe that due to the nature of these applications being free, they have to gain income through other means, in this case the sales of information. Finally we had 3 interviewees saying that the companies can collect location data. They didn't mention more than that the companies can see where people run which we believed might fall in the category of statistics but the privacy policies had their own section of location data. The use of this is according to us for demographic purposes and for disclosure to proposed business partners in areas where these statistics are relevant, such as the case with Runkeeper.

With these empirical findings combined with the unanimous decision (minus interviewee **E**) to act upon the download with all the prior SA levels known we notice that privacy isn't a large issue for our interviewee's. Even if they don't know what they collect, their assumptions are still on point and with those assumptions they are still going along with using the services and mHealth applications.

6 Conclusion

As we conclude this thesis, we return to the research question "How aware of data collection are consumers when accepting Privacy & Integrity policies (in Fitness applications)?"

The first step to provide an answer towards this research question was to assess how many interviewees actually reflect upon the privacy & integrity policies, which gave us an approximate of 50/50 interviewees but with a slight lenient towards no reflection. However out of those who reflected upon the policies, there was only one interviewee who was influenced by the policies comparative to the others in the rest of the categories. So based on this thesis empirical evidence we can conclude that only 1 in 16 users is influenced by the privacy and integrity polices when downloading or purchasing applications or wearables.

The next step towards analyzing the awareness of users was through the means comparison between the users stated awareness and to the privacy policies actual claims. The chapter 5.4 discusses these findings in detail, which reveal in summary a couple of important statements. We notice that from individual users we don't get answers that cover all the aspects the whole sample gives. They don't comprehend the holistic picture of all data that can be mined from the usage patterns but as a group of 16 interviewees almost cover all of the major parts within the privacy policies, which we can gather from 5.6. What we also found was that none of the interviewees realized that the companies can and does buy private data from third parties to get a more comprehensive picture of the consumers using their product.

However as the performance of act shows, when the interviewees got a summary of all their comprehension and speculations of data mined from their usage patterns, 15 out of 16 respondents still go through with the act of downloading or purchasing the products. We can conclude from all this that the awareness level of users, while in-group is quite comprehensive, as individuals this does not affect the usage of fitness applications to any noteworthy degree.

6.1 Future research

This thesis academic contribution is the reveal of a lack of awareness from users of mHealth applications. Since our sample is 16 interviews, we propose that a larger sample could be of use for a more thorough investigation. With that being said, this thesis also shows privacy policies and their affect on users and it would be important to see it from the perspective of companies. Another perspective that we mentioned we wouldn't apply in this thesis was the ethical perspective from companies, as we believe this should be a study for itself. To add towards this perspective, we have proposed a research question built towards the theme of companies.

Proposed research question: How do fitness application (mHealth) companies approach the topic of handling data, not to violate any rules concerning data handling, and notify consumers of their usage of the data?

To do further research on this topic, we suggest to use our study as a base to fully understand the spectrum from the users point of view. When comprehending the users perspective the researchers will have information about the applications from the interviewees and their awareness of this topic. This will lead to a solid base for conducting interviews with manufacturing companies of applications and wearables within the area of mHealth.

Appendix A

Pilot study

Interview with Anonymous A (17 min)

Gender: Female

Age: 18-25

Frequency of running: 1-2 week

Duration: 15-30 min

Distance: 2-5 km

Terrain: Flat

Weather: All

Brand of Device: Endomondo (app)

Perception: Vet inte, för att man ser att andra använder den på Instagram kanske. Att den skall vara så enkel som möjligt, bara trycka på play och så springer jag. Det viktigaste är att kunna ha koll på hur långt man springer och på vilken tid.

Comprehension: Nej, jag vet bara vad jag får ut av det. Jag vet inte vad som händer med informationen sen egentligen. Jag vet att jag får ut tillexempel kalori förbrukning och att jag kan gå tillbaka och jämföra med andra gånger jag har sprungit. Sammanfattning på hur mycket jag har tränat, jag förstår ju att applikationen sparar information på något sätt, sen vet jag inte om det är privat för mig eller vad som händer med den. Jag har tryckt på "I Agree" på ett avtal med jag har inte läst igenom det ordentligt måste jag erkänna.

Projection: Jag har inte tänkt så mycket på det men nu har det vart lite på sociala medier och på nyheterna, så man har börjat fundera på vad som händer med datan. Vissa applikationer har tillgång till informationen så den är inte bara för en själv som man kan tro.

Spekulerar att dom inte gör så mycket med datan, sen så är ju frågan om andra kan få tag på den. T.ex. så har man GPSen på och då spåras det var och hur man har sprungit sina rundor. Dom kan ju se att man springer samma runda hela tiden.

Decision: för det första så skall den vara så enkel som möjligt och på svenska. Sen är det lite vad man är ute efter, jag använder t.ex. Endomondo när jag cyklar till jobbet också för där kan man välja aktivitet om man går eller cyklar eller vad man gör. Det är bra med den så den har flera användbara funktioner enligt mig.

Act: Hade runkeeper innan. Bytte bort dem för att det var mycket att trycka på (komplicerad att använda) sen så skulle den dela på Facebook hela tiden, även om man tryckte att man inte ville dela så fortsatte den fråga men jämna mellanrum.

Objectives: Olika för vilket stadie man är på, för är man inne i en träningsfas så är det kul att kunna gå in och kolla hur mycket man har tränat under veckan och hur mycket tid och kalorier man har förbrukat och lagt ned på det och så. Att kunna gå tillbaka och se det sammanlagda sen också som sagt tidigare att den skall vara enkel att använda.

Expectations: För min del så är det att jag skall kunna mäta sträcka och jag vill kunna veta om jag har varit ute i 20 eller 30 minuter. Sen få den sammanlagda statistiken, t.ex. mäta mot hur fort det gick att springa samma strecka för en månad sen. Så kan man jämföra där.

Complexity: Ja den är viktig.

Interface design: Egentligen så är den det. Men nu så är detta en gratis applikation så man får väl ha lite lägre krav då, nu tycker jag att det kommer ganska reklam och så när man använder den. Nu accepterar man väl ändå det men om man hade betalat för appen så tycker jag att man har mer krav på den.

Experience: Ja, man jämför mellan dom två. Sen såg man mycket på Instagram alla som lade upp kartor vart dom sprang osv plus att man pratar med kompisar som har applikationer och då var det många som hade Endomondo och när man testade den och insåg att den var lättare att använda så blev det den. Sen kanske det finns ännu bättre ute på marknaden men..

Disclosure: Jag har inte reflekterat över det innan, och med tanke på att jag har fått ut det jag har velat av appen så har det inte vart något man har funderat på överhuvudtaget. Men nu när det har börjat diskuterats på olika ställen så har man ju börjat fundera över det lite grann. Det hade vart intressant att veta vad dom använder informationen till och varför dom egentligen har tillgång till min privata information.

Men jag slutar nog inte använda den ändå. För man vet ju inte, det kan ju vara överhopat detta med att dom samlar in information, så som det har varit med flera andra saker som sen inte visat sig vara så farligt ändå. Får du sen svart på vitt vad informationen används till så tänker man kanske om sen men just nu så får det vara som det är. Jag vet liksom inte vad dom skulle få ut av att se min information, att jag springer 5 gånger i månaden 5 km men om dom nu gör det så vill man ju veta och varför.

Price: Pris skulle absolut influera mitt val. Man jämför ju olika när man köper och gör två olika samma sak men kostar 1000 kr mindre så köper man ju den billigare. Sen tror jag att det spelar roll desto mer man tränar för mig som tränar / springer så ibland så är priset lite saftigt men för en som använder den ofta tränar och är väldigt aktiv så kanske man skulle kunna tänka sig att lägga mer pengar på det.

Abilities: Ja det tror jag influerar. När man tränar skitmycket så kollar i alla fall jag t.ex. på nya träningskläder, nya saker som inspirerar till mer träning osv. När man är inne i zonen så är det mer fokus på det så att säga.

Determination: Ja det är en influens. Det är samma om man ser andra eller pratar med andra som är ute och springer hela tiden så tänker man att man själv får ta tag i det liksom.

Self-Satisfaction: Nej, jag tror inte jag laddar ned en app bara för att jag tänker på min personliga hälsa utan jag springer ju för det sen blir det ju så indirekt men det är inte orsaken till nedladdningen. Det är mer när man väl springer så underlättar det med en app.

Competition: Ja det är klart den gör ju mycket i alla fall frö mig, det är ju den som driver dig framåt. Till exempel varje dag när jag cyklar till jobbet så tävlar jag med andra, är någon framför mig så måste jag cykla förbi den om den inte har el-cykel för då går det inte, haha.

Interview with Anonymous B (13 min)

Gender: Female

Age: 36-45

Frequency of running: 2-4 week

Duration: 30min - 1h

Distance: 2-5km

Terrain: All

Weather: All

Brand of Device: Nike Fuel (plus) wearable + app

Perception: Jag ville ha bättre koll på mina egna motions vanor, ville även se längd, omfattning och hur ofta. Se mitt eget rörelsemönster.

Comprehension: Jag är medveten om att de gör det. Först så får man lägga in om man är man eller kvinna, längd vikt osv för sånt har betydelse när man tränar. Sen är det ju så att den sparar ju hur lång tid, omfattning. Jag använder ju den främst som steg räknare t.ex. sen kan man ju ha pulsmätare osv på den om man vill men det kände inte jag var något som jag behövde.

Absolut är jag meteveten att dom samlar in för det sammanställs ju så man kan se grafer, man kan gå tillbaka och se förra året jämfört med nu man kan gå tillbaka till tidigare månader osv. Så man ser ju vilken information som samlas, sen kan du ju välja att bli jämförd med andra.

Projection: Jag tror inte att dom gör så mycket med den insamlade datan. För att jag tror inte att dom kan göra så mycket intressant med det. Dom försöker väl säkert se vilken del av appen som används mest för att kunna utveckla det mer och kunna sälja mer produkter. Men jag tror ändå inte att det går att få ut så mycket av det. Kanske se om dom kan utveckla något som kan skräddarsys mer mot kvinnor eller män där kan dom nog använda datan till att "nischa" sig och ta fram bättre produkter, marknadsföra dig mot en specifik målgrupp.

Decision: Jag hade bara bestämt mig att det var denna typen av stegräknare produkt, som jag ville ha. Jag ville inte bara ha en som man sätter i byxan utan jag vill ha en som mäter mig på allt, inte bara när jag går en promenad utan hur går man på en hel dag, till och med när man är still mycket på jobbet och så. Därför ville jag ha en sådan här som följer med hela tiden, och detta armband var bra. Jag var nära att köpa Garmin först och sen finns Apple Watch och många sådana men dom ser ut som klockor och det ville inte jag ha, utan jag vill ha en som är som ett vanligt armband. Mer som ett smycke som jag kan ha varje dag utan behöva ta va när man skall vara fin eller så.

Act: Nej inga komplikationer, dom har funkat bra.

Objectives: Jag vill ju se avstånd och omfattning kan man säga

Expectations: Att det skall fungera utan problem, ha bra batteritid och fungera utan strul enkel att hantera så att säga, där uppfyller den mina krav.

Complexity: Jag tycket att själva wearablen (armbandet) är lätt att förstå, appen lite oklar. Jag har väl inte utforskat den till hundra än för det finns så mycket man kan göra men...

Interface design: Ja det tycker jag är viktigt. Men viktigast är det funkar som man vill.

Experience: Jag har inte haft någon sådan här innan. Däremot så har jag gjort en undersökning innan jag köpte en, kollat bäst i test, kollat bloggar etc för att vara säker på att jag får en bra produkt.

Disclosure: Jag bryr mig inte om det. I detta fallet så kan jag välja själv om jag vill ha ett privat konto eller inte eller om jag vill jämföra med andras. Så där tycker jag att det uppfyller det jag vill ändå.

Pris: Det priset jag fick betala för denna produkten var rimligt om man kollar vad man får ut av produkten.

Abilities: Min är ju väldigt mycket fokus på steg och avstånd osv. Jag tror inte man skulle vilja ha en sådan här om man springer mycket då vill man ha pulsmätare och så tror jag. Det har ju inte min på samma sätt. För mig är det ju hur många steg osv som är viktigt, att jag är tillräckligt mycket i rörelse liksom. Den uppfyller ju det jag vill ha av den.

Determination: Jag vet ju själv vad jag vill men det är så att jag blir ytterligare lite mer motiverad för att jag en dag har gått 5000 steg tillexempel och jag egentligen skall ligga på över 7000 steg som minimum. Då går jag ju en extra promenad för att jag har bestämt mig för att jag går inte och lägger mig på kvällen om inte jag har gått mina 7000 steg. På helgen så skall det vara över 10000, så att det ger ju motivation av det så att säga.

Self-Satisfaction: Ja det hjälper ju till och sporrar.

Competitiveness: Jag skulle vilja svara nej på den frågan men jag måste svara ja. Dock ej mot andra utan mot mig själv för att det blir ju så att indirekt så tävlar jag ju med mig själv. Eller man motiverar sig själv, jag har ju att mitt mål på 7000 och då tävlar jag lite att jag måste nå upp till det målet. Sen på helgen så ökar vi det till 10000 och om ett tag kanske jag höjer det till 11000 eller något det är ju en sorts tävling med mig själv. Det påverkar absolut...

Interview with Anonymous C (7 min)

Gender : Male,

Age < 18 - 25 >,

Frequency of running <1-2 week>,

Duration <30 mins - 1 H >,

Distance <5 km - 8 km >,

Terrain : Asphalt, Flat,

Weather: All types of weather,

Brand of Device: Application, Runtastic

Perception: Funktionaliteten och syftet med det. Den skall kunna göra det jag eftersträvar efter. Jag vill bara ha tid och distans egentligen.

Comprehension: Jag tror det. Jag vet inte vad dem samlar utöver datan som jag ger dem i forma tid och distans och vart.

Projection: Kan tänka mig att det används i markandsföringssyften mot en riktad målgrupp. Kan tänka mig at dem vet - jag tror att detta är kopplat mot sociala medier [Applikationen] så dem kan antagligen se att jag är en man i 20 års åldern så kan dem rikta viss reklam mot mig, och även sälja den datan.

Decision: Jag tror jag bara googlade på running apps så kom det upp en lista på ett par, så tog jag den som verkade mest användarvänlig

Act: Nej det tror jag inte

Objectives: Bara att själv ha den datan, hur snabbt jag sprungit och hur långt jag har sprungit och kunna se det

Expectations: Inte mycket mer än det jag begär, men sen så kommer det en massa tilläggsinformation som genomsnittsfart och hur snabbt man har sprungit på vissa ställen vilket är ett plus i kanten.

Complexity: Ja ibland, om det är en applikation som verkligen är komplex som man reagerar på så kan man tänka på det men på just den här så är det inte jättemycket det.

Interface design: Nej, det handlar mest om att det ska vara smidigt att komma igång

Experience: Nej.

Disclosure: Nej, inte om det inte är någonting som är helt fel, men jag läser inte det så det spelar mindre roll

Price: Absolut, om det kostar för mycket. Jag minns inte vad jag betalade för denna men jag tror det var 3 dollar så jag skulle typ inte gå över det.

Abilities: Nej men det påverkar inte jättemycket

Determination: Nej

Self-Satisfaction: Ja absolut

Competitivness: Nej. (Så du jämför dig inte mot andra?) Eller jo, eller nej, det är väl mest för att kunna jämföra med sig själv och kunna se sin egna utveckling

END OF PILOT STUDY.

Appendix B

Start of interview study

Interview with Anonymous D

Gender: Male

Age < 18 - 25>

Frequency of running < 3 month>

Duration < 15 mins - 30 mins>

Distance <5 km - 8 km, >

Terrain: Flat

Weather: All

Brand of Device: Runkeeper

Perception: Usually just to keep track of my times and statistics

Comprehension: I guess...according to the statistics which are the ones I use, I understand what they are collecting. Like average speeds and average distance.

Projection: Probably to maybe get a hint of how long people are running, in which countries most people run and just general fitness of the general public.

Decision: Probably the on that has been downloaded the most times and the rating of the application on the store.

Performance of Act: Yes.

Objectives: To keep track of what I'm actually doing, where I run and to get a hint of the distance so I don't have to do it manually afterwards on my computer or something like that.

Expectations: To fulfil those requirements that I have and to have correct time and correct average speed.

Complexity: No not really.

Experience: I've only used one, so when I switch phones I usually go back to the one I used before, which I'm pretty satisfied with.

Disclosure: It really depends on what kind of application it is. if you compare to movie applications or music applications I would considered being more careful about the privacy. Not that I have anything to hide to that but you listen to stuff you might not want to share with the world, but considering this is a fitness application it doesn't really matter.

Price: Since with the new technology and the competition with fitness apps I feel like it should be free, because there are free fitness apps that are that good and you shouldn't have to pay for it.

Abilities: Not much. The application that I use [Runkeeper] just does what it's supposed to do I guess. And you can also put in if you go the gym [Numbers] but mostly I use it for tracking time for when I run.

Determination: Sometimes, like the can give you push notifications that you haven't run in two weeks so you better get to moving, so of course it give you motivation.

Self-Satisfaction: No I wouldn't say that it is.

Competitiveness: It is, considering that you compare your times from the same runs. When I'm at my summerhouse I have this road around a small lake, so I know how long it is and I know I always have the same distance when i run, so for my own competitiveness yes definitely. (What about social media, putting it up and sharing your times?) I don't really use it in that matter, I only use it for my own times.

Interview with Anonymous E (17:12)

Gender: Male

Age < 18 - 25>

Frequency of running < 1-2 week>

Duration <30-1H>

Distance <5 km - 8 km >

Terrain: Mixed

Weather: All but rain

Brand of Device: Runkeeper, once Spotify run

Perception: Först och främst är det bilderna som dem gör reklam med eller en infovideo som dem använder till reklam oavsett om folk har prata om den eller inte. Sen är det just det, om folk har pratat om den eller inte, det gör ju mig intresserad. Hur kompatibel den är till mina vanor, jag vill inte ha en app som säger hur dålig jag är för att jag glömmer att springa en gång någon vecka.

Comprehension: ...det är ingenting jag tänker på men självklart förstår jag det. Om den frågar om tillkomst till olika saker så är jag väldigt noggrann på platstjänsterna, inte bara på den här typen av appar men gällande alla appar. Det som är läskigt är ju att visa appar har sitt godkännande i att du trycker på knappen hämta. Har jag läst någonting innan om detta i appen så är svaret nej.

Projection: Dessa företag jag pratar om (Spotify och Runkeeper), dem gör nog inte så mycket specifikt med datan. Dem planerar inte att sätta upp reklamskyltar i stadsparken i Lund där många springer, det tror jag inte. Men jag tror att dem kan kolla mycket på sådant du frågar efter...när vädret är si och så då springer dem...om dem får reda på det så kanske man kan göra reklam för solglasögon när det är sol ute för då är folk ute och springer och då kan man springa förbi ett solglasögonställe och köpa billiga solglasögon för dom har 50% rabatt eller något sådant. Sådana crossovers kan man göra med företag om man är ett sådant företag som Runkeeper.

Decision: Det är ju antingen för att jag inte har en sådan app. Jag har väldigt många appar men jag försöker att inte ha dubbletter. Har jag den här appen eller liknande? Två, har folk pratat om den? Tre, går det snabbt och kan jag använda den nu? Jag är ingen sådan som laddar ner 40 appar och ska ha dem senare utan jag ska ut och springa nu, jag vill ha den här appen nu, den ser bra ut, jag tar den.

Performance of Act: Ja. Jag minns inte om man har ett konto på Runkeeper, jag tror man kan ha det om man vill...jag har inget sådant konto men då kan man tracka sig själv, och då kan dem också tracka en lite mer...och jag känner inte att jag behöver tracka mig själv och jag vill inte att dem gör det så jag avstår.

Objectives: Få lite översikt...inte för att jag känner att jag vill bli bättre för det kan jag känna att jag kan bli utan appen, utan det är mer för att lättare kunna variera. Om jag känner att "springa känns sådär kul idag" så kan jag kolla på appen vad jag brukar springa och då kan jag aktivt välja att springa någon annanstans. Jag kan visualisera på kartan att nu är jag på samma spår som jag var på förra veckan, och då kan jag springa höger istället för vänster. Lite enklare översikt för att för mig att kunna variera lite.

Expectations: Även om jag inte är ute efter det så förväntar jag mig att det ska finnas någon som slags motivering i det tekniska. Både att det är innovativt men också att det är roligt att starta appen och man ska få den här 'välkommen tillbaka' nu kör vi känslan. Så någon typ av autopromotion. Jag vet att på Runkeeper, var femte minut så får man feedback på hur snabbt du sprungit, hur average distansen och speeden är. Har du satt ut A-B så får du höra att såhär långt är det kvar och du klarar det på 20 minuter om du håller detta tempo. Jag springer aldrig från punkt A till B så för mig kan det vara jobbigt när det avbryter musiken, jag har än så länge inte hittat ett bra sätt att kringgå detta.

Complexity: Nej det är inget jag tänker på. Jag vet att den är där och den finns men det är inget jag tänker på.

Experience: Jag har spenderat en del pengar på applikationsköp och ligger några tusenlappar in på det, så om det blir några tusenlappar till så kan det inte vara hela världen. SÅ det är lite farligt med inApp-köp då det lätt blir så att appar blir dyrare. Och dem värsta är då applika-

tioner som gör att man måste köpa sig fri från att få sin data samlad [gratis applikationer]. Det är sneaky åt båda hållen.

Disclosure: Sekretesspolicy tycker jag är väldigt viktig, den kan jag glänsa igenom kanske inte när jag laddar ner grejer men när man uppdaterar hela mobilen, eller Facebook eller Spotify och hur dem hanterar ens kort-information och hur man har kopplat det till mailen etc. Det brukar jag glänsa igenom, inte skumma men lite mer granskande. Gillar jag inte det, så får jag ändå gilla det för jag vill ha appen men då kan man sätta sig lite kritiskt emot det så att om man ska tipsa det vidare till någon annan så kan man understryka det, att dem är ganska dåliga på det där.

Price: Absolut. Inte för att man är snål med sina pengar, men för att det finns så många bra appar och alla kostar inte pengar. Så det handlar inte om dem där 15 kr till den där appen, utan finns det en liknande app som kostar mindre än 15? Så snål nej, men pris absolut, just för att konkurrensen är så hård.

Abilities: Aa det tror jag. Jag tror dem som ligger lite längre ner på fitnessstegen kommer inte på den nivå dem är nu på köpa ett armband för 2000 kronor och par koppla det med en app, det tror jag inte. Men absolut, en springklocka hade jag absolut inte sagt nej till, för jag tror ens personliga förmåga har stor inverkan på både vilken produkt man köper och vilken till vad produkten marknads för sig till. T.ex. löpning 2-3 gånger per vecka eller bergsklättring.

Determination: Nej. Jag tycker det är onödigt att logga in utan push-noteifikationer och få information om att det var länge sen man sprang, det är bara onödigt.

Self-Satisfaction: Nej något som har jag aldrig fått av någon app. Bara 'dissatisfacton', när en app strular.

Competitiveness: I mitt fall så finns det inget att skryta och visa via fitnessappen. Självklart kan jag göra det via sociala medier men på egen hand. Men just att par koppla appar på så sätt bidrar nog till data ackumuleringen man bistår med och jag tycker inte att den är allt för sund alltid... att ackumulera så mycket data i onödan. Om man laddar upp det på Facebook på feeden så tror jag inte den fyller mer än skräp till mina vänner

Interview with Anonymous F (12:49)

Gender: Female

Age < 18 - 25>

Frequency of running < 1-2 week>

Duration <30-1H>

Distance <2 km - 5 km >

Terrain: Flat, Mixed

Weather: All but rain

Brand of Device: Runkeeper

Perception: Dels så hade vi en tävling på vårt jobb där vi skulle skicka varje gång man varit ute och sprungit så man triggade varandra...printscreena och skicka till sina kollegor att 'idag har jag sprungit såhär' så då hade vi alla Runkeeper på jobbet, och jag hade den redan innan dess. Anledningen från början var egentligen att man hade hört talas om den och att den var bra. Jag har haft lite olika men Runkeeper har jag använt mest och den har funkat bra, är en av dom populäraste och är gratis.

Comprehension: Njäe inte direkt. När man registrerar sig så kan man ju skriva in vikt, längd och ålder så att dom kan räkna ut BMI och sånt, men inget jag tänker på eller är så medveten om.

Projection: Jag tänker att dem kan se var jag sprungit, hur mycket jag har sprungit och hur mycket jag använt appen. Sen kan man ju också dela på sociala medier men det har jag aldrig någonsin gjort. Men att dem kan se mitt namn... jag vet inte om jag har kopplat mitt till Facebook, men längd etc. Man kan ju koppla sådana appar till mat också [MyFitnessPal] så kan man ju räkna ännu mer på sådant.

Decision: Att det är kul att kunna se hur länge man har sprungit och vart man har sprungit och hur snabbt såklart...framförallt snabbt för då kan man se om man förbättrar sig. Man blir också mer triggad om man sprungit 5 kilometer med en app och ser vad man kan förbättra...springer du utan en sådan app så har du inte koll på hur snabbt du springer och exakt tidtagning. Det är därför jag använder mig av en app...för att kunna mäta resultat, sätta upp mål och förbättra mig.

Performance of Act: Jaja. Du behöver ju inte skriva in vikt, men då får du ju inte resultaten, dock blir du inte tvingad att skriva in det. Dock blir det ju missvisande utan den datan.

Objectives: Mäta sina resultat och mäta förbättringar. Dock har jag varit dålig att använda appen på senare för jag sprungit med andra.

Expectations: Att programmet ska kunna mäta hur snabbt och länge jag springer och långt.

Complexity: Njäee...jaa. Klart man tänker på det men jag när jag tänker på det nu så har jag inga klara klagomål. Det är klart man tänker på det men jag har som sagt inget jag vet på rakt arm jag tycker är dåligt.

Experience: Ja, dels som det jag var inne på innan med sådana som räknar mat som man kan connect:a med denna. Men sedan kan det ju...jag vet inte om det påverkar men jag hade flera för olika ändamål. Dels för att springa, dels för övningar men jag vet inte om det påverkar nya, det är isåfall för att ha det samlat.

Disclosure: Man är ju dålig på att läsa sånt men det är klart att det känns ju bra om det är avtal att datan behandlas bra. Sen känner jag inte att just denna data är så privat så det är inte hela världen för mig om den skulle läcka, men oavsett så ger det ju trovärdighet till appen.

Price: Jaa fast samtidigt vet man att är det någonting som är bra så är det sällan att priset spelar så stor roll...pris på appar är ju ändå låga. Så länge man vet att det är bra så är det värt att betala pengar för det också. Om man inte hört talas om den så kan man ju ta en gratis.

Abilities: Nej det är inte så att jag har en atletisk förmåga som gör att jag använder en specifik app. Jag springer och då räcker Runkeeper. Springer man marathon så kanske man har pulsband och hela köret men nej även om jag var bättre eller sämre på att springa så funkar ändå Runkeeper.

Determination: Mm man blir mer taggad till att träna om man har en sådan app. Det är lättare att sätta upp och uppfölja mål. Sen är det också att 'nu var det ett tag sen du sprang' [pushnotifikationer] men det kan absolut göra en mer taggad till att springa.

Self-Satisfaction: Jaa men det känns bara bra av att veta att man tränar.

Competitiveness: Det är som det jag sa innan med jobbet, 'Min chef springer på den tiden och det ska jag slå'. Det är klart att man alltid tävlar mot sig själv, men man blir taggad av att springa och tävla mot andra som jag skickar en skärmdump till. (Men du delar inte det på sociala medier?) Nej verkligen inte.

Interview with Anonymous G (4.36 min)

Gender: Male

Age: < 25 - 30>

Frequency of running: < 3 month>

Duration: <15- 30>

Distance: <2 km - 5 km >

Terrain: Flat

Weather: All but rain

Brand of Device: Runkeeper

Perception: För att det blir lättare att motivera sig och hålla koll på hur långt man springer och så.

Comprehension: Nej.

Projection: Titta vem jag är kompis med kanske. Sen så vet jag inte, dom kanske riktar lite reklam om springskor och sådant om man är aktiv men främst så tror jag det är för att kartlägga så många som möjligt. Ta hjälp av mina vän-listor och sånt.

Decision: För att det blir lättare att hålla koll på sin träning.

Act: (Tänker du något på att dom samlar in information eller har det någon påverkan för dig när du laddar ned?) Nej.

Objectives: Att jag skall springa regelbundet.

Expectations: Underlätta att hålla koll på hur mycket man springer och hur ofta man springer och så.

Complexity: Nej. Jag valde runkeeper för att någon annan använde den.

Experience: Nej.

Disclosure: Nej.

Price: Nej. Eller ja, den är ju gratis så det spelade ju roll.

Abilities: Nej.

Determination: Ja eventuellt, jag ville ju ändå bli mer motiverad. Så ja.

Self- Satisfaction: Nej.

Competetiveness: Nej.

Interview with Anonymous H (6 min)

Gender: Male

Age: 25- 30

Frequency of running: 1-2 week

Duration: 30 - 1 H

Distance: 2-5 km

Terrain: Flat

Weather: Varied

Brand of Device: Runkeeper

Perception: Jag ville ha en spring app så jag kunde se hur jag hade sprungit, och det var den jag hade hört talas om.

Comprehension: Nej.

Projection: Dom kontrollerar väl hur ofta den används. Med deras syfte att kanske ta betalt för saker och ting jag vet inte riktigt. Jag vet inte mina resultat är inte något man vill spara ned, haha.

Decision: Jag ville ju se om jag kunde förbättra mina resultat från gång till gång. Jag ville ha något som kunde berätta hur långt jag sprungit, hur länge jag sprungit och även vilken väg jag sprungit. Det kunde man se på den kartan som fanns.

Act: -

Objectives: Det var inte direkt för något speciellt syfte, det var bara en rolig grej och kanske kunna förbättra mina resultat.

Expectations: Jag hade inga förväntningar alls mer än att den skulle vara exakt eller så.

Complexity: Nej, jag behövde bara en app helt enkelt.

Experience: Nej.

Disclosure: Jag läste faktiskt ingen av dom utan det blir lätt att man bara accepterar.

Price: Den var ju gratis den jag hade. Jag hade nog inte köpt en app så, då får det nog vara lite mer seriöst.

Abilities: Ja det påverkade nog då.

Determination: För motivationen om inte annat, för just hur länge man sprungit och hur långt. Det hade jag bara kunnat veta på ett ungefär om jag kollat vad klockan är.

Self- Satisfaction: Nej.

Competetiveness: Det var ju bara mot mig själv så det var ju inget så. Eller jo man visade ju på jobbet att man hade sprungit men det var ju inte nån direkt tävling det handlade ju bara om mig själv.

Interview with Anonymous I (7.40 min)

Gender: Male

Age: 25 - 30

Frequency of running: 2-4 week

Duration: 1 H >

Distance: 10 km >

Terrain: Flat

Weather: All

Brand of Device: Runkeeper

Perception: Jag bara laddade ned den för att den var lättillgänglig. Den var högt rankad på App Store så.

Comprehension: Att det sparas eller? Ja jag antar det eller det är inget jag reflekterar över. Men jag är medveten det är som alla andra saker.

Projection: Jag skulle kunna gissa på att dom skulle kunna skicka ut reklam och så vidare så att jag kan bli ett offer för deras varor. Och att dom kan producera sina varor kan jag tänka mig, eller liksom hur många är det som springer denna sträckan vad gör dom cyklar dom, simmar dom skulle jag gissa.

Decision: Men appen var det för att jag ville lagra min träningsdata någonstans om det är en bok eller en app nu var det en app. Sen var det nog mycket för distansen också, det berättar ju för mig nu har du sprungit en kilometer och att det lagras.

Act: -

Objectives: Samma som decision, lagra data, distans när man springer.

Expectations: Det är väl distans då och tiden det är väl dom. Sen hade dom funktioner som jag tyckte om också att dom sa till efter varje kilometer.

Complexity: Nej det tänkte jag inte på.

Experience: Nej, det har jag inte.

Disclosure: Nej ingenting, om dom hade skrivit i policyn ge oss fem miljoner så hade jag nog klickat ja ändå, för jag hade ändå inte läst det.

Price: Det tror jag spelar roll. Hade den kostat hade jag nog köpt andra saker. Det är nog mycket för att den är gratis ja.

Abilities: Jag tror att dem spelar roll ja. Men det är för att jag är på en amatörnivå så köper jag en gratis grej istället för en som kostar väldigt mycket.

Determination: Ja absolut. Jag gillar att lagra träningsdata och jämföra.

Self- Satisfaction: Det är väl en biverkning av allt.

Competetiveness: Ja för min utveckling. Jag tävlar mot mig själv och mot andra för mig är nog det viktigt.

Interview with Anonymous J (10:12)

General Questions Answer Categories

Gender Male

Age <18-25>

Frequency of running <3 Month>

Duration <15-30 mins >

Distance <5-8km>

Terrain Flat

Weather All

Brand of Device On either application or wearable

iPhone & Runkeeper

Perception: The primary reason for me to download Runkeeper is my curiosity. I'm interested of finding out how well I'm performing and if my running skills are improving over time. But I base my choice of application on the fact that I can link the data to Apple's own application iHealth. This provides me with a clear overview of my progress and link it to other applications which focuses for example sleeping patterns or calorie intake.

Comprehension: I understand what information the application collects but the curiosity of my progress are in my opinion more important then the privacy concerns of sharing my personal information.

Projection: I think that the data will either be sold or used to further improve the application and device but also for marketing purposes.

Decision: Ironic enough it was the marketing which influenced me to download and start using Runkeeper

Performance of Act: Yes I still decided to act since the privacy concern and knowabouts of my data is not limited to the application itself but rather to the device. All the applications on the device (iPhone) have the same abilities to get hold of my personal info.

Objectives: As I mentioned previously it I was interested in keeping track on my running progress and influenced by the marketing of this app. If I would receive any suggestions for a better app through marketing or word of mouth I would switch.

Expectations: I expect it to keep track of my pace, geographical location, distance that I'm running and also display the progress in the form of a dashboard or overview.

Complexity: The intention of the application is not to provide the user with a large number of functions or an advanced design but rather to present it in a simple fashion. Hence, no I never think about the design of the application as the majority of the time when I'm using the application it stays in my pocket.

Experience: Yes as mentioned earlier Runkeeper was and as far as I know still is the biggest app for runners. I tend to follow this pattern and look for reviews and ratings in the App Store. I have tried applications with bad reviews and ratings which certainly have changed my perspectives when it comes to downloading applications to my device.

Disclosure: I never read them because if you have let's say Facebook, Gmail, twitter and WhatsApp you have already said goodbye to your privacy.

Price: If the application has a bad review I would never pay for it due to previous bad experiences. Usually I stick with the top 100 which is relatively safe as far as I know.

Abilities: Not more then that I make an effort to perform better based on the dashboard/statistical overview.

Determination: Yes, I usually do a quick research on google such as "iPhone application for runners" which results in a list based on reviews, ratings and opinions.

Self-Satisfaction: When you download the application you have no clue if it will provide you with any satisfaction at all.

Competitiveness: No

Interview with Anonymous K (14.23 min)

Gender : Male

Age < 26 - 35 >

Frequency of running <1-2 week>

Duration <30 mins - 1 H< >

Distance <8-10 km >

Terrain : Mixed

Weather: Sunny

Brand of Device: Runkeeper

Perception: I evaluate my needs and then I go online and search for it primarily on the App Store, and then based on the rating I download the cheapest and highest rated.

Comprehension: I understand on a high level that the app-makers are collecting data however not in any detailed sense that I can say I'm totally aware what it is used for...if it is stored than it is never clearly stated anywhere.

Projection: I think that it would first make them track their users and see what they are using the app for so that they can enhance the software and also sell it.

Decision: High rating, cheap or free and recommendations from friends.

Performance of Act: Yes, I have the awareness however I think that it is the benefit of the app overshines the application tracking me running around...so I guess I can live with that

Objectives: Mainly just keep track of time and my runs in general and timing them so that I can see progress and also that it helps and enables me to reach my goals easier.

Expectations: Basically that's it, and if I can get a nice chart or breakdown of the run or walk or if I go cycling, if I can get a breakdown in minutes or km/h it's always nice to have that sort of data feedback.

Complexity: Well...I could understand it from a UI-builder perspective, to make it as user friendly as possible. However it is not something I think about in my day to day usage

Experience: Umm...yes...I haven't really thought about it. I primarily use one app and I've tried some food app in the past, just to keep track and count all the things that I eat so that I eat healthy enough for the exercise I'm doing so maybe that could be seen as a compliment to the running app. But I haven't really gone full mental in the app business for fitness apps, I keep to one because it's basic and it fits my needs.

Disclosure: They don't affect at all my usage of the thing. If I think it is a reasonable, decent functionality, I never really contemplate over the contents of the disclaimers or these notices. (do you read them?) No.

Price: Yes, however most of the apps are around 10-20 kronor so it's not a big deal but yes... in some way.

Abilities: I wouldn't say so. I'm primarily using it for running and bicycling and I mean I'm not anything else than a happy amateur so I wouldn't say that I go for advanced things. I don't need, I just need the basic stuff. (So you don't need another application for your bicycling?) I actually downloaded a speedometer for that so yeah, maybe in some way.

Determination: Yeah I would say so, and it would be the other way around as well because usually I'm training for a race and then it motivates me to go up and running because then I can track my time and I can see my sessions stacking up which is positive in a way because you can see how much you exercise and how much you've made progress. That motivates to go out running in someway i mean the goal is always to compete and do well in the race but if I can see that I've made progress it makes me feel good and also the other abilities to keep timing and measure the distance on the runs enables me to do better for the race, so it goes both ways.

Self-Satisfaction: Yes.

Competitiveness: Well...in some terms but I mainly try to compete with myself so I try to do better than the last run more or less so if that counts as competitiveness. (Do you for share your runs on social media?) No.

Interview with Anonymous L (8.29 min)

Gender : Male

Age < 18-25 >

Frequency of running <3-5 week>

Duration <30 min>

Distance <5-8 km>

Terrain : Flat

Weather: All but rain

Brand of Device: Runkeeper

Perception: Framförallt Runkeeper var väl för att <u>få en beskrivning på hur långt man springer</u>...det var väl den enda anledningen. Jag ville även få ut lite kalorimätningen utöver det.

Comprehension: Mm det tycker jag.. både på vilken sträcka man har sprungit, hur långt, hur mycket man har bränt.

Projection: Jag vet faktiskt inte vad dem ska göra mer än att få ut vad dem flesta människorna i dem områdena springer mest, eller kanske vad majoriteten av löparna springer, hur långt. Jag vet faktiskt inte vad mer dom ska få ut ur datan mer än en visualisering för mig som använder det.

Decision: Just i det här fallet var att jag hade hört av en kompis när jag ladda ner den att detta skulle vara en bra app när man springer så då testa jag på den. Det var inte så att jag sökte på running apps och sökte ut en app utan att jag tidigare bestämt att jag skulle ladda ner en.

Performance of Act: Nej absolut inte.

Objectives: Få ut distansen, få ut vilken rutt jag har sprungit oftast och framförallt också få reda på lutningen den terrängen man springer så gör man det på asfalt i uppförsbacke så kan den räkna ut det... så det tycker jag också är bra, hur mycket mer jag bränner i det tillfället. Men det är inget mer än kalori och distans.

Expectations: Det är det jag sa innan som jag förväntar mig att appen ska kunna göra.

Complexity: Det tänker jag på om det är en app som man inte riktigt kan hantera men är det en app som fungerar så är det inget man tänker på...och Runkeeper i det här fallet tyckte jag var väldigt lätt att hantera.

Experience: Ifall appen skulle vara extrem dålig och hade funktioner jag inte kunde hantera så hade det antagligen påverkat att jag skulle hitta en bättre än den nuvarande jag hade.

Disclosure: Absolut ingenting. Jag går inte igenom dem sekretessavtalen innan jag laddar ned och har inget bekymmer att folk sparar min data. (Känner du att du vet vad dem innehåller?) Nej.

Price: Det beror lite på, jag skulle säga att det beror på hur stor användning jag har av appen. Hade det vart ett spel som jag verkligen ville ha så skulle jag kunna köpa det och hade det vart en app som verkligen var nödvändig (träning) så hade jag funderat på om jag skulle köpa den.

Abilities: Jag ville ha en app som uppfyllde dom kriterierna jag nämnde tidigare så då tog jag den.

Determination: Ja det tror jag, absolut. Det får en att vilja prestera bättre om man har sprungit 40 minuter på ett visst antal så skulle man bli motiverad att springa ännu mer för en bättre tid.

Self-Satisfaction: Absolut.

Competitiveness: Det är bara för mig. (Du lägger inte upp på sociala medier?) Nej, jag springer, ser hur långt jag sprungit och sparar lokalt.

Interview with Anonymous M (7.04 min)

Gender : Male

Age < 18-25 >

Frequency of running <2-4 week>

Duration <30 min - 1 H>

Distance <5-8 km>

Terrain : Flat

Weather: All

Brand of Device: Runkeeper

Perception: Att den ska vara enkel. jag söker bara på själva appen och googlar på vad folk har rekommenderat.

Comprehension: Nej inte den blekaste.

Projection: Dem använder väl det för att matcha mig med punktmarknadsföring mot sina appar. Dem som vet att jag är 25 och rör på mig si & så, så många gånger i veckan och vet att jag lyssnar på musik försöker hitta en app som passar mig. Det är väl ungefär det. Som Spotifys veckans tips.

Decision: Det är betygs- ratio och vilka som kom högst upp på searchen, det som är mest nedladdat.

Performance of Act: Nej det påverkar mig ingenting. Att min information att dem ser att det var just jag som laddar ner är inget jag bryr mig om. Att dem använder min data bryr jag mig inte heller någonting om.

Objectives: Mäta mina löprundor, hur snabbt det går.

Expectations: Det är det i princip ja [Objectives]. Så jag hade typ kunnat använda en timer... och sedan stänga av den. Men jag vill kunna mäta min sträcka och hur snabbt det går.

Complexity: Nej inte när jag köper den (När du ska ladda ner den då?).. Jag kan tänka att den här appen var dålig och ta bort den, jag tänker inte på att jag ska titta på det innan.

Experience: Nej. Snackar man strikt löpande så har jag bara använt en och konstant uppdaterat den och hängt med när jag bytt telefon i form av iCloud.

Disclosure: Nej. Inte det minsta.

Price: Ja det måste vara gratis.

Abilities: Nej. Jag har bara Runkeeper och använder det strikt när jag springer.

Determination: Nej. Det kan jag inte säga.

Self-Satisfaction: Nej.

Competitiveness: Nej det tycker jag nog bara är lökigt. (Mäter du mot dig själv då?) Njäe inte ens det heller tror jag. Jag har ju ett hum vad jag springer på, men när jag springer på gymmet så springer jag inomhus på ett löpband och ser och vet den tiden till nästa gång. När jag använder Runkeeper så ser jag hur snabbt jag springer just i det specifika tillfället, jag bryr mig inte hur mycket någon annan springer eller jag själv vid ett tidigare tillfälle.

Interview with Anonymous N (8.08 min)

Gender: Male

Age: 26-30

Frequency of running: < 3 month

Duration: 30-1H

Distance: 8-10km

Terrain: Flat

Weather: All

Brand of Device: Runkeeper

Perception: För att se hur man ligger till, jämfört mot vad man vill. Mäta avstånd.

Comprehension: Ja.

Projection: Dom säljer ju ut information till intressenter. För att dom skall kunna rikta sin verksamhet mot mig, sen vad det är jag inte helt hundra på. Det kan ju vara som typ stadium som säljer löparskor strumpor eller vad som helst. Dom köper ju information om dom som tränar mycket så kan dom skicka reklam till, marknadsföra sig mot dom.

Decision: Testa vad det var alla pratade så gott om, bara testa den själv. Men framför allt för att få koll, framförallt för min egna skull för att kolla resultat och även hjälpa mig att få bättre resultat. Om jag får tider , rapporter på hur jag springer om jag vill hamna på en viss tid.

Act: Nej det påverkar inte, dom måste ju få in pengar på nått sätt. Få sin verksamhet att gå runt , så funkar ändå det mesta idag. Dom flesta företagen jobbar så idag även Facebook å all dom här avtalen som man skall läsa igenom och så.

Objectives: Det var bara för att testa den och kolla tid och avstånd och få det på så sätt.

Expectations: Hur långt jag sprungit, vilken tid jag har, det är typ det som är viktigt. Det här med nyhetsflöde och lägga upp på Facebook och sådär det skiter jag i. Det är mer för min egna koll, att jag gör någonting vettigt t.ex. om jag skall springa en speciell sträcka så måste jag måtta upp den innan för att veta, nu får du ju sträckan och appen gör det åt dig. Sen dom andra tilläggen har jag aldrig använt.

Complexity: Nej, det var bara för igenkänningsfaktorn som jag tog den för.

Experience: Nej.

Disclosure: När dom kommer så skrollar jag bar igenom. Det finns ju regler och stadgar som man går efter, och jag litar på att dom finns av en anledning. För att folk verkligen inte läser det, men jag tror det är mer riktat mot att företaget inte skall bli stämda på pengar än att det skall skada dig som privat person. Även om dom använder dig som en resurs.

Price: Pris spelar alltid roll. Vad man får tillbaka. Jag använder inte extra funktionerna och det är dom man får betala för och skulle den kosta 100 spänn skulle jag kanske valt ett annat alternativ men hade den kostat 9 kronor så kanske jag hade vart beredd att lägga det, det beror vad man får ut av det.

Abilities: Ja säger jag, det beror på det påverkar ju inte negativt.

Determination: Ja.

Self- Satisfaction: Ja känna att man har lagt upp mål innan och ligger man över det målet pressar sig själv och kommer över det så är man jävligt nöjd över att ha gjort det.

Competetiveness: Nej inte mot andra men mot mig själv.

Interview with Anonymous O (11.18 min)

Gender: Female

Age: 18-25

Frequency of running: 6 week >

Duration: 30-1h

Distance: 8-10km

Terrain: Mixed

Weather: All

Brand of Device: Garmin, 220 Smart watch (Garmin connect included) but she uses Funbit a website for storing data about exercise.

Perception: Det är mer hur stor appen är om det är en app jag känner igen och att jag vet att just det jag behöver finns i den så jag kollar recensioner och frågar nära och kära vilka dom använder.

Comprehension: Antagligen inte all men jag använder ju dom apparna där jag vet att jag kan få ut den informationen jag vill ha, sen vet jag inte vad min klocka sparar om mig eller vad dom använder det till sen, förutom att visa mig det jag vill se.

Projection: Om båda? Klockan kan nog spåra mer mina tränings-mönster om det är samma rundor som jag springer på eller vad det är för plus jag ligger i. Dom kan ju egentligen veta vem jag är som träningsmänniska baserat på all den datan. För allting loggas ju i klockan, vart enda steg vart enda träningspass. Men den på hemsidan vet jag inte, ja dom kan väl mer se... Det jag kan se av den är hur mycket jag tränar varje månad, vad jag lägger för kommentarer och var jag har sprungit. Njee jag tror inte hemsidan spårar så mycket.

Decision: När jag skulle köpa denna så ville jag ha en så lätt som möjligt, alltså enkel att använda med få funktioner. Eftersom jag bara ville ha den för löpmässigt och jag ville se min plus och även att jag kan bygga egna träningspass på Garmin Connect på hemsidan och logga in dom så jag kan springa egna intervall pass. Det var det som jag valde det på, jag ville inte

ha andra funktioner utan jag ville ha en så simpel som möjligt som skall vara så enkel som möjligt.

Act: Ja, tills det kommer någon större skräll om att dom läcker information så tänker jag nog använda den. Jag väljer ju ändå att aktivt publicera mina träningsresultat på en hemsida och jag vet att den är ju kopplad till min mobil den är ju kopplad till allting och då.. Ja köper man en klocka så får man ju vara beredd på att informationen kan spridas. Och man kan ju göra ett aktivt val att på den här när det loggas automatiskt via Bluetooth till Garmin Connect så kan jag göra min profil synlig för alla eller mindre synlig och det är ju också ett val vill man vara anonym så gör man ju den mindre synlig men någonstans så kan ju ändå företaget komma åt all information.

Objectives: Mina mål är mest att kunna se hur snabbt jag springer, puls zonerna och intervall. Så det är mer att logga min frekventuella träning och olika sorters träning jag gör. Och även eftersom jag springer i skogen så när jag har gjort min tävling kan jag logga in så kan jag lägga hela GPS-routen på min karta och se exakt var jag har sprungit. Det var egentligen huvudsyftet varför jag köpte den. För att jag skulle kunna bli en bättre orienterare.

Expectations: På just denna så är det bara dom nämnda förväntningarna jag har på den. Jag funderar på nästa klocka köpa så att man kan ha cykling och simning så det blir en tri-atlet klocka. Men denna vill jag bara ha som löpnings och den uppfyller det än så länge.

Complexity: Ja för när jag är ute och tränar så har den bara tre fönster så jag kan se det hade varit rätt bra om den hade några fler så man kunde se mer specifika saker. Men samtidigt så är det något man kan se efteråt på datorn, så det är ingenting jag känner att jag saknar så.

Experience: Jag använde runkeeper innan. Det var många år sedan men där så pratar den med en var femte minut och det tyckte jag va kass, så det är nog det som gjort att jag vill ha en klocka istället. Det gör att jag kan se vad klockan pratar med mig om istället för själva appen. Så det var mer det att jag ville ha en mer synligare kontakt när jag tränar.

Disclosure: Ingen aning, jag vet att jag har fyllt i ålder, kön, vikt för att den använder väl det för att räkna ut hur mycket man förbränner under vart pass. men annars vet jag inte mer vad den vet om mig. (Läser du eller bryr du dig om policys när dom kommer upp?) Nej.

Price: Ja, dom är ganska dyra. Denna köpte jag lite billigare och det var därför jag gjorde det valet. För dom ligger emellan, billigaste kostar i orienteringsklockor då mellan 2000 och den dyraste upp mot 4500 kr. Och då är det ju lite så att ja vilka funktioner vill jag ha, jo jag vill ha de lättaste funktionerna då får jag ju gå till den prisklassen men tillexempel tri-atlet klockorna. Dom kan ju se exakt på vilket ben du tar mest stabilitet när du springer etc. då får du ju ge 4500kr så det avgör ju priset också.

Abilities: Ja.

Determination: Ja, jag köpte, den är ganska ny jag har bara haft den sen augusti och jag köpte ju det dels för att jag ville ju se var jag springer när jag springer orientering så vet man ju inte alltid var man är på kartan, utan man hittar kontrollen sen och sen efteråt går ju det inte att analysera. Så det är ju också en motivation att träna mer och så ha den igång på tävlingar, se var jag har sprungit och blir bättre. Det är väldigt sällan jag gör träningspass utan klockan.

Self- Satisfaction: Ja.

Competetiveness: Nej tror inte det, inte vad jag har tänkt på jag har alltid velat ha en Garmin klocka och då var det Garmin jag gick till direkt jag kollade inte på de andra märkena. Men nu när jag har sett fler alternativ så har jag tänkt att i framtiden vill jag kolla vad de andra har för utbud. Dom kanske har fler fönster att titta på när man springer osv men nä, jag tippar nog på att min nästa klocka blir en Garmin också. (Men för din personliga del är tävlingsinriktning någonting som påverkar ditt val? Tävlar du mot dig själv eller mot andra?) Nej det är nog mot mig själv, fast det blir ju både och för att jag tävlar ju mot mig själv för att jag blir bättre med den men sen samtidigt blir jag bättre mot mig själv så blir jag automatiskt bättre mot andra också. Så från det att när jag inte hade klockan så fick jag inte ställ upp i elittävlingar men efter jag har skaffat klockan så har jag på nått sätt tränat så mycket att nu kvalificerar jag mig till att börja springa elittävlingar också. Så det är ju också lite är det för att jag har tränat mer eller att jag har tränat mer på grund av att jag har en klocka? (Skulle du säga att du jämför mot andra genom att lägga upp på sociala medier och så?) På Funbit så är det så att man har sina vänner och då ser man exakt hur mycket dom tränar och det är ju hets gentemot varandra.

Interview with Anonymous P (6.38 min)

Gender: Male

Age: 18-25

Frequency of running: 2-4 week

Duration: 15-30 min

Distance: 2-5 km

Terrain: Flat

Weather: All but rain

Brand of Device: Runkeeper

Perception: Ja mest var det för att kunna se, framförallt hur långt man har sprungit sen se man den här average km/h man har sprungit vilket är ganska intressant tycker jag. Sen ser du ju också i vilken tid du har sprungit på. Det är väl egentligen för att få en sammanfattning på sin träning och sen är det ju även om du springer många gånger under en längre tid så får du oftast såhär genomsnitt på all och då ser du hur du förbättrar dig och progress och så.

Comprehension: Ja.

Projection: Ja, jag bryr mig inte så mycket vad dom gör med informationen och sen vet jag inte vad dom gör med den.

Decision: Det var väl för att tracka min löpning, det är inte svårare än så.

Act: Nej, jag har aldrig tyckt att så information är särskilt känslig på någon app eller hemsida utan jag tycker att kan dom förbättra sina produkter och tjänster genom att använda min information så är det fritt fram att göra det.

Objectives: Mina mål är väl främst att förbättra träningen och få en bra överblick.

Expectations: Ja men jag förväntar mig att den skall ge detaljer som jag inte kan få genom att bara springa, utan jag vill ha detaljer som jag inte kan få annat sätt än genom en sån app. Och det finns ju mycket man kan mäta och har man en wearable så kan man ju säkert mäta puls och såna saker, ytterligare detaljer. För att få mer detaljer helt enkelt.

Complexity: Nej, jag tog väl mest Runkeeper eftersom den låg i topplistan när jag skaffade den, den är ju ganska känd och så.

Experience: Nej, det har jag inte det är bara Runkeeper jag haft.

Disclosure: Nej det läste jag inte så jag har egentligen ingen aning om vad dom gör med min information.

Price: Ja, den skulle vara gratis och det var den.

Abilities: Nej det gjorde det inte, jag valde den mest för att testa och se hur det var.

Determination: Kanske lite, man får ju notiser att skall du inte ut och träna nu var det en vecka sen du sprang det här passet så lite kanske att man blir mer motiverad. Om man inte tar det här löppasset så får man den notisen så får man lite extra ångest och då kanske man går ut och springer även om man inte hade tänkt det, så absolut.

Self- Satisfaction: Ja, det får jag väl ändå säga. att den på något sätt har ökat min egna personliga tillfredställelse också. (Men påverkade det när du laddade ner appen?) Nej inget jag har tänkt på. Det kanske blir att man springer ett extra löp-pass ibland och då ökar det ju min egna tillfredställelse.

Competetiveness: Nje det har det inte men jag vet att du typ kan utmana din kompisar och koppla det till Facebook och allt det här men det är inget jag har experimenterat i.

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