GPS - GUARD, PATHFINDER OR SUPERVISOR?

AN ETHICAL ANALYSIS OF THE GLOBAL POSITIONING SYSTEM IN THE TAXI BUSINESS

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Abstract

This study is an ethical analysis of the Global Positioning System (GPS) in the context of taxi business, i.e. it is an attempt to investigate the ethical consequences of installing GPS in taxis. The reason for installing GPS in taxis was to increase the taxi drivers’ security, but there are other effects of the installation as well. When the stakeholders that are possibly affected by the technology were identified it was concluded that the taxi drivers was the most affected group, not only because they have the most direct experience of the system but also that the only negative effect of GPS, i.e. that it is potentially privacy invasive, is attributable to them. Since they are the most affected stakeholders the empirical study was focused on them. It was made by means of a questionnaire addressing 200 taxi drivers in the Stockholm region. The empirical study showed that taxi drivers are sympathetic towards GPS, but nevertheless 17.5% of the taxi drivers perceived of GPS as privacy invasive. Given the different stakeholders’ perception of GPS, it was discussed whether the installation of GPS is legitimate or not from a consequentialist and a right-based perspective assuming that the taxi driver has a prima facie right to privacy. It is argued that the installation that is used today could be legitimised from a consequentialist perspective but not from a right-based perspective.

Keywords: GPS, ethics, taxi, privacy, workplace privacy, surveillance, location based, positioning, security.
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1. Introduction

1.1 Privacy and Technology

Many studies suggest that we are moving towards an era in which privacy, due to technological advances, is nearly inexisten (e.g. Froomkin 2000). However, Ferdinand Schoeman (1984:2), one of the few social philosophers who have made a philosophical approach to privacy, argues that we are in fact experiencing an increase of privacy as a result of both technological and social changes, exemplifying this with the anonymity of urban life. Scholars discussing modern surveillance technologies claim that the anonymity of urban life is now being decreased by a variety of technologies (Mason 1986:5), e.g. surveillance cameras (Brin 1998:5-6) and the Global Positioning System (GPS) (Clarke 2000:2). Pictures digitally recorded by cameras combined with other invisible traces that we are leaving, e.g. credit card transactions, have made anonymity decrease and mapping possibilities of individual behaviours rise (Lundblad 1999). Furthermore, the surveillance technologies do not only affect private aspects of life. Another important fact is that they provide an employer with the possibility to supervise employees.

Apart from the technological development, the concept of privacy has also been given more importance. Schoeman argues that this is due to the trend of moving public domains of life into the private (1992:121). Schoeman exemplifies this by referring to the theories of Norbert Elias. Elias claims that people stopped living their lives in public “as political, economic and social life became more complex” (Schoeman 1992:118). The increasing complexity has caused people to internalise the principles of correct public conduct which Elias defines as a conduct “that allows one to carry out one’s varied functional relationship, independent of how one is inclined” (Schoeman 1992: 118). The conduct that was once acted out in public has been transferred to the private and socially hidden dimensions of life. This could be seen as a factor that has led to an increasing interest in the concept of privacy.

It is difficult to reach a conclusion regarding whether human beings at present are in fact experiencing more privacy than previously, at least it can be noticed that certain technologies are affecting privacy. Sven Ove Hansson (2002) argues that technologies are seldom intrinsically good or bad which makes it important to investigate the setting in which the technology is implemented. For example, surveillance cameras in public places are meant to increase people’s security, but at the same time they are possibly privacy invasive. The surveillance cameras in Orwell’s novel 1984 were installed in order for the state to get total control of the citizens, and had no positive effects for the citizens. These are two different ways of implementing surveillance cameras with different societal effects. In order to evaluate and possibly prognosticate the future effects of an emerging technology, a societal analysis of the technology in a specific setting is crucial.

William Ogburn (1922) argued that the technology develops in a faster pace than society (e.g. ethics, politics, law), which results in a cultural lag, that is, a situation where e.g. ethics, politics and law have become inadequate for the needs of the society. In order to try to prevent the emergence of a cultural lag, it is crucial to analyse new technologies from a societal perspective. Technology Assessment (TA), which serves to analyse aspects of a technology that are apart from the purely technological, is an important undertaking that should evolve in parallel with all the phases of the development of a technology. As the societal effects of new technologies are difficult to predict at an early stage, TA is especially important to undertake in the dawn of the process of technological development. Although the
TA covers the societal effects of technologies, ethical aspects are most often left aside in traditional TAs (Hansson 2002:94).

This report will be an attempt to highlight the ethical issues concerning a relatively new phenomenon in Sweden, that is, GPS in taxis. An ethical assessment of the allegedly privacy invasive technology GPS is desirable since the taxi business is a new area of implementation. In this study two questions will be focused on. The first is as follows:

1) *What ethical consequences does an installation of GPS in taxis have?*

In order to assess the consequences of installing GPS, the relevant stakeholders will be identified and how they are affected by the technology will be discussed. Thereafter, a second question arises.

2) *Can the installation of GPS be ethically justified given the consequences obtained?*

In order to obtain a broad view of the issue, the legitimacy of installing GPS in taxis will be investigated from the perspective of two different ethical theories, namely a consequentialist theory and a right-based theory. In addition to the broadening view of the legitimacy issue, the reason for discussing the issue from these two specific theories is to highlight the prevailing discussion on whether there exists a right to privacy or if privacy could only be seen as an important value.

### 1.2 Report outline

This report outline shows that the first research question will be addressed in chapters 2 through 5 and the second research question will be addressed in chapter 6.

In chapter 2 a description of the background that has led to the installation of GPS, the taxi business will be discussed.

In chapter 3 the GPS technology will be examined. This will be done in order to identify the technical possibilities and limitations of GPS in taxis. In this chapter different ways of implementing GPS in taxis will be explored and the stakeholders that may be affected by the technology will be identified. Since the taxi driver is supposed to be the stakeholder that is the most affected, the taxi drivers' perception of GPS will be thoroughly examined in the following chapter.

In chapter 4 the issues concerning the taxi driver and his perception of GPS will be investigated by means of a questionnaire distributed to 200 taxi drivers in the Stockholm region. This and the following chapter should be considered as belonging to the stakeholder analysis.

In chapter 5 the concept of privacy will be presented and the results from the questionnaire and their relation to privacy will be discussed. This is done in order to elucidate the concept of privacy and the importance of the concept. Since GPS surveillance in taxis is in fact workplace surveillance, the difference between ‘ordinary’ privacy and workplace privacy will be discussed followed by an examination on how companies legitimise potentially privacy invasive technologies.

In chapter 6, an analysis on if it is legitimate to install GPS, given the consequences of the installation identified in chapters 3, 4 and 5, will follow from two different perspectives, namely a consequentialist and right based perspective.
In chapter 7 a concluding discussion will be found where the main findings are summarised and more global comments are made on the study.

In chapter 8 some suggestions for further research are presented.
2. Taxi

In this chapter, the background that has lead to the installation of GPS in taxis will be presented. Part 2.1 will provide a description of the crime situation, with relation to taxi business, from 1987 to 2002 and comment on the study made by The Vocational Training and Working Environment Council (Transport Trades) (Transportfackens Yrkes- och Arbetsmiljönämnd, TYA) concerning taxi drivers’ security, which has lead to the recommendation to install GPS into taxis. As another means of increasing security, surveillance cameras in taxis have been proposed by TYA. In part 2.2 a distinction between the functionality of GPS and surveillance cameras is drawn.

2.1 Means of increasing security

Taxi drivers work relatively unprotected and alone, especially during night shifts. In addition, taxi drivers handle cash, which makes it plausible that taxi driving is a job that is exposed to critical risks. In the last 15 years, the number of cases of violence towards taxi drivers in Sweden has increased significantly. Statistics from the Council of Crime Prevention (Brottsförebyggande Rådet, BRÅ) show that the number of reported robberies has increased from 34 in 1988 to 104 in 1997, which is a rise of over 200% in 10 years. This rise was followed by a slight reduction in 1998 and 1999. However, the number of robberies increased again in 2000, followed by a reduction in 2001. In the first quarter of the year 2000, 48 robberies have been reported, and if this continues the rest of the year analogously, it would imply an increment of more than 100 % in 1 year. The crime development can be seen in graph 1.¹

¹ Graph 1 is a translation of the original graph extracted from Svenska Taxiförbundet (2002).
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With these statistics in mind and in order to clarify the taxi drivers’ perception of changes in the working environment, TYA (1999) decided to make a study consisting of 3000 randomly chosen taxi drivers. In short, the study shows that 22 % of the female and 35 % of the male taxi drivers have experienced threat at work. The proportion of taxi drivers who have experienced violence is 8 % and 13 % respectively. The conclusion of this study was that threat and violence is a relatively frequent part of working as a taxi driver. In many cases the reason for violence and threat, stated by the taxi drivers, was drunken clients or clients under the influence of drugs. TYA concluded the report with recommendations on how to diminish the number of situations of threat and violence and enhance the taxi driver’s well-being at work, and one of these recommendations was to equip taxis with GPS. At present, in 2002, the three major companies in the Stockholm region (Taxi Stockholm, Taxi 020 and Taxi Kurir) have introduced or are introducing GPS.

The introduction of GPS in taxis has not been met by any serious objections in the general debate. Rather, a more controversial issue is that of a possible introduction of surveillance cameras in taxis as another means of increasing taxi drivers’ security. Both GPS and video surveillance cameras are means to enhance the security of the driver. However, there is a significant difference between the two technologies, which probably has led to this debate. That is, that GPS is only possibly privacy invasive to the driver, while video surveillance is possibly privacy invasive to the client. It is reasonable to assume that technologies that have positive effects for one group and negative effects for another group become controversial issues. For example, GPS has positive consequences (such as enhanced security) for the driver as well as negative consequences (i.e. possible privacy invasiveness). Both the positive and negative effects affect the taxi driver. In the case of surveillance cameras the positive effect is the increase of the taxi drivers’ security, while the negative effect is the possible privacy invasiveness to the client. In this case the positive effect is attributable to the taxi drivers and the negative effect to the clients. It is plausible that this fact is what has led to the debate on the installation of surveillance cameras. In the following, a brief overview of how the taxi companies obtained permission to install video cameras will be presented.

The first attempt to introduce surveillance cameras in taxis was made in 1996, but was rejected first by the county administrative board (Länsstyrelsen) followed by the Swedish Supreme Administrative Court (Regeringsrätten). The petition concerned cameras designed to take pictures with the interval of 12 seconds, combined with sound-recordings (Trafikutskottet 1999). In 2001, the county administrative board accepted Taxi Stockholm’s petition about installing surveillance cameras, only allowed to take 5 pictures when the client enters the car and 5 pictures when the client leaves. The Attorney-General (Justitiekanslern) appealed against this, opining that cameras should be installed with a restriction stipulating that pictures should be taken only when the taxi driver sounds the alarm. However, this appeal was overruled in the county administrative court (Länsrätten) and in the Swedish administrative court of appeal (Kammarrätten) (Opitz 2002), which will lead to an introduction of this technology before the end of the year 2002 (Nilsson 2002).

2 The results from the questionnaire made by TYA (1999) show that 30.9 % of the men and 18.6 % of the women, exposed to threat, stated that alcohol or drugs was the most frequent reason. The percentages for the taxi drivers exposed to violence were 10.2 % of the men and 5.5 % of the women.
2.3 Limiting the study to GPS

Although the installation of surveillance cameras in taxis is an interesting and controversial issue, this study will be focused on GPS. There are several reasons for this limitation. First, this thesis aims at describing the special case of workplace surveillance and as the discussion on surveillance cameras concerning privacy has been skewed towards the privacy of the client, this is more a general privacy issue than a specific workplace related issue. Second, there is also a functional difference between GPS and surveillance cameras. GPS is designed to assist the taxi driver in case of threat or violence, hence it is a real time application. On the other hand, surveillance cameras are designed to, given a crime perpetrated in a taxi, identify and connect the perpetrator to the crime scene and make him liable to the crime. From the taxi driver’s perspective, GPS relieves a physical threat, as it is real time based, while surveillance cameras in the aftermaths of a crime can increase the taxi drivers’ well-being, knowing that the perpetrator can be brought to justice. Third, the information stemming from the two different sources - GPS and surveillance cameras - cannot be used in a similar way. The information from GPS is present to the calling central and is also kept during a specific time period, which makes the information available to the specific taxi company\(^3\). Thus, the data from GPS could be used to control the workplace behaviour of individual taxi drivers. As opposed to GPS, the only institution that can take part of the information provided by the above mentioned surveillance cameras, is the police. This implies that this technology cannot be used to control workplace behaviour. Fourth, by the launching of this project the taxi drivers had no experience of camera surveillance and the purpose of this study was to ethically analyse a new technology of which the taxi drivers had experience.

The reason for installing GPS in taxis is thus to enhance the taxi drivers’ security, due to the roughening working environment. Although the main reason for the installation was the taxi drivers’ security, the GPS has the potential to be used in different ways. A description of the GPS will follow in the next chapter and the ways in which taxi companies in fact are using GPS will be commented on.

\(^3\) Whether this is possible depends on the mode of implementation. See part 3.4.
3. The Global Positioning System

In the last chapter it was affirmed that the main reason for installing GPS in taxis was to enhance the taxi drivers’ security. It was also mentioned that GPS could be used in other ways as well. In order to understand how GPS can be used in the taxi business, an analysis of GPS is necessary. The background and history of GPS will be discussed in part 3.1. This is done in order to show that a technology, which is originally designed for one purpose, can eventually come to be used in other ways. This prompts that a historical analysis is important when undertaking an ethical analysis. In part 3.2 the technical features of GPS will be described. In part 3.3 the concept of location will be introduced followed by a discussion about the technological possibilities and limitations of GPS used in taxis. In part 3.4 different implementations of GPS will be investigated and their possibilities and limitations. In part 3.5 the different stakeholders who might be affected by the installation of GPS will be identified.

3.1 Introduction

The predecessor of GPS was the Navy Navigational Satellite System (NNSS), which was also denominated TRANSIT. The reason for the deployment, executed by the U.S. military, of the six satellites that constituted the TRANSIT system, was to be able to determine the coordinates of vessels and aircraft. However, civilian use also became authorized and still today small vessels and aircraft make use of this system to determine their position worldwide.

In 1973, the Joint Program Office located at the U.S. Air Force Systems Command’s Space Division, Los Angeles Air Force Base, was directed by the Department of Defence to develop a new space borne positioning system. GPS, the result of this process, was developed in order to replace the TRANSIT system due to two major shortcomings in the earlier system. The major problem with the preceding system was the lack of timing accuracy due to the use of only six satellites. The satellites of the TRANSIT system were designed to pass fixed spots every 90 minutes which further exemplifies the unreasonably high time granularity. The second drawback was the system’s low navigation accuracy. (Hofmann-Wellenhof et al. 1992:3,10-11) The definition given by Wooden⁴ suggests that these shortcomings would be inexistent in the new GPS.

“The Navstar Global Positioning System (GPS) is an all-weather, space-based navigation system under development by the Department of Defence (DoD) to satisfy the requirements for the military forces to accurately determine their position, velocity, and time in a common reference system, anywhere on or near the Earth on a continuous basis.”

This definition also shows that GPS, in the same way as TRANSIT, was developed for military purposes, but eventually civilians were similarly allowed to use GPS.

3.2 The basic principles of GPS

3.2.1 Satellite positioning

The principle of satellite navigation is shown by the three figures x1, x2 and x3, as depicted in figure 1. Solving an equation of three variables with the information input of only one satellite would yield a one-dimensional result. However, the GPS system is designed to provide results in three dimensions, that is, latitude, longitude and height, thus, three satellites are needed to be electronically visible from the receiver.

![Figure 1. Satellite Positioning](image)

The drawback with an implementation similar to the one described above is that all GPS receivers would have to be equipped with a clock providing exact GPS system time in order to maintain a perfect synchronization at the time of measuring the distance between satellite and receiver. As this would strongly raise the equipment costs, an inexpensive crystal clock and a slightly different technique are used. As the clock of the ground receivers will, to some extent, be offset from true GPS time, the distance measured to the satellite will be slightly longer or shorter than the true distance. To overcome this problem and reach a satisfactory accuracy it is necessary that four satellites are electronically visible to the receiver which thus provides the solution of the four-dimensional equation with the variables latitude, longitude, vertical position and clock bias. (Hofmann-Wellenhof et al. 1992:4-6)

3.2.2 The GPS modes

GPS functions in different modes depending on the identity of the user. The two modes that exist are Precise Positioning Service (PPS), which provides a theoretical accuracy of below 6 meters, and Standard Positioning Service (SPS), which is slightly more inaccurate with its theoretical accuracy of 10 meters. The PPS mode is only available to the U.S. military and others that are granted permission by the military. The SPS is available to civilians, and these signals may be received without cost, reducing the cost of implementing GPS to the receivers and the internal network structure. (Spilker & Parkinson 1996)
3.3 Characterization of GPS in taxis

The purpose of this section is to characterize GPS as a surveillance technology in taxis, that is, its features, its possibilities and its limitations. As GPS is a location-based technology, the location concept will be thoroughly discussed. Roger Clarke\(^5\) defines location as follows:

“By an entity’s location is meant a description of its whereabouts, in relation to other, known objects or reference points” (2000:3).

GPS signals combined with an electronic map based on various reference points whose location are objectively known can assist the taxi driver and provide him with his location shown on a map next to the instrument panel and optionally with the shortest way between two known points. This implies time-efficiency and cost-reductions since the taxi drivers do not have to search for the destination in the traditional street map. To utilize this service the taxi must be equipped with a navigator which at present is not standard in all taxis equipped with GPS. One of the important competences that a taxi driver must have, according to Svenska Taxiförbundet (2001:5), is to know the locality well, and therefore it is credible that it is, in both the taxi driver’s and the taxi company’s interest, to install this navigator. The reason why all taxis are not equipped with the navigator is the high equipment cost.

The location capabilities also make it possible to get an overview of all the taxi company’s cars on a screen which enables the calling central to assign drives to the taxi closest by the customer, without having to track the taxis for their exact location via the com-radio, leading to a faster and more efficient assignment of cars. Furthermore this leads to cost savings and decreased environmental effects due to the objective location of GPS instead of the relying on subjective location descriptions of the taxi drivers\(^6\). Hence, GPS facilitates efficient fleet management. This presupposes that GPS is connected to the taxi company’s calling central.

An alarm central is also able to track the taxi immediately in case of an accident or a situation of threat/violence which implies a safer working environment for the taxi drivers, following the recommendations of TYA (1999). Without GPS the taxi driver must secretly try to provide his exact location during dangerous situations which is both difficult and risky. Using GPS, the location is given objectively and with a relatively good accuracy which facilitates the rescue work substantially. If the GPS system is connected to the taxi company’s calling central, GPS also makes an emergency situation easier to handle for the calling central\(^7\). Furthermore, GPS makes the taxi less attractive to theft given that it is known that the taxi is indeed equipped with GPS.

Continuing with Clarke’s terminology a location can be obtained with various degrees of precision. Theoretically the GPS system for civilian use can provide a degree of precision of 10 meters.

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\(^5\) Roger Clarke is a consultant specialising in electronic commerce, information infrastructure, and data surveillance and information privacy. From 1984 until 1995, he held an appointment as a senior Information Systems academic at the Australian National University.

\(^6\) According to Taxi Göteborg the annual savings can be as high as 7% of the total driving distance. See www.taxigbg.se

\(^7\) According to TYA (2001) 55 – 70% of the personnel in the calling central do not know well how to proceed when a taxi driver is exposed to threat or violence. With GPS at least the decision of the location of the car is facilitated, hence one difficult aspect of the calling centrals’ work is removed.
There is an important difference if the information provided by location-based systems can be shared by the supervisors in real time or not. The time lag “that occurs between the event, and the availability to a person undertaking surveillance of the transaction data reflecting that event” is by Clarke (2000:3) referred to as the timeliness of the system. The GPS system provides real time information as opposed to the previously mentioned video surveillance system\(^8\) that is to be installed in taxis in the near future. The video surveillance system does not operate in real time, since the taxi company does not have access to these data files (the video snapshots) and that these can only be opened by the police in case of a special occurrence\(^9\).

“By tracking is meant the plotting of the trail, or sequence of locations, within a space that is followed by an entity over a period of time.”(Clarke 2000:3) With GPS, this function can also be executed, not by utilising the signals from the GPS system alone but by relying on GPS combined with another computerized system which is, in most installations of GPS, the norm. The reason for the statement that tracking is possible with GPS lies in the very nature of the system. The information stemming from GPS must be saved for a limited period of time in order to track drives in the case of an occurrence. For example, a person who has lost something in a taxi can return to the taxi company and ask in which taxi he was riding and by just stating the time he took the taxi and the destination of the trip, the taxi company can provide him with the adequate information to recover his belongings. In the case of a crime, it is even more important to be able to extract the necessary information about the location of the taxi. Tracking could thus be used in the taxi business.

### 3.4 Possibilities considering different GPS implementations in taxis

Four different implementations of GPS in taxis could be identified:

1. GPS connected to the alarm central.
2. GPS connected to the alarm central and to the taxi company’s calling central.
3. GPS connected to the alarm central and to the taxi company’s calling central. In addition, the taxi is equipped with a navigator.
4. GPS with navigator connected only to the alarm central\(^{10}\).

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\(^8\) Although Clarke’s terminology concerns location, the concept of timeliness can be used discussing e.g. video surveillance.

\(^9\) A real time use of camera surveillance would be if e.g. the calling central had monitors overviewing directly what the client is doing in the taxi. This way of using the system could possibly prevent crime even to a greater extent than GPS. However, there are several drawbacks with the system. First, it could be perceived of as more privacy invasive to the client than the not real-time installation. Second, it would demand many operators to control what happens in every taxi, which makes it more expensive. Third, there are technical difficulties in transferring streaming video. It is possible that the third drawback could be disregarded with the forthcoming deployment of 3G.

\(^{10}\) Although this implementation is not used, discussing it theoretically could yield interesting result. To whom is the implementation beneficial and why is it not used in the taxi business?
The characterisation of GPS that can be done so far is that:

- GPS could be used for the undertaking of fleet management of taxis. This feature is enabled in implementation 2 and 3.

- GPS provides location information in real time which enables fast assistance from e.g. the police in the case of an accident, but also implies a constant revealing of the taxi driver’s location. This feature is enabled in all three implementations. However, in implementation 1 the location of the taxi driver is only known to the police. In implementations 2 and 3 the location is additionally known to the taxi company’s calling central. Thus, in implementations 2 and 3 the system is real-time based.

- GPS is enabled for tracking based services. This feature is enabled in all four implementations. However, in case 1 and 4 only the police could perform the tracking function while it in case 2 and 3 could be used by the taxi company as well.

- GPS could be used to help the taxi driver finding the nearest way to the destination. This feature is only enabled in implementation 3 and 4.

- GPS could be used to prevent the stealing of taxis. This feature is enabled in all implementations.

3.5 The Stakeholders

Given the characterisation this part will identify the stakeholders that are affected by the installation of the technology.

3.5.1 Taxi company

As stated in TYA (1999) the security of the taxi driver is a delicate issue and this is in fact one of the reasons for the taxi company to install GPS. The taxi company has an interest in increasing the taxi drivers’ well-being at work and could also be seen as legally (and possibly morally) responsible for risks of threat and violence in the workplace.

Another reason for installing GPS in taxis is closely related to the trend of using computerized fleet management. The introduction of GPS leads to a possibility for the company to know exactly where their fleet of cars is which facilitates the assignment of drives. This is due to the objectivity and exactness of the location information from GPS. This is only possible with GPS implementations\(^\text{11}\) 2 and 3.

The taxi company also benefits from the possibility to track a stolen taxi. A wide spread knowledge of GPS in taxis might reduce the number of stolen taxis.

\(^{11}\) The implementations are listed in part 3.4.
3.5.2 Taxi driver

The main reason why taxi drivers are sympathetic towards GPS is probably its security enhancing effects. With GPS, a taxi driver can advise the alarm central of a present threat and be assisted in a short time frame. This is due to the exact and objective location provided by GPS. Also in this case, a wide-spread public knowledge of GPS implementation may in itself reduce the risks of threat and violence.

Due to the very nature of the GPS system, a location-based map can be installed in taxis equipped with the technology. This electronic map provides the taxi driver with his current position and can also be used to find the shortest way to the destination which significantly eases the metier of taxi driving\(^\text{12}\). However, this is only possible using the third and the fourth implementation of GPS.

The possible reluctance to installing GPS is the possible threat of privacy caused by constantly giving up the location of the taxi. The issue on why the revealing of location could be seen as privacy invasive will be discussed in part 5.4. There could also be a difference between revealing the location to the police (as in implementation 1 and 4) and revealing it to the taxi company and the police (as in implementations 2 and 3). The difference will be commented on in part 6.1.

3.5.3 Client

One aspect of GPS of importance to the client is that the taxi drivers are able to find the destination more rapidly, given that the taxi is equipped with a navigator. This is likely to make the ride shorter and cheaper. This is only possible in the third and fourth implementation.

It could be argued that revealing the client’s location is privacy invasive, but in cases where only GPS is used, the client can always maintain his anonymity paying with cash instead of with a credit card which makes his location totally irrelevant. Therefore, the use of only GPS in taxis does not give rise to any privacy invasiveness in the clients’ perspective. However, as discussed in chapter 2, the coming introduction of video cameras in taxis gives rise to an important issue. That is, the client can no longer remain anonymous using taxi service since surveillance cameras combined with GPS in fact show the identity of the client and his location.

The client may also feel an increased security while riding a taxi equipped with GPS. In the case of an occurrence the client knows that the taxi could be tracked. In Stockholm there have been some occurrences with women who have been sexually harassed by taxi drivers. The knowledge of these tracking possibilities could make this group perceive more security.

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\(^\text{12}\) When meeting with taxi drivers the author has noticed that many of the taxi drivers are not at all pleased with the navigator system. Taxi drivers who have been in the business for a long time tend to put more faith in their own opinions on the shortest way to the destination than the way suggested by the navigator. However, in the following it will be assumed that the navigator will develop and become more accurate in its suggestions and that it indeed helps or will help the taxi driver. When the technology becomes more flawless, more taxi drivers will probably appreciate it.
3.5.4 GPS service developer

The main interest of the GPS service developer is to benefit economically from GPS based services. This is based on the assumption that the main goal for for-profit companies is to increase financial gain. As the market of private persons are substantially bigger than the workplace surveillance market, the manufacturers are more interested in finding ways of commercialising new services for the private person, for example, find your friends and children, find the nearest restaurant, mobile games, etc (Cf. Lavin 2001, Wong 2002). It also seems credible that the GPS service developers have interest in legislating the introduction of GPS in mobile phones\footnote{This has occurred in the U.S. with the E-911 system. See Sveriges Tekniska Attächée (2000:9).} which would increase the market potential considerably. Hence, the major focus of the GPS service developer is to find a ‘killer application’ for commercial use.

3.5.5 Worker Unions

As previously discussed, the issue of workers safety and a good work environment has been addressed by TYA. TYA has made studies both concerning taxi drivers and worker in taxi companies’ calling centrals. The interests of the Union are to enhance the working conditions of taxi drivers, i.e. enhancing security and lowering privacy invasiveness.

3.5.6 Society

The society, comprising the individuals as a group, is interested in an efficient taxi service for which the possibilities are augmented with GPS. The economic sector of the society does also have an interest in capitalistically efficient companies. This interest is covered by the fact that the taxi companies that already have implemented fleet management based on GPS are indeed lowering the dead time between the drives. This beneficial effect is only possible using GPS implementations 2 and 3.

The societal interest of a ‘green’ environment can also validate the choice of installing GPS in taxis. According to studies made by Taxi Göteborg\footnote{See note 6.}, the utilization of fleet management based on GPS is lowering the total driving distance of the entire fleet which implies reduced environmental effects. With implementation 2, the driving distance could be reduced by means of an efficient fleet management. Implementation 3 is even more beneficial, since the driving distance is reduced both by efficient fleet management and the navigator. Implementation 4 reduces the driving distance using the navigator. However, since there is no possibility of fleet management using implementation 4 it is less beneficial than the third implementation in this respect.

Another possible reason for installing GPS is that the well-being of the society as a whole increases if the crime level is reduced\footnote{It cannot be concluded that the crime level actually is reduced implementing GPS. It is possible that the perpetrators of crimes displace from the taxis to other less supervised areas.} and if the perpetrators of the crimes committed can be brought to justice which is significantly facilitated by the GPS system.

The societal interest is also to promote the employee’s interests at work, i.e. his rights to a correct salary, his safety, and (perhaps) his privacy. His safety is promoted by all GPS
implementations while his privacy is possibly violated revealing his location (with implementation 1 and 4, to the police and with implementations 2 and 3, to the taxi company and the police).

Since the taxi drivers are the ones who will use the technology it seems plausible that they are the possibly most affected. Additionally the division into stakeholders indicates that the taxi drivers are the only stakeholder group that possibly can be affected negatively by GPS in taxis. This makes the taxi drivers an interesting group to study, and therefore a more detailed investigation has been done by means of a questionnaire distributed to 200 taxi drivers in the Stockholm region. The empirical study should be considered as an in-depth analysis of the stakeholder group ‘the taxi drivers’ fitting in the division into stakeholder groups undertaken above. The findings from the investigation will be found in the subsequent chapter. It is important to bear in mind that the implementations, of which the taxi drivers have experience, are of the second and the third kind.
4. The Investigation

In order to amplify how GPS affects the stakeholder group ‘the taxi drivers’, an empirical study has been made by means of a questionnaire. In part 4.1.1 the scope of the investigation will be presented, followed by a discussion on the questions forming the questionnaire in part 4.1.2. In part 4.2 the results from the questionnaire will be presented and in part 4.3 important findings will be summarized.

4.1 The Questionnaire

4.1.1 The scope

The taxi drivers’ perception of GPS has been investigated by means of a questionnaire that has been distributed and collected from 200 taxi drivers in the Stockholm region. The participating taxi drivers in this study represent a small fraction of the possessors of taxi driver’s license which in the year 2000 amounted to 15000\(^{17}\). However, this figure could be slightly misleading as some possessors of a taxi driver’s license are not working taxi drivers (e.g. retired people).

The questionnaires have been distributed and collected in taxi cafés (Café Eden and Nattkafé), at the taxi companies’ information points (Taxi Stockholm and Taxi 020)\(^{18}\) and at several other places in the Stockholm region (mostly at the Central Station) during the period of May-June 2002. The numbers of questionnaires obtained in each of the places can be seen in table 1.

<table>
<thead>
<tr>
<th>Distribution point</th>
<th>Number of answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stockholm Central Station</td>
<td>104</td>
</tr>
<tr>
<td>Taxi Companies Information Points</td>
<td>73</td>
</tr>
<tr>
<td>Taxi Cafés</td>
<td>23</td>
</tr>
</tbody>
</table>

*Table 1*

A comment should be made regarding the time that the respondent had to fill in the questionnaire. At the information points and taxi cafés the respondent had, theoretically, plenty of time to ponder over the questions, while at the Central Station the respondent filled it in while waiting in the queue for a drive (approximately 5 minutes). Therefore it could be argued that the results obtained at the taxi cafés and information points are better thought-out. Against this difference it may be argued that the questionnaire could easily be answered in a time shorter than 5 minutes\(^{19}\) and it is difficult to find out the amount of time that taxi drivers at the taxi cafés and information points devoted to filling out the questionnaire.

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\(^{16}\) The English translated version of the questionnaire can be found in appendix 1 and the original questionnaire in Swedish can be found in appendix 2.

\(^{17}\) The figure in taken from Länsstyrelsen (2001) as the figure from 2001 is missing in Länsstyrelsen (2002).

\(^{18}\) See appendix 3 for contact information.

\(^{19}\) A comparison has been made between the two subgroups, that is, Info Points and Taxi Cafés compared to questionnaires from the Central Station with the following results. Yes-answers of question 1: 58.5% and 54.4 % respectively, Yes-answers of question 2: 89.4 % and 85.6 % respectively and Yes-answers of question 4: 14 % and 14.4 % respectively. The difference between the two subgroups could be explained by the method of collecting the answers. At the taxi cafés and info points filling out the questionnaire was completely voluntary,
4.1.2 The structure

The questionnaire is composed of 7 questions numbered from 1 to 7. These questions will from now on be referred to as Q1 through Q7. The questions Q1 – Q6 are of multiple-choice character (yes/no) and Q7 is a question requiring an auto-formulated answer. Personal information (age, sex, most frequent working hours) is also asked for at the end of the survey. There are also possibilities to comment on the questions or on GPS more generally. The reason for the low number of questions in the survey was to make a good-looking, easily comprehensive questionnaire which is an important feature of a questionnaire (Ejvegård 1993:50-2). One other methodological issue should be briefly commented on, namely the possible answers to the multi-choice questions. The reason for a utilization of a yes/no combination compared to a yes/no/don’t know is, in short, to make the respondents think and see whether there is a tendency towards one answer or another. The lack of a don’t know does not, in fact, make the respondent obliged to answer the question, as there always exists a possibility to leave the question in blank. This could possibly lead to the respondent thinking more before answering a question. In fact, in the aftermath of the distribution there has not been much internal falling off20, that is when a question has been left blank. The internal falling off of each question will be stated in footnotes.

thus it could be argued that the taxi drivers who filled out the questionnaire had strong opinions about GPS. However, at the Central Station, the author personally asked each taxi driver to fill in the questionnaire and this could have lead to that those taxi drivers represented a more heterogeneous population of Stockholm’s taxi drivers, i.e. not only those with strong opinions. If this is the case, it would indicate that only 85,6 % as opposed 89,4 % of the taxi drivers perceive GPS as security enhancing. However, in the study I have disregarded the indicated difference since it facilitates the rest of the analysis.

20 Ejvegård (1993:51-2) distinguishes the concept of falling off of questionnaire and internal falling off. The former is used to describe that the questionnaire sent out has not been returned and the latter that one or more questions of the questionnaire lack an answer. As the respondents of this questionnaire have deliberately put it in a sealed box, the term falling off of questionnaire is of no interest in this study.
4.2 Interpretation of the questionnaire

4.2.1 Situations of threat at work

The result of the question Q1: ‘Have you experienced situations of threat at work?’ shown in graph 2 is the following: 56.3 % have experienced threatening situations and hence 43.7 % have not.

4.2.2 Does GPS increase security?

Graph 3 and 4 depict the answers of Q2: ‘Do you think that GPS will enhance / enhances your security when you are driving taxi?’ sorted by the respondents’ answer on Q1 23; ‘Have you experienced situations of threat at work?’ In the case of a yes-answer on Q1, 92.8 24 % of the taxi drivers believe that GPS is security enhancing whereas 80 % 25 of the no-respondents of Q1 have the same opinion. It can thus be concluded that a majority of the respondents believe

21 The internal fallout rate of Q1 is 1.5 %.
22 The security investigated by this question is the security that the taxi drivers perceive. Installing GPS could be combined with a decrease of police resources, which would not increase objective security.
23 The aggregated percentage of yes-respondents of Q2 is 87.3 %.
24 The internal fallout rate of Q2 by Yes-respondents of Q1 is 0 %.
25 The internal fallout rate of Q2 by Yes-respondents of Q1 is 1.2 %.
that GPS raises the security at work. The difference between yes- and no-respondents of Q1 is probably due to the fact that a taxi driver who has not experienced threat in the workplace is less likely to perceive and appreciate the security enhancing effects of GPS. Although the existence of threat is known to all taxi drivers, a taxi driver who has not experienced threat could possibly think of himself as invulnerable. On the other hand, a taxi driver who has experienced threat or violence could possibly, knowing the effects of GPS, understand and evaluate how this system has or could have helped him in that situation.

4.2.3 Is GPS privacy invasive?

Graph 5

Graph 5 shows the result from Q4: ‘Do you think that GPS will be / is privacy invasive?’. It can be concluded that 17.5 % consider it privacy invasive while the majority of 82.5 % do not have such concerns. Then, is it legitimate for a taxi company to install GPS if 17.5 % of the taxi drivers consider GPS as privacy invasive? This issue will be discussed in parts 6.1 and 6.3.

Graph 6

The result of Q6: ‘Do you want GPS in the taxi that you are driving?’ based on the selection of yes-respondents of Q4: ‘Do you think that GPS will be / is privacy invasive?’ is shown in

\[\text{\footnote{The internal fallout rate of Q4 is 3 \%.}}\]
Graph 6. In short, the graph depicts the number of taxi drivers that want GPS although they perceive of the technology as privacy intrusive. It can be concluded that 67.6 % of the taxi drivers that perceive GPS as privacy invasive, do want GPS\textsuperscript{27}. This issue will be discussed in part 6.1-2.

4.2.4 Should GPS be switched on during lunch and breaks?

![Graph 7]

Above, in graph 7, the answer of Q5: ‘Do you think that GPS should be switched on during lunch and breaks?’, based on yes-respondents of Q6: ‘Do you want GPS in the taxi that you are driving?’ is depicted. A majority of 71 % want GPS to be switched on even during lunch and breaks\textsuperscript{28}. However, the 29 % that do not want GPS to be switched on are in a precarious situation. At least one taxi company in the Stockholm region has GPS switched on in all their taxis, at all hours, hence including breaks and lunches. This implies that a taxi driver who works in this company and does not want GPS to be switched on during breaks is forced to accept it. There is certainly a possibility to change company or to become an independent driver, i.e., a driver who does not belong to any company. However, to work for a taxi company may include significant benefits in other respects. For example, there are severe problems in the taxi business in the Stockholm region. There are taxi drivers who charge too much, who do not pay tax, and even those who driver taxi although they do not have taxi driver’s licence. Driving a well-known taxi company’s car shows the client that the taxi ride will be market priced and that the driver has a taxi driver’s licence.

The crucial issues raised from this discussion are: is it legitimate to locate employees during breaks? Why are the privacy claims different? The former issue will be discussed in parts 6.1 and 6.3, and the latter in part 5.5.

\textsuperscript{27} The internal fallout rate of Q6 by Yes-respondents of Q4 is 0 %.
\textsuperscript{28} The internal fallout rate of Q5 by Yes-respondents of Q6 is 5.8 %.
4.2.5 Differences between experience and expectation

In graph 8, Q3: 'Have you driven a taxi equipped with GPS?' is visualized. According to the graph 79.4 % of the respondents have experience of GPS while 20.6 % have never used the technology. In the following, the questions Q2, Q4 and Q6 will be analysed in the two different subgroups yes-respondents and no-respondents of Q3. This will be done in order to ascertain if there are any differences between the drivers that have experience of GPS and the drivers that have not.

In graph 9 and 10 a distinction of the formerly mentioned groups have been made regarding Q2: ‘Do you think that GPS will enhance / enhances your security when you are driving taxi?’ In the interpretation of the graphs a clear difference between the two groups can be noticed. 90.5 % of the taxi drivers that have experience of GPS think that the technology enhances their security, while the percentage of taxi drivers, with the same opinion, that do not have experience of the technology is 75 %. Why is there a difference in the perception of GPS? It is possible that the taxi drivers without experience of GPS know neither all positive effects nor all negative effects of GPS and that this fact explains the obtained results. It could also be the other way around, that the taxi drivers who do not think that GPS is security

29 The internal fallout rate of Q3 is 0.5 %.
30 The internal fallout rate of Q2 by Yes-respondents of Q3 is 0 % and the internal fallout rate of Q2 by No-respondents of Q3 is 2.4 %.
enhancing simply do not want to drive taxis equipped with the technology. The taxi drivers that have experience of GPS could possibly have experienced threat or violence after the installation of GPS and realize how the technology has helped them during these specific situations. This could possibly explain the differences between the subgroups.

In graph 11 and 12 the result from Q4: ‘Do you think that GPS will be / is privacy invasive?’ selected by yes- and no-respondents of Q3: ‘Have you driven a taxi equipped with GPS?’ is shown. 12.5 % of the taxi drivers experienced with GPS perceive it as privacy invasive while the percentage of taxi drivers without experience of the technology amounts to 34 %. This difference is probably due to two facts. First, taxi drivers who think that GPS is privacy invasive have not driven taxis equipped with the technology due to that fact. Second, taxi drivers who have experience of GPS have, after testing the technology, concluded that it is not as privacy invasive as they thought before the installation.

In graph 13 and 14, the results from Q6: ‘Do you want GPS installed in the taxi that you are driving?’ in the two subgroups are shown. The graphs show that the taxi drivers who have experience of GPS are more sympathetic towards GPS than the group without experience of the technology. Analogously with the preceding comments, this difference could be due to either that taxi drivers who do not want GPS have not driven cars equipped with the technology or that GPS is perceived as more positive after the installation.

As mentioned above, this is certainly connected to problems if the current employer wants to install GPS in all taxis of his fleet.

The internal fallout rate of Q4 by yes-respondents of Q3 is 3.8 % and the internal fallout rate of Q4 by no-respondents of Q3 is 0 %.
4.2.6 Do you want GPS in your taxi?

The aggregated result of Q6: ‘Do you want GPS installed in the taxi that you are driving?’ is shown in graph 15. According to the graph, 87.3 % want GPS installed in their taxis.

From the preceding parts it would be plausible to conclude that the reason for which taxi drivers do not want GPS is either that they find it privacy invasive or not security enhancing. However, 7 taxi drivers, who think that GPS enhances security and that it is not privacy intrusive, still do not want the technology installed in their taxis. One of the taxi drivers stated the reason for this reluctance as follows:

“I do not want it because I do not want to be logged in where the car is. The drives that I want could be somewhere else.”

Before the installation of GPS the taxi drivers stated their position by informing the calling central where they were over a com-radio system. Sometimes they stated a location other than the actual in order not to get more drives in the actual area. The calling central would then assign drives in the area that the taxi drivers were stating. Before the introduction of GPS this was a common way of working.

Another taxi driver who does not want GPS, although he thinks that it is security enhancing and not privacy invasive, answers Q7: ‘Why have you chosen to work driving taxi?’ as follows:

“It was a free job. Taxi driving nowadays is too controlled from the top.”

This is another sign that GPS could be rejected for other reasons than those regarding security and privacy.


4.2.7 Freedom in taxi driving

To Q7: ‘Why have you chosen to work driving taxi?’ 25.5% of the taxi drivers answered that taxi driving is a free job. These answers have been scrutinised in order to investigate if there are any significant differences between the answers of this subgroup compared to the rest.

Graph 16 shows that 98% of the taxi drivers who think that taxi driving is a free job find GPS security enhancing. The total percentage of the taxi drivers who think that GPS is security enhancing is 87%. Hence, there is an important difference between the two groups.

Graph 17 shows that 89.8% of the above mentioned taxi drivers perceive of GPS as privacy invasive compared to 82.5% in the aggregated group of taxi drivers. This suggests that the taxi drivers who think that taxi driving is a free job do to a lesser extent find GPS privacy invasive.

Graph 18 shows that 98% of the taxi drivers who think that taxi driving is a free job want GPS to be installed in their taxis compared to 87.3% in the totality of participating taxi drivers. In order to understand the figures above it is important to consider that the concept of

...
freedom has many facets. Why are taxi drivers, who think that they have a free job, more sympathetic towards GPS? At first sight GPS could be seen to decrease freedom as the location of the taxi drivers is constantly revealed. However, GPS could also be seen as a way for the taxi drivers to be free, in the sense of free or deliberated from the worries of being exposed to violence. GPS, although it reveals location, could be a manner for the taxi drivers to feel ‘free’ in their work. Another explanation could be that taxi drivers who have stated that taxi-driving is a free job, are very sympathetic towards their work. Job satisfaction could bring about more sympathy towards changes at work, e.g. by installing GPS.

4.3 Summary of important findings

The important findings from the questionnaire are the following:

- The majority of taxi drivers perceive of GPS as increasing their safety. The taxi drivers who have experienced situations of threat at work consider the technology as more security enhancing than taxi drivers who have not experienced such situations.

- The majority of the taxi drivers do not think that GPS is privacy invasive. The majority of the taxi drivers who do think the technology is privacy invasive still want to have it installed in their taxis.

- Almost a third of the taxi drivers, who want GPS installed in their taxis, do not want it to be switched on during breaks.

- Taxi drivers who have experience of GPS are more sympathetic towards GPS than taxi drivers without such experience.

- Taxi drivers who have explicitly stated that taxi driving is a free job, appreciate GPS more than the population of taxi drivers in total.

In chapter 5, the second and the third point will among other things be analysed. Why do some taxi drivers find GPS as privacy invasive? Why do taxi drivers who think that GPS is privacy invasive still want GPS and why do not taxi drivers, who want GPS, want to have the technology switched on during breaks? The following chapter is thus thought to investigate thoroughly the concept of privacy in order to understand the empirical findings.
5. Privacy and privacy invasiveness

In the previous chapter it has been concluded that 17.5 % of the taxi drivers think that GPS indeed is privacy invasive. In this chapter the reasons why GPS could be seen as privacy invasive will be discussed. In part 5.1 some definitions of the concept of privacy will be described and discussed. Part 5.2 will give a notion of why privacy is considered as an important value. In part 5.3 the impact of surveillance technologies on privacy will be presented followed by a discussion in part 5.4 on location and privacy. Since GPS in taxis concerns privacy at work, part 5.5 highlights and gives explanations of the differences of privacy claims at work and off work and what argument companies use to legitimise an installation of a potentially privacy invasive technology.

5.1 A definition of Privacy

Schoeman (1984:2-3) states that three categories of definitions of privacy have been prominent. These three categories are:

• privacy as a claim, entitlement or right
• privacy as the measure of control and individual has over
  ➢ information about himself
  ➢ intimacies of personal identity; or
  ➢ who has sensory access to him.
• privacy as a state or condition

Schoeman identifies difficulties with the first two categories of definitions. The first one shows that privacy is morally significant without stating why that is the case. This definition will here be discarded, since it is better to first establish the moral value of privacy and afterwards discuss if there could be such a thing as a right to privacy or not.

Schoeman exemplifies the difficulties of the second category by a man shipwrecked on an island who lacks the control of information about himself. In this case, he states that it would not be argued that the shipwrecked man lacks privacy. Although Schoeman discards the definition of privacy as the measure of control, it seems that it could still be valid, in other more realistic cases. A person who deliberately gives up information about himself, making a homepage with a personal CV on the Internet, would hardly believe that this is privacy invasive. Or, people who give up personal information to a supermarket chain in order to get special member offers would in the same way probably not think that their privacy is intruded. However, if someone hacks into a computer to search for the same information that the person himself gave up to get the member offers at the supermarket, this would probably be seen as privacy invasive, at least by some people. In some cases it is thus the lack of control over information that constitutes the privacy invasiveness. When arguing against this, it can be said that it is impossible to have control over all information about oneself. If, for example, someone sees you and looks at the huge scar you have on your throat, some people would consider this as privacy invasive, some would not. Robert S. Gerstein states that “it is prima facie wrong to observe a person against his will at any time, because it violates his autonomous right to decide whether he will be observed or not (1978:78)”. However, this right is questionable. When walking in a street, a person cannot possibly claim that nobody watches him; hence it is even more implausible to argue for such a right. Since it seems that
the control over information is an important aspect of privacy, this category will not be discarded although Schoeman does so.

Schoeman defines privacy as a state or condition, that is, the third definition above, stating that “[a] person has privacy to the extent that others have limited access to information about him, limited access to the intimacies of his life, or limited access to his thoughts or his body” (1984:3). Persson and Hansson (2002) part from Schoeman’s definition and argue that there is a sphere of privacy constituted by two different parts: a core and a discretionary part. They write that “as a first approximation the core can be considered to consist of those types of access that most persons wish to have control over. The discretionary part consists of those types of access that it is considered legitimate for a person to wish to have control over” (2002:9). This definition of the sphere of privacy leads to the conclusion that the clothes you are wearing do not form part of the sphere of privacy since it is not considered legitimate to claim to have control over the access to the colour of our clothes. However, it is still difficult to determine what could be considered as a legitimate claim to privacy. This could be different depending on the social traditions and it could also change during the evolution of a culture. If a claim to privacy is legitimate or not, also depends on the actual setting where the problem occurs. We will see differences between the workplace and the private setting in part 5.5.

Schoeman’s definition of privacy with the modifications made by Persson and Hansson (2002) makes it possible to discuss the decrement of privacy, without the implication of the concept of a right to privacy. Before discussing a right to privacy, it is useful to investigate the concept. Is it a desirable value and if so, due to what reasons? And the question regarding the potential privacy invasiveness of GPS is: is control over the access to one’s location legitimate in our culture?

5.2 Why is privacy important?

The mere fact that some people suffer from privacy invasive actions (or technologies) makes it reasonable to think that privacy could be seen as an important value. But why do people suffer from privacy invasive actions? In the following, privacy’s importance will be discussed. The following survey exemplifies how the concept of privacy has been discussed and the difficulties in assessing its importance.

“Privacy is closely implicated in the notions of respect and self-respect, and of love, friendship and trust. Quite apart from any philosophical analysis this is intuitively obvious” (Fried 1968:210). Following Charles Fried, a philosopher discussing among other things contracts and legal philosophy, there are some values in life that are closely related to privacy and whose existence seem impossible without a certain amount of privacy. The relation that privacy has to love and friendship is that it makes the particular intimacy of such a relation possible. Fried explains intimacy as “the sharing of information about one’s actions, beliefs, or emotions which one does not share with all, and which one has the right not to share with everyone” (1968:211). Privacy is hence the regulating factor of having different kinds of relations maintaining different degrees of intimacy (Rachels 1975:326). Since life in a modern society involves many different kinds of relations, it seems intuitively right that a means is needed to regulate these relations. Fried argues that the most complete form of privacy is probably the most basic one: a necessary means to freedom is the option to define our relations to others and to define ourselves. To lose control over who we are is “the ultimate assault on liberty, personality and self-respect” (1968:212). The regulator could be
seen as different degrees of privacy or possibly as different roles, comprising more aspects than just privacy. This concept of roles, with focus on the employee and private role, will be brought up in part 5.5.

Turning the issue around, it is easily conceivable how the notions of respect and self-respect are implicated in privacy. Respecting a person is among other things to respect his privacy, given that privacy has the inherent functions described above. The concepts of respect could be connected to the freedom of expression.

Robert S. Gerstein claims that privacy is crucial for the development of individuality, which could be seen as a product of freedom of expression (Schoeman 1984:23). This is concordant with the opinions of John DR Craig who argues that the fundamental point in the discussion on privacy lies in the development of one’s self (1999:25). A person who cannot keep thoughts for himself and elaborate them within, would have difficulties to develop his self and not get own opinions, etc.

“Trust is the attitude of expectation that another will behave according to the constraints of morality” (Fried 1968:212). Fried argues that relations of trust are inherently good. This seems intuitively right. Fried argues that trust cannot exist where there are no possibilities to betray the trust, thus a man cannot feel that he is trusted if he is constantly supervised, since he cannot betray the trust under constant surveillance. Privacy is the feature that makes such an infringement on trust possible, and therefore Fried argues that privacy is the foundation of trust. Young argues that in a society where trust is completely absent “the conduct of normal interpersonal relationships would be impossible” (1978:4) which further emphasises the importance of privacy. Some studies on workplace privacy show that the employees that are supervised feel that the employer does not trust them, and the employer’s response is normally that an employee who has nothing to hide does not feel that he is not trusted (Näslund & Resare Sandberg 2001:22). Could control be a legitimate reason for supervising employees? The issue will be brought up in part 5.5.2.

This part shows that there have been many attempts to uncover the features of privacy. However, all these attempts show that it is difficult to pinpoint privacy invasiveness to another concept, such as respect, trust etc. However, all of these attempts to unravel the nature of privacy point to one and the same thing, i.e. that privacy is an important value.

### 5.3 Surveillance technologies and Privacy

Surveillance is, according to the Collins Cobuild English dictionary, “the careful watching of someone” (1995:1684). The watching of someone provides the supervisor with information about his location and possibly about his behaviour, that is, information about him. However, in order to find out whether a surveillance technology is privacy invasive or not, it is crucial to consider what kind of information the technology is designed to collect. For example, surveillance cameras can be used to supervise a public spot, e.g. a square, and this could be seen as privacy invasive because of the reasons stated above. However, it seems implausible that this information could belong to the core of the sphere of privacy. It could not possibly be claimed that someone who does not care of being filmed in a public area does not care about his privacy (cf. Persson & Hansson 2002:8-9). It is more likely that the information collected by a surveillance camera at a public place belongs to the discretionary part of the sphere of privacy which means that to discover whether it is privacy invasive or not, the personal opinions of the individuals have to be considered. That is, a theoretical discussion cannot determine this question. To elucidate the context dependency of privacy claims, the
surveillance cameras described in Orwell’s book *1984* could be considered. Those surveillance cameras were designed to provide the state with a ubiquitous control system, including filming in people’s homes. If the sphere of privacy once again is considered, it is, in this example, plausible that the information collected by those surveillance cameras belongs to the core part since most people would agree that accepting video surveillance in one’s home would imply that one would not care at all about privacy. This seems to indicate that one specific surveillance technology can be viewed differently depending on the context in which it is used.

If someone is under surveillance and is aware of it, he will most likely adapt his behaviour to the situation. This is a well-known phenomenon in experiments and studies of behaviour (Passer & Smith 2000:71). Robert S. Gerstein explains that there is a difference between experiences where one is taking part, as opposed to experiences to which one is observer (1978:79), and he states that being observed implies that the observed person introspects himself which makes him an observer of an action and not a participant. He argues that this implies the destruction of spontaneity, and with it, the intimacy described in the preceding part. Gerstein bases this arguing on that spontaneity which is action without social scrutinising, is an important value. If people have to scrutinise themselves constantly, they will probably feel that they have less possibilities to choose their actions and thus, to control their own lives. To perceive a control of one’s life, which is connected to the concept of free will, is intuitively important.

How then can the installation of allegedly privacy invasive technologies be justified? The possible infraction of privacy is not the only effect of a surveillance technology; there could also be positive effects. Video surveillance in public places, for example, is said to decrease crime. In the case of video surveillance in public places the importance assumed of the decrement of crime followed by an increase of personal security is considered to be of greater value than the invasion of privacy. This is often discussed as an overriding value. Personal security and reduction of crime in the case of camera surveillance can override claims to privacy. The installations of allegedly privacy invasive technologies are often justified by means of overriding values. Overriding values will be commented on in parts 5.5.1-5.5.2.

### 5.4 Location and privacy

Location based technologies are considered as privacy invasive or potentially privacy invasive in a number of studies (e.g. Craig 1999, Froomkin 2000, Clarke 2000), probably as the access to the location of a person can be seen as information about him. It could also be considered as a sort of access to his body, not physical but informational. The mere location of a person would probably, for most people, be considered as potentially privacy invasive. The location belongs to the discretionary part of the sphere of privacy, i.e. it is legitimate to claim to have control over the access to that information. Since revealing one’s location is an

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37 In many experiments the test persons want to behave, as they think the researcher wants them to behave. Analogously, people under surveillance will probably behave in such a way that they live up to the expectations of their supervisors.

38 Information about […] someone consists of facts about [him] (Collins Cobuild 1995:865) The location of a person could be seen as a fact about the person, i.e. the fact of where he is, thus location could be seen as information.
issue that has been mentioned in both academic writings and the press, it is plausible that the claim to have control over the access to our location is legitimate in our culture.

The possible privacy invasiveness of what is referred to in part 3.3 as tracking is further commented by Clarke as that “given an amount of data about a person’s past and present locations, the observer is likely to be able to impute aspects of the person’s behaviours and intentions”(2000:3). This longitudinal access to a person’s location can be seen as partial access to an individual’s thoughts, which could be assumed to belong to the core of the sphere of privacy. Thus tracking seems to be more privacy invasive than location, due to its possibility to impute aspects of people’s behaviours and intentions. It is reasonable to argue for that access to an individual’s behaviours and intentions is more privacy invasive than the access to a person’s location.

Analogously with the example above of video surveillance, it is important to consider the positive effects of location and evaluate if the pros are more important than the cons or vice versa. The example of location-based technologies in cars will serve as an example. The negative effect is stated earlier as the potential privacy invasiveness. Somebody has got access to the location of the car in every moment. The positive effects are e.g. that the car transmits an alarm signal in case of emergency, and that the computer in the car could help the driver to find streets, restaurants, hotels etc. The security aspect is often the main overriding value, e.g. concerning video cameras, and could be the main overriding value here too. However, it has not been confirmed whether it is the increase of security or the services related to the “navigator” service that constitute the overriding value. Many probably do not think that they will be involved in a car accident, thus the navigator is foremost perceived of as beneficial and the negative effects are secondary. As will be seen in the discussion on GPS and taxis it is more evident that the taxi drivers perceive security as an overriding value, since they are exposed to threat.

5.5 Privacy and Workplace Privacy

The most plausible reasons for which workplace privacy claims could differ from ‘ordinary’ privacy claims are the explicit and implicit responsibilities between employer and employee. Persson and Hansson (2002:12) argue that the consequences of an employment contract are what distinguish workplace privacy from privacy in general. The contract comprising the employer and the employee could be seen to constitute an institution with its own rules. The particular features of this institution could imply that a technology which in a private situation is seen as privacy invasive, could be accepted in the workplace.

The existence of an employment contract supposes that both employer and employee are aware of the specific rules of the employment in the act of signing the contract. Although the employee is aware of all the rules regarding an employment, Craig argues that in most workplace settings “it is surely unreasonable for employers to expect every minute of their employees’ working day to be dedicated solely to employment matters. Private matters […] are bound to come up at the office. For this reason, pervasive employer monitoring of employee movements, conversations and telephone calls impacts directly upon the autonomy

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39 The concept of institution “is meant to cover such diverse items as games like chess, the social practices that center round the making of promise, and the thought and behaviour that supports or is supported by the notion of the identity of persons through time” and an institution is “constituted by many people behaving in fairly regular ways, with relations between them which transmit and encourage and perhaps enforce those ways of behaving.” (Mackie 1973:80)
of workers” (1999:22). While an employee dedicates time to private matters, his claims to privacy might change. An example will serve as a base for the following discussion:

The boss constantly taps a person working in a calling central. Given that there is an explicit employment contract, the employee considers that the boss controls him and makes sure that he performs well at work. However, the employee would probably be reluctant if the boss taps a private phone call. It could be argued that the employee has changed from an employee to private role; and with that he has got different claims to privacy.

The different demands of privacy as this example show, stems from a common post-modern notion (Hatch 2002:65) that demands of privacy are context dependent and that a person acts in spheres or in different roles. The positive and negative effects of a surveillance technology could change while a person changes between the employee and the private role which implies that an employee could have different privacy claims depending on the role he is assuming. The variable in those cases is not the person’s privacy, but the potency of the overriding values. Therefore it is considered important to have private spaces at work where the employee can be sure that there is no surveillance (Trades Union Congress 2000). In the case of a calling central there could be a special phone, which is not tapped, used solely for private phone calls. However, for some jobs it is not obvious how to separate the private role from the employee role. In an office a worker can decide to take a break and for example take his car to the nearest post office to make an errand, being sure of not being watched, but a taxi driver is more or less bound to his taxi and hence to the constant surveillance of GPS. From the questionnaire it can be seen that 29 % of the taxi drivers that want GPS installed, want it to be switched off during breaks which means that in the taxi business the concepts of different claims to privacy or different roles could be used.

As described in part 5.3, there has to be some overriding value to legitimise the installation of a possibly privacy invasive surveillance system. Two of the most frequent overriding values will be described in the following: security and control.

### 5.5.1 Overriding value: Security

Analogously to the mentioning of surveillance technology and overriding values in part 5.3, security could be considered as an overriding value. This is the case concerning e.g. video cameras in subway wagons. The security of the passengers is, in this case, more important than their privacy. Analogously with 4.2.2 the people who have experienced situations of threat in the subway will probably be more sympathetic towards the surveillance cameras.

A belief that a technology is security enhancing could hence override the claims to privacy. Supposing that the claims to security, life and well-being are inherent in human beings, it is plausible that those fundamental claims are more important than the claims to privacy.

### 5.5.2 Overriding value: Control

If surveillance systems are installed, control as an overriding value is often used as a way to legitimise the installation. But could it be legitimate to control the employees? Some may argue that the employer has a right to control the employee at work. For example, in calling centrals the personnel’s behaviour when calling potential clients is crucial. This has implied that employers have tapped the personnel’s phones in order to make sure that the personnel
sells ‘properly’. Controlling the employee’s actions that are crucial for the performance of the job seems legitimate. However, it is not obvious that an employer has the right to control aspects that are of no importance for the employee’s work. Such aspects would be, in the case of people working in calling centrals, e.g. the location of employees. Persson and Hansson state that it is legitimate for an employer to monitor an employee in order to “ensure that the employee performs the tasks and fulfils the role responsibilities, owed to the employer, that are explicit or implicit in the contract of employment” (2002:9). Although this suggestion is clarifying there probably exists a discrepancy between the notion of implicit role responsibilities between employer and employee. Furthermore, even though some aspects of a job are included in the role responsibilities, it is not always reasonable to monitor them. For example, a taxi company might include friendliness and helpfulness towards the client in the role responsibilities of a taxi driver. However, it does not seem legitimate to record the conversations of all taxis in order to find out whether the taxi driver is friendly or not. In some jobs the helpfulness is the most important factor of the job. Analogously to the preceding example of the taxi drivers it would not be reasonable to record all conversations of the personnel. But why do companies tap sales people’s phones and why do employees consider it as legitimate? Analogously to the mentioned example of the taxi driver, the absolute core responsibility for the salesman is to sell and the absolute core responsibility of the taxi driver is to take the client where he wants to go. Nevertheless, recording conversations seems legitimate in one case and not in the other. It seems difficult to legitimise the intrusion on employees’ privacy using control as an overriding value without reaching similar apparent contradictions. The issue of using control as an overriding value will now be left, since taxi companies use security as an overriding value.
6. The installation’s legitimacy

In this part the second research question will be discussed, i.e. whether it is legitimate to install GPS in taxis considered from the perspective of two different ethical theories. In part 6.1 a consequentialist theory will be used, focusing on the two major stakeholders of the issue, i.e. the taxi company and the taxi driver. Part 6.2 will be an attempt to discuss the most beneficial implementation of GPS considering all stakeholders. In part 6.3 an alternative perspective on privacy will be presented where it will be assumed that there exists a right to privacy. This will open up a second discussion on the legitimacy of an installation of GPS but now seen from a right based perspective. In part 6.4 the results of the different ethical theories will be commented on as well as the possibility of using a legitimate implementation of GPS from both the consequentialist and the rights based ethical theory.

6.1 Consequential ethical theory

A consequentialist ethical theory will first be utilised to evaluate whether the installation of GPS could be justified from a moral perspective. A consequentialist ethical theory takes in account the consequences of actions, in this case, the consequences of the installation of GPS in taxis. The consequentialist theory in brief states that if an action has good consequences, it is good. Hence, the action, which has the overall best consequences, is the best action. The weak parts of the application of the theory are first, that there is no accepted definition of a good consequence, and second, that the theory does not consider for whom the consequence is supposed to be good. This is not a flaw in the theory per se but a difficulty when implementing it. In this discussion a good action from a specific stakeholder’s perspective is seen as an action that fulfils the preferences of the stakeholder. This is however not a clear definition since the preferences of a stakeholder are not generally known. However, some intuitive preferences will in the following be assumed.

- A good action from the taxi company’s perspective will be considered as an action, which directly or indirectly increases financial gain. Effects that indirectly (at least from modern business theory) lead to financial gain such as competitive advantages, increments of efficiency in the production of the service, and human resource management will thus be included in the concept of good. The preference of increasing financial gain is a trait of for-profit companies and it will here be assumed that taxi companies fall into this group. Considering the market this is not a risky assumption.

- A bad action from the taxi driver’s perspective will, for the purposes of this study, be considered an action that causes pain, i.e. physical pain, mental distress etc. This is intuitively plausible. Actions that are opposed to the taxi driver’s wants will also be considered as causing mental distress.
6.1.1 Taxi company

First, the installation of GPS would lower the risks of working in the taxi company. The goodness of this action follows directly from the assumed preferences of the taxi company, since favouring the employees is good human resource management. This feature is provided by all GPS implementations.

Second, the potential efficiency increments of installing fleet management based on GPS are important to consider. It is intuitively easier to overview the taxis on a screen, than to communicate with all taxi drivers in order to locate them. Fleet management based on GPS allows the taxi company to assign drives or plan pre-booked taxis in a more efficient way. Efficiency in the service management increases financial gain which is another good consequence of GPS. This is only possible with implementations 2 and 3.

Third, for a potential taxi driver who is interested in taxi driving but concerned about the potential risks, a taxi company that has GPS installed will have a competitive advantage compared to other companies without GPS and thus be seen as attractive in the eyes of potential employees. This could lead to more job applications to this specific company or even that taxi drivers working in another company that has not installed GPS, change to the mentioned company. The results of the questionnaire show that 87.3 % of the taxi drivers consider GPS as enhancing their security. Taxi drivers, working in a company, who do not think that GPS will enhance their safety and due to this are reluctant to an installation of GPS, could leave the company for another one. This is problematic for the company, especially since the taxi companies in the Stockholm region experience worker shortage at present and do not have the personnel to supply all the demands of the society (Svenska Taxiförbundet 2002:4). On the other hand, not installing GPS could theoretically lead to a loss of 87.3 % of the workforce (taxi drivers who leave the company for another one which uses GPS). Since a loss of 87.3 % of the workforce would be more severe than losing 12.7 % it is reasonable to assume that it is better to install GPS than to abstain. The security enhancing effects of GPS are provided by all implementations of GPS.

Fourth, there is also a possibility that taxi drivers will perceive of taxi companies that have taxis equipped with navigators (that is, implementation 3 and 4) as attractive. This leads to a competitive advantage, but it also brings about installation costs for the taxi company. A taxi equipped with a navigator could also lead to good service and cost-savings for the client as it objectively states the shortest way between the taxi and the destination (although this technology is not yet perfect). However, this cost-saving implies a loss of income to the taxi company.

Fifth, GPS could be used as a means of decreasing robberies of taxis, i.e. when the entire car is robbed. It follows from the taxi company’s preferences that GPS, seen from this perspective is good, since robberies of taxis decrease financial gain. This is possible with all implementations of GPS.

Which implementation of GPS would the taxi company prefer? The first implementation brings about installation costs and the advantages of enhancing the security of the drivers and the prevention of stolen cars. This implementation is not widely used in the taxi business. Rather, there are more taxi companies that use the second implementation of GPS. The additional benefit is the possibility of managing the fleet efficiently, which leads to cost-savings. The third implementation brings about installation costs for the navigator, but also provides the driver with a tool to enhance the taxi service. The taxi companies that choose to install the navigator probably value the intangible quality of the service and facilitating the taxi driver’s work more than the installation costs. Thus, if the taxi company only considers
costs and revenues, it is not likely that the taxi company installs the navigator. However, if the taxi company values the enhancement of the taxi service (which is likely to lead to increasing demands), it is likely that the taxi company installs the navigator. The fourth implementation does not bring about as many advantages as the third. It does not provide the possibility to use GPS for managing the fleet, which leads to higher costs than in the third implementation. The most beneficial implementations to the taxi companies are thus the second and the third.

6.1.2 Taxi driver

The main benefit of GPS for the taxi driver is the security enhancement. This was the original reason for the installation of GPS in taxis and the results from the questionnaire show that 87.3% of the taxi drivers indeed perceive GPS as security enhancing. The security enhancing effects of GPS are provided by all four implementations of the technology. A negative aspect with GPS is its possible privacy invasiveness. The results of the questionnaire show that 17.5% of the taxi drivers think that GPS is privacy invasive. If GPS is installed, what will the consequences be for the 17.5% that think that GPS is privacy intrusive and what will the consequences be for the 87.3% that think that GPS is security enhancing? In the questionnaire it has also been noticed that 67% of the taxi drivers who think that GPS is privacy intrusive, do want GPS anyway. Why is that?

Many would argue that it is obvious that in most cases when dealing with new complex issues, in this case GPS, each person values what seems to be convenient about the issue and what is inconvenient, that is, identifying and weighing the pros and cons to be able to assume a positive or negative attitude regarding the issue. Earlier, in part 3.5.2, three important aspects on GPS concerning the taxi driver have been suggested: (a) its possibility to be privacy invasive (with the difference of revealing the location to the police in implementation 1 and 4 and the taxi company in implementations 2 and 3), (b) its possibility to be security enhancing (with all implementations) and (c) its possibility to help a taxi driver to perform his work more easily (with implementations 3 and 4). To the taxi driver aspect (a) is, if existent, negative and the aspects (b) and (c) are, if existent, positive.

Why would then such a large number of the taxi drivers to whom GPS is privacy invasive want GPS? An examination of aspect (c) will be done. The taxi driver is, with GPS implementations 3 and 4, possibly able to find his destination more easily which leads to an increased efficiency and possibilities of augmented revenue. However, the ones who find something privacy invasive are likely to believe that privacy is an important value, and plausibly more important than an increased efficiency and possibilities of an augmented revenue. Using GPS in normal cars could be seen as increasing efficiency, as it, for example, makes it possible to avoid traffic jams. Given that the location of a person using such a system is constantly known, someone who considers the system as privacy invasive would hardly utilize such a system, as the pros for him (displacing himself more rapidly) are not as valuable as the cons (giving up his location). It is therefore not credible that the taxi drivers that have their privacy abused want GPS because of aspect (c).

However, the aspect (b) of GPS is not of the same nature as the aspect (c). Most people would probably agree that their life or well-being is an important value to them. In this case it can be suggested that both well-being and privacy are important values. The claim to well-being and security has to be weighed against the claim to privacy. Here we can sense a difference and intuitively and presumably empirically state that the claim to well being in these circumstances overrules the claim to privacy.
Which implementation is then most beneficial to the taxi drivers? The first and fourth implementations enhance the taxi driver’s security and reveal only the location to the police. This makes it plausible that the less privacy invasive implementations are the first and the fourth, due to that the police can only get access to information on the taxi driver’s location in case of an occurrence, while in the other two implementations the location is constantly available to the taxi company. The second implementation is thus more privacy invasive and provides no additional benefits to the taxi driver. The third implementation is as privacy invasive as the second but it facilitates the taxi driver’s work. However, the fourth implementation provides the same possibilities as the third; additionally it is less privacy invasive. This reasoning implies that a taxi driver who is concerned about his privacy and is interested in the navigating service would prefer the fourth implementation. The fourth implementation is the most beneficial. Thus, the implementation that is most frequently used today, i.e. the second, is not the most beneficial one.

There is another issue that needs to be commented on. During breaks, 29 % of the taxi drivers want GPS to be switched off, and this could be explained by considering different roles and different privacy claims at work. The consequence of having GPS switched on during breaks is that the taxi company do not respect some of the taxi drivers’ will, which above is stipulated to cause mental distress. However, the taxi company’s utility of having GPS switched on during breaks is increased. As the GPS is switched on, the cars are tracked and are therefore easier to find in the case of someone stealing the car. This is especially important during breaks as the car often is less supervised by the taxi driver than during the rest of the workday. Since a higher percentage want GPS to be switched on during breaks and that the taxi company has an interest in having GPS switched on, it could be assumed that the positive consequences will overrule the negative.

### 6.2 The most beneficial implementation

A majority of the taxi drivers do not think that GPS is privacy invasive, and most of those who have such concerns want GPS anyway. In the preceding discussion it was argued that, to most people, physical well-being is more important than privacy. This makes it plausible that an installation of GPS can be legitimised. But, what installation would be the most beneficial to all stakeholders?

A weighing of the interests of taxi drivers and taxi company in all four implementations of GPS identified in 3.4 will be performed in the following.

The first implementation is beneficial to the taxi drivers who are concerned about their privacy, since the location is only known to the police. However, this implementation is not to a great extent beneficial to the taxi company. The taxi company can prevent the stealing of cars but the implementation also brings about significant installation costs.

The second implementation is beneficial to the taxi company but provides no additional benefits to the taxi driver. Rather, it is more privacy invasive than the first, since the driver’s location is not only available to the police but also to the taxi company. Is the benefit of the taxi company more valuable than the benefit of the driver? As the taxi company comprises, among other people, all taxi drivers, it is possible to argue that as the whole taxi company benefits from the second implementation, the fraction of taxi drivers who think that GPS is more privacy invasive are irrelevant. On the other hand, the taxi drivers’ reduction of well-being could be more valued than the increase of financial gain of the company. However, as the business sector focus on measurable units, money is seen as the most important value
since it is easier to measure than for example well-being. This is no way of morally legitimising the installation of GPS, but it is how companies legitimise it.

From the discussion in part 6.1.2 it can be concluded that the third implementation is more beneficial to the taxi drivers than the second. It is also more beneficial, in the long run, for the taxi company since it enhances the taxi service which probably leads to an increasing demand. This suggests that the value of the consequences of using the third GPS implementation is higher than for the second one. Additionally the clients prefer the third implementation due to cost-savings (see 5.1.3). Society at large also values this implementation, striving for a market priced taxi service.

The fourth implementation is the most beneficial to the taxi driver. However, it is the least beneficial to the taxi company which plausibly explains why it is not used in the Stockholm region. This implementation does not provide any economical benefits to the society, but it fulfills the society’s and the Worker’s Unions interest of lowering the privacy invasiveness at work.

It is difficult to assess if the first, the third or the fourth implementation is the preferred one seen from a consequentialist perspective. The taxi companies that have installed GPS often use implementation 2 and 3, as these implementations bring about the greatest benefits to the taxi company. Since the taxi companies have the power to decide what implementation to install, the implementation that is most beneficial to the taxi company will be the one that is used.

From the discussion above it is reasonable to assume that an installation of GPS is legitimate (using either GPS implementation 1, 3 or 4). However, seen from a right-based perspective, could it be legitimate to violate the privacy of some taxi drivers to enhance the security of others? From a consequentialist perspective this problem is relatively straightforward, but are the guidelines of action from such a theory ‘reasonable’. Recommendations from consequentialist ethical theories have sometimes not been seen as acceptable, and could the results from the preceding part be unacceptable as well? The subsequent part will address the legitimacy issue from a right-based perspective.

6.3 The right to privacy

The importance of privacy has been discussed in the preceding chapter, but perhaps there is something more to the privacy concept than that it is an important value. The discussion about a right to privacy started with the article of Warren and Brandeis (1890) where the authors state that privacy is “the right to be let alone”. Warren and Brandeis argued against the situations when people try to discredit other by making private facts publicly known. Others have also argued that there is a right to privacy extending its area of application, e.g. Benn (Schoeman 1984:21), Fried (1968).

Could the right to privacy be a fundamental right or could it possibly be derived from other more fundamental rights? Judith Jarvis Thomsson (1975) argues that the right to privacy is based on several other rights, as the right over the person, the right of property etc. This means that the right to privacy could be seen as a prima facie right. This employee right is what Persson and Hansson (2002) are assuming to exist in the workplace, which means that a justification must be done in order to install a privacy invasive monitoring system. Persson and Hansson (2002) suggests that it is legitimate to monitor an employee when:
1. The intrusion is undertaken with one of the following three purposes:
   a. To ensure that the employee performs the tasks and fulfills the role responsibilities, owed to the employer, that are explicit or implicit in the contract of employment.
   b. To protect the employee’s own interests in matters for which the employer is morally responsible, and to do this with means that are also in the employee’s own interest.
   c. To protect a third party’s interests in matters for which the employer is morally responsible.
2. The intrusion is performed in a way that is an efficient means to achieve its purpose.
3. The intrusion is performed with the least intrusive means that are available to achieve its purpose.
4. The resulting intrusion into the employee’s privacy is not so severe as to outweigh the value of achieving its purpose.

Each of these four requisites will be discussed in the following. First, if the employer could be seen as morally responsible for the security of the employee, the intrusion of privacy could be partially legitimised by point 1b. This moral responsibility of the taxi company is intuitively plausible. However, the means (GPS) used to protect the employee must be in his interest. According to graph 14, 87.3% of the taxi drivers want GPS. This intuitively justifies an introduction of GPS in the taxis of those 87.3% of the taxi drivers. The remaining 12.7% of the taxi drivers do not want GPS because they consider the technology as privacy invasive or not security enhancing⁴⁰. In both of those cases an installation of GPS could not be legitimised by point 1b. In the former case the installation of GPS, although perceived as security enhancing, is not in the employee’s interest and could therefore not be legitimised. In the latter case the taxi driver does not think that GPS enhances security and it is therefore not in his interest to have it installed.

Second, it can be concluded that GPS is an efficient means to increase drivers’ security, since it provides the objective location of the driver. However, the system is not offering a complete security to the taxi driver. The major drawback is that the police cannot come to the taxi driver’s rescue instantly. Although GPS provides the taxi driver with fast aid, the taxi driver could be exposed to violence during the period it takes for the police to come to the taxi. This suggests that GPS should be complemented by another protection. One way to complement GPS would be to install a bulletproof wall between the front seats and the back seat, in order to avoid direct contact between driver and client. This would relieve the taxi driver from violence while alarming the police. However, this could be perceived as decreasing the possibilities of verbal contact, hence a good relation, between driver and client, which is an important part of taxi drivers’ work (and income).

Third, in order to know the location of a taxi in case of an occurrence, GPS implementation 1 and 4 are the least intrusive means to achieve its purpose, considering their efficiency. This is due to that the location of the taxi can only be retrieved by the police in the case of an occurrence. In the other two GPS implementations, both the police and the taxi company know the location. Since the location of the taxi driver is accessible by two parties and even constantly known to the taxi company, these implementations are more privacy invasive. Since the major companies in the Stockholm region use GPS to manage their fleets, the second or third GPS implementation is used. Those are not the least intrusive means; hence the installation of implementations 2 and 3 could not be legitimate. Although the majority of the taxi drivers participating in this study do not think that GPS, used to overview the fleet, is

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⁴⁰ As commented on in part 4.2.6, some of the taxi drivers do not want GPS since they could get stuck into an area where they do not want to be. The former behaviour of the taxi drivers, that is, stating locations other than the actual not to get more drives in the actual area, is questionable and could hardly be seen as fulfilling the role responsibilities owed to the employer. To these taxi drivers point 1a applies, that is, legitimising GPS to control the role responsibilities of the employee.
privacy invasive, this way of using the technology is not the least intrusive means of enhancing the taxi drivers’ security. Thus, the only implementations that could be legitimised is the first and the fourth.

Fourth, the results from the questionnaire show that the majority of the taxi drivers do not perceive of GPS as privacy invasive. In these cases it is reasonable to believe that it is legitimate to install GPS. This is due to the fact that the privacy invasiveness is less important to the taxi drivers than increased security. However, it is illegitimate to force the taxi drivers that do not want GPS, to have it installed in their taxis. If a taxi driver does not want GPS, and his taxi company still chooses to install GPS, there is often no way to avoid it, but to change company or to become an independent driver. Although this happen in the taxi business, it is not legitimate to present the taxi driver with such an ultimatum. If the taxi company does not force all taxi drivers to use GPS, the installation would be legitimate.

Returning to the issue about the legitimacy of having GPS switched on during breaks, what could a right based theory say about it? First of all, the privacy intrusion could not be considered as enhancing the taxi drivers’ security, since he seldom is in the taxi during breaks. Thus, point 1b does not apply in this case. It is also implausible to think that the intrusion is made in order to control that the taxi driver fulfills his role responsibilities, thus 1a falls as well. It is difficult to imagine who the third party could be if 1c is supposed to be the legitimating point, hence it is reasonable to assume that no one of the criteria in point 1 is applicable which implies that the intrusion is illegitimate.

The preceding discussion makes it reasonable to assume that only the first and the fourth implementations of GPS could be legitimised by Persson and Hansson’s rights based perspective, provided that it is in the employees’ interest.

### 6.4 Comments

The different results obtained from the consequentialist discussion and the right-based discussion depend on the nature of the theories. In a right-based theory, the legitimacy of one action is considered, focusing on important rights without considering the consequences. Consequentialist theories have been criticised because of the ‘unreasonable’ recommendations that sometimes stem from them. Right-based theories avoid this problem by assuming that there exist fundamental rights. The disadvantage of the right-based perspective is how to argue for the existence of such rights.

It is difficult to decide which theory provides the most reasonable recommendations. However, the fundamental advantage by using different ethical theories when analysing an issue is illuminating the issue from different perspectives. In this study, it is reasonable to assume that the consequentialist theory legitimised the installation while the right-based theory did not. In the case only one of these theories would have been used, it would have rendered the result: legitimate or not legitimate. By utilising the two theories it can be concluded that the issue is more complex than that.
7. Conclusions

The aim of this thesis has been to identify the consequences of installing GPS in taxis and to discuss whether such an installation can be ethically justified by utilising two different ethical theories. In part 3.5 it has been argued that GPS could be used for more efficient fleet management. For the taxi driver the identified consequences are the increase of security, the navigator service and the possible privacy invasiveness of the surveillance system. Since the taxi drivers are the stakeholder group that is most directly affected by GPS, an empirical study was made in order to find out how they perceive of the technology.

The empirical data show that taxi drivers in general are sympathetic towards GPS. However, 17.5% of the taxi drivers think that GPS is privacy invasive. Despite this, 67.6% of the taxi drivers who think that GPS is privacy invasive want the technology installed in their taxis. In the discussion in part 5.5.1, 5.5.2 and 6.1.2 it has been suggested that the only plausible overriding value to privacy is security. The conclusion could thus be that taxi drivers in general want GPS and that the majority of those who perceive of it as privacy invasive still want it due to its security enhancing effects. Departing from these consequences of the installation of GPS, the second part of the aim, i.e. whether an installation of GPS could be ethically justified or not was brought up.

The installation of GPS used today in taxis could be ethically justified from a consequentialist ethical theory but not from a right-based theory. From a consequentialist perspective GPS implementation 1 (i.e. GPS connected only to the alarm central), 3 (i.e. GPS with navigator connected to both alarm central and calling centre) and 4 (i.e. GPS with navigator connected to the alarm central) are the most beneficial. From a right-based ethical theory the first and the fourth implementations would be ethically justifiable. The implementations that are ethically justifiable according to both theories are thus the first and the fourth. At present the implementations that are used are the second (i.e. GPS connected to the alarm central and calling centre) and the third, which are the preferred implementations of the taxi company identified in part 6.1.1. This is probably due to the fact that the taxi companies stand for the installation costs of GPS, which means that they have the authority to decide on how to implement GPS.

In chapter 6 it has been shown that the different ethical theories in fact give different recommendations and this indicates that it is important to make the ethical analysis based on several different ethical theories, and afterwards analyse the arguments from the theories and make a decision about whether to install the technology or not. Since the discussion on privacy mainly has been focused around the consequentialist and right based theories this study has been made from those two perspectives.

The ethical analysis of GPS has shown that there are different ways to implement a new technology with different impacts on the stakeholder groups. It is important to analyse the different implementations before the installation in order to find out what implementation brings about the desired consequences. Certainly it is difficult to predict all possible consequences; nevertheless the ethical analysis is crucial for commencing a discussion based on rational arguments about the technology.

A comment has to be made on the discussion on overriding values. An important aspect discussing overriding values concerning surveillance is the party that stipulates the overriding value. In the workplace context it is important to investigate how the decision of the installation of the specific surveillance technology has been taken. Is it the employer that ‘supposes’ an increased security for the employees or is the installation a product of consent between the employer and the employees? Control over information seems to be an important
issue in the privacy discussion, and this makes it highly recommendable to inform and ask the employees how they perceive the technology and get their consent before installing it. This would be a way to involve the employees in the installation process.

Another important comment is that the taxi drivers with experience of GPS are more sympathetic towards GPS. This could possibly indicate a fear of the unknown, or at least that the expected effects of technologies sometimes do not correspond with the real effects. If this is a common phenomenon, a good way to introduce new technologies would be to let the people, who are potentially affected by the technologies, try them out before they are definitively installed. This may sound like an overly optimistic argument. The installation costs are often significant and the removal of an installed system seems implausible. However, although this might not happen, it is nevertheless a thought that could render interesting feedback from the people who are potentially affected by the technology in addition to hopefully make decision-makers more aware of people’s opinion.

It can be concluded that GPS is a great step forward as a means of increasing taxi drivers’ security. When the stakeholders were identified in part 3.5, it was suggested that the major drawback of the technology, i.e. its privacy invasiveness, impacts on the taxi drivers. However, discussing surveillance cameras in taxis would render a different result. Surveillance cameras are another means of increasing security for the taxi drivers, but the most affected group in that case are the clients. This is probably what has given rise to the intense discussion about whether to install it or not. This indicates, as mentioned above, the importance of identifying relevant stakeholders in order to understand why some issues are ‘hot’ and others not.

In addition to the two mentioned technologies, bullet-proof walls have also been briefly commented on in the study. GPS was installed in order to increase taxi drivers’ security but the technology also benefits the taxi company economically. The surveillance cameras seem to have no positive economical benefits to the taxi company, but after considering the issue the taxi company could in fact use the technology to identify people who vandalise taxis. In contrast, bullet-proof walls seem to benefit the taxi drivers only. If the taxi drivers would want bullet-proof walls in their taxis, would the company install them, although this does not lead to any economic benefits? Is it possible that taxi companies only promotes the well-being of their employees when it is economically beneficial?

It is certainly important to analyse different means of attaining an end. GPS, surveillance cameras and bullet-proof walls are all means to increase security but in different ways and with different levels of efficiency. Since the security that is affected is that of the taxi drivers it seems reasonable that they could decide or at least be a part of the discussion about which means to install.

Finally, an interesting point, which has to be commented on surveillance, is that after time people tend to perceive of it as an ordinary part of their lives. Nowadays, few think about the constant camera surveillance in shops, nevertheless the new installation of surveillance cameras in taxis is a hot issue. If many taxi companies get permission to install cameras, the phenomenon will probably be seen as perfectly normal in a number of years. One of the taxi drivers commented on the installation of GPS and cameras in taxis as the continuation of a process that is unstoppable. He said: “If there are cameras in taxis, then we could install them in places x, y and z to”. Could he be right in his observation? Are we heading towards a society with ubiquitous camera surveillance? Is the death of privacy approaching?
8. Ideas for further research

• **Cameras in taxis: Driver’s security vs. client’s privacy**

It would be interesting to make a similar study on surveillance cameras in taxis. It is necessary to investigate both what taxi drivers and client expect of surveillance cameras in taxis and possibly compare these expectations to the ‘real’ effects of the technology after the introduction. A fundamental difference between surveillance cameras and GPS implementations 2 and 3 is that the video snapshots are only accessible to the police in the case of an occurrence. This could be seen as less privacy invasive than the constant revealing of the snapshots. However, it is plausible that photos are more privacy invasive than the location of a person. As was commented on in part 3.5.3 with surveillance cameras in taxis it is no longer possible to be anonymous, and since taxi companies that have been granted the permission to install surveillance cameras already have GPS installed, the location and the identity of the person will be stored.

• **Cultural differences in privacy claims**

Another interesting research issue could be that of cultural differences in privacy claims. Since a substantial part of the taxi drivers in the Stockholm region are immigrants, it would be interesting to see if there are any substantial differences between in privacy claims of people from different cultures.

• **Enhancing underground hosts’ security with a location based surveillance system**

The number of cases of violence towards hosts of Connex (the company that is running Stockholm’s underground) is increasing rapidly. Although hosts could use their mobile phones to get assistance in case of an occurrence, this system is not always fast and reliable. A location based surveillance system would fulfil the requirements on maximum delay and location accuracy. These hosts are not stationary situated but are constantly displacing themselves which implies that a location based security system would be beneficial to them. The issue would be interesting to investigate. It would preferably be done by asking the hosts what they would think about such a system, considering security and privacy. The study would also have to address questions about the possibility of implementing a location-based system in the underground, in terms of coverage and installation costs.

• **Other applications of GPS**

There are other companies that are using GPS, e.g. trucks, delivery companies. In order to investigate if there are any differences in privacy claims, between taxi drivers and the drivers of trucking or delivery companies, an investigation should be made. When investigating these issues, it is important to consider the discrepancies from the taxi
business. In delivery companies GPS is installed in order to manage the fleet efficiently and deliver more rapidly. In trucks GPS is installed both for an efficient management of the fleet and the security of driver and load.

• **A similar investigation in other parts of Sweden**

The present study focuses only on the Stockholm region. It would be interesting to investigate how taxi drivers in different parts of Sweden perceive the issue of installing GPS. The navigator function could be valuable in Stockholm, but maybe the assistance in smaller cities is not as valuable to the taxi driver.
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