Ethical challenges of a product-service system within the field of personal monitoring design

Matthijs Teun Hoogendoorn
Department of Product Design
Norwegian University of Science and Technology

ABSTRACT

Today's digital age enables increasingly more and quicker innovations. Concepts quickly reach the market without a chance for legislation to catch up. This occurrence can create a friction in which the ethical standards of share- and stakeholders play a big role. An interesting area to discuss this phenomenon is personal monitoring design, where user information can be crucial. This paper is set out to investigate the impact of ethics within this design field. Based on a currently trending innovation a system of stakeholders is identified. The paper sets focus on the ethical aspect of responsibility in relation to privacy. Using a literature review the aspect is explained. Also, a comparison between the current situation and the user perceived situation is drawn. From this comparison a possible outlook for the future of the product-service system is given. The goal of this paper is to help share- and stakeholders cope with the ethical friction which can occur during design innovations.

KEYWORDS: personal monitoring design, ethics in design, information privacy, autonomy of the user

1. INTRODUCTION

Society in which we live today has been so thoroughly influenced by information systems that the present time is referred to as the information age. As a result, the possibilities in the collecting and processing of data are greater than ever.

An information system can be described as an organized arrangement of any form, which interacts to support and improve day-to-day operations, problem solving and decision making of its users [1]. These information systems contain significant information about people, places or things which can be considered important for the systems organization or surrounding.

Considering the fact that, according to Polack [3], people over time get more experienced with technology due to the amount and scope of the information available on the internet; ensuring the security and privacy of persons connected to these information systems has become areas of significant concern. With legislation trying, but not always succeeding, to keep up with the ever rapid innovations, interesting questions and challenges occur. A component of information systems which has experienced a lot of these innovations over the last decade are the personal monitoring systems.

Personal monitoring, also known as self-tracking, is defined as 'the regular collection of data that can be measured about the self, such as biological, physical, behavioural or environmental information' [4]. Goal of this data collection is to let the user gain more self-knowledge and hereby optimise their behaviour and lifestyle.

The idea of personal monitoring is a phenomenon of all times, with humans listening to their body and act according to its messages. Aid of (electronic) devices in this data collection process was first introduced in the 1970's [5]. In 1981 wearable heart rate monitors became available for athletes [6]. The first self-tracking devices targeted at consumers were introduced in the early 2000's,

however focusing mostly on the users physical health. With the further come up of certain devices in the following years, groups of people with an interest in behavioural information started growing, with most notable the so called 'Quantified-Self' movement [7].

An industry in which this audience is clearly targeted is the automotive industry. As newly developed cars become more technologically advanced, they slowly turn into driving computers, gathering a vast amount of information about not only the car, but also the user. Goal of this information system is to inform both the driver and manufacturer about the state of the car and the user's behaviour within the car's environment. In this situation however, the information is gathered and shared only with the user and car manufacturer. In order to enable other stakeholders in the user's behaviour to have access to certain information, or access this information for older cars; a relatively new tool is developed, being the car dongle. A dongle is a small electronic device that plugs into a different information system and 1) provides additional functionality, or 2) gathers information. In the case of the car dongle its functionalities cover the latter, collecting and forwarding information through the car its OBD (On Board Diagnostics) port. The forwarded information contains among other data, the distance driven by the car, the location of the car and the behaviour of the driver (throttle usage, cornering etc.) This information can be considered both interesting for the user as for third parties. The distribution of this information creates friction in the socio-political area. With legislation not always up to date, third parties are able to exploit this information for their advantage, without necessarily informing the user about this.

2. ANALYSIS

Laudon and Laudon [2] describe ethics as the principle of right and wrong that an individual uses to make choices concerning their behaviour. Furthermore, ethics involves the leading of morally accepted guidelines of behaviour. Related to information systems the ethics of corporate responsibility in both data collection and technology innovation can be seen as crucial. Companies may handle vast amount of sensitive data and should ensure their related proceedings are morally justified. Within information systems Olumoye [8] describes three main ethical-bound concerns, of which information privacy is the biggest challenge within the before described system. This article will mainly deal with regulations between information privacy and corporate responsibility.

Information privacy concerns the collection and spreading of certain data and the legal and political issues associated. The predetermined system contains vast amounts of data, with uncertainty for the user about the amount of stored information and who is able to access it. In order to perform an ethical analysis, a case concerning an insurance company that offers the dongle is used.

Corporate responsibility concerns the activities a company is morally obliged to fulfil towards other stakeholders [9]. Often, a big part of this responsibility is defined by legislation, with consequences such as the losing of licensing. Within the predetermined system, the authorities have not yet been able to catch up with the innovations, leaving more responsibility to the company itself.

The insurance company offers the product as an addition to their regular insurance. By using the dongle, users can save on their insurance fee, when they follow the correct behaviour. Users can view the gathered information through an app and hence influence their behaviour. Each quarter of a year the insurance company calculates ones fee based on the shown behaviour. When this behaviour is perceived as being correct, the user saves on their following monthly fees. When the behavioural standard is not met, the user pays a predetermined fee plus an additional fee. Information gathered by the company is stated as being solely used for fee determination. However, when fraudulent activities are suspected, the data is used for further research. The company also states that the information will not be given to other parties, with exclusion of being required by authorities. However, this statement is questionable, since

comparable services have made similar statements and ended up not conforming [10]. In order to create a sufficient stakeholder system, the step process as described by Olumoye [8] will be used.

2.1. Identification of participants

At first glance it seems that only two parties within this system are involved, being the user and the insurance company. With the user both using and benefitting (a lower fee) the product, it can be identified as a stakeholder. Naturally, the provider of the product, the insurance company, can also be seen as a stakeholder, benefitting from the information provided by the product. A third stakeholder are the authorities, which can benefit from the information. To obtain this information however, a court order is necessary. With legislation still not up to date the possibility occurs that this situation will change in the (nearby) future. For this reason the decision is made to include the authorities in this system. A fourth stakeholder within the system is the producer of the dongle. They are crucial in determining the possibilities of the dongle and benefit usage of the device. Third parties are not yet included as a stakeholder within this system, since there is no concrete proof for their suspected involvement. The created stakeholder system is presented in Figure 1.

2.2. Identification of higher-order values

All of the different groups within the system can be identified through the theory of American social psychologist and cross-cultural researcher Schwartz [11]. This theory tries to measure ten universal, motivationally different values. Through these values, human values can then be categorised in four different higher order groups, being the following:

1. *Openness to change group*
   Persons are independent in thought and action and are risk-taking in relation to challenges
2. *Self-enhancement group*
   Persons main motivations relate to a better wellbeing for themselves. Aspects such as power and control of oneself are crucial.
3. *Conservation group*
   Persons are risk-avert, conservation of the status quo is of uttermost importance.
4. *Self-transcendence group*
   Persons are mostly focused on enhancing the wellbeing of the system. Aspects such as understanding and tolerance are crucial

The user group can be identified as pursuing a 'Self-Enhancement'-value, aiming to get more control over their insurance fee and being rewarded for good behaviour. The insurance
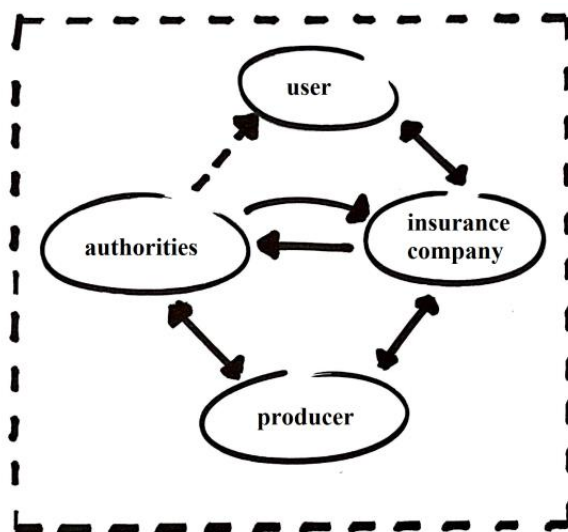

Figure 1: The identified stakeholder system

company can be seen as pursuing a more 'Conservation' higher order value. By providing the product it offers the company the opportunity to be more in control, ensuring conformity from its users.

The authorities can be seen as pursuing a more 'Self-transcendence' higher order value, with their aim of social justice and equality. The producer can be identified as pursuing a 'Conservation' higher order value, the current system is beneficial and hence conservation is important.

These different values create friction between the different parties, with both the user group and the insurance company wanting for more control and the authorities pursuing a more balanced relation.

2.3. Responsibility of stakeholders

Each stakeholder within the system has different responsibilities towards the other parties. These different relations are discussed below:

User
The user's main responsibility in relation to the insurance company is to perform morally correct behaviour whilst using the device.

Insurance company
The insurance company has different responsibilities to different parties. The responsibility towards the user concerns the protection of data, conserving the information privacy of individuals. Another responsibility towards the user is the fact that the device is only used as agreed upon by both parties. Responsibility towards the authorities concerns two aspects. First, the company must provide the obtained user information when obligated. The second aspect involves the fact that the data storage has to comply to set legislation by the authorities. Responsibility towards the producer concerns the fact whether the device will be used as intended.

Authorities
The authorities' responsibility towards the insurance company concerns the fact that the requests for information are substantiated.

Responsibility towards the user is to ensure that the insurance company's focus is solely on legitimate actions.

Producer
The producers' responsibility towards the authorities concerns the fact that the product abides by the set legislation. Responsibility towards the insurance company concerns the correct functioning of the device, in order to provide a solid foundation for decisions towards user and authorities.

2.4. Dilemmas

The system above provides several dilemmas for different parties. For example, users want to minimize their insurance fee, which interferes with the morally correct behaviour of being honest towards the company. The insurance company on the other hand wants to maximize their profit, but is morally obliged to secure their users information, which limits their opportunities for different incomes. Authorities pursue to maintain equality through the system, whilst not limiting the autonomy of parties. Producers want to succeed demands of the insurance company, without interfering with legislation.

The system offers a lot of questions and challenges that relate to ethical theory. The challenges which are identified as the biggest are included for further research.

For the user group, identified as the '*self-enhancement*' group, the biggest ethical challenge is to leave control to the insurance company in terms of driving behaviour.

For the authorities, identified as the '*self-transcendence*' group, the biggest ethical challenge is to adequately interfere within the system.

For the insurance company, identified as a '*conservation*' group, the biggest ethical challenge is to apply changes to the current system.

All these dilemmas in different ways connect to one overarching dilemma concerning the relation between the information privacy of the user and the companies' responsibility.

3. METHODS

Goal is to enable a substantiated comparison between the situation described above and the manner in which the situation is perceived by the user. Focus will be on whether possible users realise the roles and consequences within the system. To obtain this information, qualitative interviews related to an exemplary scenario are conducted. The decision for qualitative interviews is based upon the nature of the problem and the fact that an attitude towards an ethical problem can be hard to translate to quantitative data

3.1. Procedure

The study population comprises all Dutch persons who are in the possession of a valid driver license. Because of the large magnitude of this population, a sample will be selected for interviews. This sample will consist of Dutch persons within the age-range 18 to 60, the general driving population in the Netherlands. Because of the time-intensive nature of interviews and the fact that qualitative data will be used, the sample group does not have to be large for a satisfactory and realistic result. The sample will consist of eight to ten respondents. The respondents will be contacted with the aid of telephone and email. Preferably the interviews will be conducted through a real-time connection, but written responses will also be used.

First, consent will be sought, subsequently the interview will be conducted. The interview will be conducted by the executer, enabling the advantage of probing questions. The responses of the interviews will be summarized, first per person and if applicable per sub-group within the sample. The (if applicable) summarized interview responses will then be used for further analysis.

The interview will consist of two parts. At first a scenario will be presented in which the exemplary scenario is presented. The function of each stakeholder is then explained, however caution is taken in the extent of explanation to ensure an honest answer from the respondent. The second part consists of asking questions regarding the roles of the stakeholders.

4. PROJECT CASE

Although the sample consisted of some variety, limited to the definition of the sample population, general consensus was met between all of the conducted interviews. An example is the fact that all the interviewees thought they had the most control over their information, for the reason that most of them identified as the owner of this collected data. Furthermore, the interviewees stated that they would trust the insurance company with the collection of data, as long as activities agree with legislation. Contrasting to this however, they were cautious towards the increase of interference possibilities for the government. Although the comments towards the system, all interviewees still remained positive towards the product, stating that they would use it because of the possible savings it can deliver.

What should be mentioned is, although the fact that the different stakeholders' roles were explained in the scenario, the capacity and extent of these roles appeared to remain unclear to these potential users.

Further information regarding the interviews can be found in the related project.

5. COMPARISON

Overall it might be difficult to compare the current situation as described above with the situation perceived and idealized by the user. Although all users might answer questions identically, this does not mean that they perceive the system as a whole in the same way. Also, although the interviewees were familiar with the product system, none of them was actually using it. Furthermore the qualitative nature of the interview makes it difficult and speculative to perform a present firm conclusions. However, when comparing the status quo with an interview resume, some differences occur.

First of all, there is a clear difference in perceived ownership of the obtained

information. In the status quo the insurance company is the one who collects and owns the information, presenting data to the user and using it for fee analysis. However, when presented with the situation the majority of the interviewees perceived themselves as being the owner of information. This difference leads to two complications: *The transparency of the system* and *the roles of stakeholders.*

A second difference that occurred is the fact that the interviewees preferred a system in which more legislation for the insurance company is applied, increasing monitoring possibilities for authorities. However they were hesitant towards the sharing of information with authorities, wanting to maintain as much privacy as possible. This difference also relates to the before stated complication concerning the roles of stakeholders.

6. OUTLOOK

Although the interviewees stated that they would be interested to use the product-service system in its current form, changes might be necessary to maintain this positive and competitive situation. Although the system does not has a lot of authority interference in its current form, comparable cases [12] tell us that changes in legislation will inevitably occur. For this reason, a change in roles would be applicable. Besides this change being compelled by a statuary force, thus being lawful and with according sanctions, economically motivated, a change in roles would also improve the ethical stature of the company. By a change in roles, users could become more familiar with the system, decreasing the transparency issue the status quo presents. Furthermore, a difference in roles, especially one in which the users gain more influence over their information, would help in possibly creating a more trustworthy image for the insurance company, which could then influence its economical position.

Overall an immediate change in roles for the insurance company, users and authorities would not be necessary, however in the long-term it would be inevitable for all parties.

REFERENCES

[1] Whitten, J. L., Bently, L. D., & Dittman, K. (2001). Systems Analysis and Design Methods. In *Systems Analysis and Design Methods* (pp. 8-45). New York: McGraw-Hill.

[2] Laudon, K. C., & Laudon, J. (2012). *Ethical and Social Issues in Information Systems.*

[3] Polack, T. A. (2006). Ethical and Legal Issues for the Information System Professional. *ASCUE Conference.* Pittsburgh: School of Business Administration.

[4] Swan, M. (2009). Emerging Patient-Driven Health Care Models: An Examination of Health Social Networks, Consumer Personalized Medicine and Quantified Self-Tracking. *International journal of environmental research and public health*, 492-525.

[5] Riphagen, M., van Hout, M., Krijnen, D., & Gootjes, G. (2013). *Learning tomorrow: Visualising student and staff's daily activities and reflect on it.* Amsterdam: AUAS.

[6] Polar. (2006, November 7). *Olympic Medical Institute Validates Polar RS800 Running Computer And Training System*. Retrieved from Polar: https://www.polar.com/us-en/about_polar/news/polar_RS800

[7] Ferris, T. (2013, 03 04). *The First-Ever Quantified Self Notes (Plus: LSD as cognitive enhancer)*. Retrieved from Four Hour Workweek: http://fourhourworkweek.com/2013/04/03/the-first-ever-quantified-self-notes-plus-lsd-as-cognitive-enhancer/

[8] Olumoye, M. Y. (2013). Ethics and Social Impact of Information Systems in Our Society: Analysis and Recommendations. *Internation Journal of Science and Research*, 154-158.

[9] Jones, T. M. (1980, Spring). Corporate Social Responsibility Revisited, Redefined. *California Management Review*, 59-67.

[10] Verlaan, D. (2016, June 16). *Zorgen om privacy: in alle grote steden word je via je telefoon gevolgd.* Retrieved from RTL Z: http://www.rtlz.nl/tech/zorgen-om-privacy-alle-grote-steden-word-je-je-telefoon-gevolgd

[11] Schwartz, S. H. (1992). Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries. *Advances in Experimental Psychology*, 1-65.

[12] Privacy First. (2016, October 21). *Nieuwe megazaak dreigt tegen wetsvoorstel ANPR*. Retrieved from Privacy First - eigen keuzes in een vrije omgeving: https://www.privacyfirst.nl/rechtszaken-1/item/1046-nieuwe-megazaak-dreigt-tegen-wetsvoorstel-anpr.html