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A Survey on Trust and Privacy Negotiability in the Norwegian Mobile Telecom Market

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Abstract

We investigate, by method of statistical survey, people's attitudes toward privacy, trust and personal information sharing in the context of price discrimination effects in the mobile telecom market, by asking a selection of 546 individuals, a sample size that is sufficient to be representative for the Norwegian mobile market of consumers. Common wisdom tells that people value their privacy, but not much facts have been collected about *how much* people value privacy, say, as consumers of specific services in the mobile market. Moreover, it is reasonable to expect that individuals will differ in their negotiability of personal information vs price of service. In this study, we measure a strong privacy negotiability correlated to age and income, thus confirming common intuition about this. We find that technically assuring anonymity of service will significantly affect and facilitate the user's willingness to release personal information to the service provider, in particular with respect to information about specific buying preferences and frequent travel destinations. Somewhat surprising, a practice of targeted advertisement in exchange for lower mobile service price is acceptable to about half the population.

Keywords: Mobile telecom, privacy, trust, survey, price discrimination, negotiability, privacy-protecting technology.

1 Introduction

Background

This paper reports on a survey aimed at mapping people's attitudes about privacy and personal information in the context of the mobile telecom market. The inspiration for this inquiry stems from the thesis of Odlyzko [5]: the counteraction between price discrimination in the market and privacy laws. Our survey investigated the Norwegian mobile telecom market and is based on 546 respondents.

Table 1 shows the total number of mobile phone subscriptions per December 31 in the years 1997 through 2004. The Norwegian population in 1.1.2006 was

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Year	1997	1998	1999	2000	2001	2002	2003	2004
Subscr.	1676 763	2106 414	2744 793	3339 936	3766 431	3911 136	4163 381	4716 090

Table 1

The number of mobile phone subscriptions as of December 31 from 1997 to 2004. (Source: Norwegian Post and Telecommunications Authority)

4,640,219, so currently there are more mobile phone subscriptions than people in Norway.

Crucial to the ability to perform price discrimination is the available technical means to group and identify customers, and monitor and analyze request and purchase behavior in order to optimize the correct pricing. The general developments of effectiveness in information and communication technology are very much supporting this ability. The longer term questions which may be raised are in which domains these mechanisms are located in the systems, at the user terminal, in the protocols or part of the networked servers. These are important engineering questions in itself, but answers to these questions may also contribute to our understanding of why most of the many ingenious academic proposals for privacy-protecting ICT systems have not been put into practice, for instance digital cash and pseudonymous transactions.

Special price for you

Price discrimination is an economic term for describing that a seller offers the same (or almost the same) product or service at a price dependent on some characteristics, or negotiation with, the buyer. Commonly agreed economic understanding states that this has advantages both for seller and buyer [5]. A direct implication of this thinking is that the seller needs to acquire information about the *prospective* buyer in order to distinguish customers and set the optimal price. Hence, the rational seller will drive to use efficient methods of collection and access to personal data that can be used to distinguish the buyers.

On the other side, this force is counteracted to some extent by the society's construction of regulations and legislation of personal data protection in the business sector. Some will take the position that this can be seen as a particular example of the free vs. regulated market contention, where the good is 'personal information' [4]. In the Norwegian jurisdiction, the laws putting restrictions on personal information are; "Personopplysningsloven", directly based on EU's Directive 95/46/EC, on the collection and processing of personal data; "Markedsføringsloven" (Marketing law) on the commercial usage of personal data; and the "Ekonom" law that specifically rules the telecom industry and market.

To gain insight into this phenomenon by exploring empirical evidence, we ventured to ask a representative selection of the customer population in the mobile communications market in Norway about their attitude toward release personal information in exchange for some advantage, such as a reduced subscription price, what is perceived as common practice for acquiring and use of personal information within the legal regulations, and how is the collected personal information actually

exploited in the strategy and marketing of the companies. Is the effective market of telecommunication undermined by the Norwegian and EU legal regulations of privacy? Conversely, is it so that price discrimination of telecom products and services represent a major threat to the privacy of consumers? If so, does there exist means of information structure and technology organization, such as anonymous and aggregated statistical data, that may satisfy both ends?

Related work

In unpublished work by Wathieu and Friedman (2005) not yet available to us but referred to in [2]; they suggest that privacy concerns are sensitive to indirect consequences of information transmission. In particular, they argue that personal information may not have intrinsic value, and the flow of personal information may not be the key privacy concern. Rather, it is the concern about information use that affects consumer behavior. Their argument was supported in an experiment that involved 647 subjects from a U.S. business school research pool.

Hui [2] reviews some empirical studies that have been carried out recently. An online survey of U.S. 381 respondents in 1998 found that 58% would report income, investments, and investment goals to obtain customized advice, but only 35% would also reveal their name and address. The Pew Internet and American Life Project found in 2000 that among 1017 American Internet users, 54% would provide personal information in order to use a web site, whereas 27% would never provide personal information to web sites. A survey of 1200 respondents, aged 18 years and up, and used Internet from home, showed that most who did not accept a web site's data collection policy would nevertheless disclose their real name and email address if they valued the web site. This survey was carried out by University of Pennsylvania in 2003. Ref. [2] also refers to an online survey with 415 respondents carried out by Earp and Baumer in 2003. One of 30 web pages of well or lesser known retail, medicalhealth, and financial sites was randomly chosen and shown to each respondent. Respondents were most willing to reveal gender and age, and least willing to reveal their social security numbers. They were significantly less willing to provide personally identifiable data (phone number, home address, email address, social security number, credit card number) to lesser known than well-known web sites.

2 Method

The empirical methodology used in our study is a cross-sectional (tverrsnittsunnersøkelse) survey with anonymous questionnaires, based on the recommendations in [7]. The inquiry instrument of questionnaires requires much less resources than interviews. A large part of the survey was easily set up and automated by an existing web server application at the university [3]. This mode of data collection is advantageous because it sets no restrictions on geography, time of day, or availability of the survey conductor, and the raw data is recorded in a structured digital format.

A stratified selection approach with randomization was used to get a representative population, by using several source situations. The invitation to take part in the survey included the use of e-mail distribution lists. Moreover, paper questionnaires handed out and collected by the conductors were also used to avoid potential skewed representation of groups of users. This included paper based questionnaire handed out and collected in the shopping street of Trondheim, at Secondary Schools (Videregående skole), and employees at two industrial companies.

The survey acquisition period was about one month in the spring of 2004, resulting in a total of 546 respondents. A size of 500 to 1500 individuals is normally considered sufficient for Norwegian market research.

The survey aimed at collecting individual information about:

- (i) The standard demographic variables of age, gender, and income level.
- (ii) The level of mobile phone usage and spending.
- (iii) The appreciations and apprehensions related to privacy, price and trust in mobile operators and public authorities.
- (iv) The awareness of privacy legislation and rights with respect to personal information processing by organizations.
- (v) Identify the types of personal information that are useful in price discrimination, and measure how willing users are to release personal information in return for mobile operator services.

The identification and selection of interesting variables for price discrimination to be put in the questionnaire resulted from interviews with marketing specialist in two large Norwegian mobile operators Telenor and Netcom, and from findings in a forerunner project [1].

The exact phrasing of the questionnaire questions is of course of utter importance to the respondents correct and non-ambiguous understanding. A preliminary questionnaire was made and tested on about ten students at our university, in order to provide feedback and advice on the interpretation and response of the question formulation. Some questions are measured with nominals (e.g. Yes/No), others with a range of ordinals (e.g. on a scale from 1 to 5).

It seemed interesting to probe for a difference in the reluctance to release personal data *in name* (anonymous) as opposed to anonymous. Intuitively, the privacy negotiability is probably dependent on this. The idea was that this could make it interesting to price discriminate anonymously, like child/adult bus ticket.

The questionnaire is in Norwegian, but an English translation can be found in the appendix. It contains 19 variables.

3 Survey Results

The survey population comprised 546 individuals, where 55% were male and 45% female. 39% were under 18 years of age, 41% were between 18 and 30 years. 8% spent over one hour per day by mobile phone calls, and 70% used the mobile phone

Type of data	Willingness to release personal data		
	<i>Nonymous</i>	<i>Anonymous</i>	<i>Increase</i>
Age	91,9	95,8	3,9
Email address	50,0	51,5	1,5
Interests	67,0	80,0	13,0
Marital status	57,7	76,7	19,0
Education	63,0	82,2	19,8
Occupation	51,5	67,8	16,3
Travel destinations	50,0	72,3	22,3
Shopping preferences	26,7	59,2	32,5
Income	22,3	50,5	28,2
Children	36,3	57,7	21,4

Table 2

The percentage of the population willing to release personal data to a mobile operator, either in full name or anonymously.

Income(kNOK)	Degree of acceptance					Total
	<i>Negligible</i>	<i>Little</i>	<i>Medium</i>	<i>Much</i>	<i>Very Much</i>	
< 50	3	6	20	64	81	174
50 – 100	6	9	15	45	60	135
100 – 300	25	9	22	31	24	111
300 – 500	18	31	4	27	3	83
> 500	21	9	10	3		43
<i>Total</i>	73	64	71	170	168	546

Table 3

Response to the question: Mobile operators collect personal information in order to offer users and groups of users more specialized services: To which degree do you accept that they get access to this kind of personal information if you will pay less for your mobile phone usage?

Level of use	Degree of acceptance					Total
	<i>Negligible</i>	<i>Little</i>	<i>Medium</i>	<i>Much</i>	<i>Very Much</i>	
> 1 hour/day	5	6	4	17	10	42
> 1 call/day	50	69	111	126	27	383
Daily	6	22	29	9	3	69
2 – 5calls/week	9	18	10	0	0	37
Seldom	3	8	3	1	0	15
<i>Total</i>	73	123	157	153	40	546

Table 4

Response to the question: Mobile operators collect personal information in order to offer users and groups of users more specialized services: To which degree do you accept that they get access to this kind of personal information about you if you get a service menu and subscription adapted to your needs?

several times per day, whereas the rest used it more seldom.

More details on correlation and hypothesis testing results on the survey data can be found in [8]. The essential tallies from the survey are given here.

Table 2 shows the percentage of the population that is willing to give specific data to mobile operators. Significantly more people are willing to state personal data anonymously than nonymously.

Table 3 relates the figures between level of yearly income and the willingness to release personal information listed in Table 2 in exchange for a lower service cost.

Table 4 relates the figures between level of mobile phone usage and the willingness to release personal information listed in Table 2 in exchange for personalized

service.

4 Discussion and Inferences

We wanted to investigate the privacy negotiability of consumers in the mobile telecom market in Norway. By the term *privacy negotiability* we mean a person's willingness to release information about himself or herself in exchange for some service or good. Here is a short list of the findings:

Privacy negotiability. Overall, there is a strong privacy negotiability with respect to mobile telecom services in the population.

Age and income. There is a strong (negative) correlation between income and privacy negotiability. The younger earn less and are most willing to exchange personal data in exchange for lower mobile service price. This is according to intuition.

Anonymity. Anonymity facilitates the user's privacy negotiability in general, this effect is strongest with respect to information about buying and travel destination preferences, and income level.

Privacy legislation. The awareness and knowledge of the Norwegian privacy legislation and the individual's inspection rights on service provider's databases are weak.

Targeted ads. Targeted advertisement ("mobile push") in exchange for lower mobile service price is acceptable to about half the population, also here the tendency is strongly correlated with income level and age.

Personalized service. The negotiability of personal data and call statistics in exchange for quality of service is strongest for the big mobile service spenders.

Future work

It seems interesting to try to validate our findings by setting up a more realistic behavioural experiment with respondents rather than just answering a questionnaire without explicit incentives, so we have worked out an experimental set up for this. Moreover, it seems interesting to investigate similar variables in other markets, such as the Internet Service Providers and Web Commerce, to make a comparative study.

Acknowledgement

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A The Questionnaire

Introduction.

Do you have 5 minutes to answer some questions about mobile telephony and privacy? [...half a page of introduction text left out here.]

Questions.

- (i) To which degree do you think about which personal data you give to your mobile operator in establishing the customer relationship? (scale 1-5)
- (ii) To which degree do you think about which rights you give your mobile operator (logging of calls, duration etc) when establishing the customer relationship? (scale 1-5)
- (iii) Mobile operators collect information about you in market surveys, offers, etc. To which degree do you think about which personal data you give your mobile company in this respect? (scale 1-5)
- (iv) The law gives you rights with respect to a company’s processing, use and storage of your personal data. How well do you know the following rights? (scale 1-5)
 - (a) The right to revoke your consent about using your personal data.
 - (b) The right to be informed about how the company is using your personal data.
 - (c) The right to inspect the personal data stored about you.
- (v) Are you willing to receive commercial ads to your mobile phone if you get:(scale: yes, indifferent, no)
 - (a) Gratis SMS service.
 - (b) Gratis MMS service.
 - (c) Gratis call time.
- (vi) How willing are you to let mobile operators use information about you in their generation of product offering and marketing if you get: (scale 1-5)
 - (a) A more adapted subscription and service menu.
 - (b) Lower service charge.
- (vii) Mobile operators collect personal information in order to offer users and groups of users more specialized services: (scale 1-5)
 - (a) To which degree do you accept that they get access to this kind of personal information about you?
 - (b) To which degree do you accept that they get access to this kind of personal information about you if you get a service menu and subscription adapted to your needs?
 - (c) To which degree do you accept that they get access to this kind of personal information if you will pay less for your mobile phone usage?

- (viii) Which personal data, not already provided to mobile operator, are you willing to release in return for 'tailormade' services and prices for you? (scale yes, no)
- (a) Age
 - (b) E-mail address
 - (c) Hobbies and interests
 - (d) Marital status
 - (e) Education
 - (f) Position
 - (g) Travel destinations (business and leisure)
 - (h) Shopping practice
 - (i) Income
 - (j) Number of children
- (ix) New technology makes it possible for mobile operators to know your whereabouts by signalling from your mobile phone. (scale 1-5)
- (a) To which degree do you agree that mobile operators inspect such information?
 - (b) To which degree do you consent that mobile operators can use this type of information about you in developing and marketing services?
 - (c) To which degree do you consent that the authorities can inspect this information for criminal investigations?
- (x) All information you have provided to your mobile operator can be revoked, if you so wish. To which degree are you willing to release more personal data if the mobile operator told you about this right, in comparison to be ignorant about this? (scale 1-5)
- (xi) To which degree do you trust that your mobile operator will not use the personal data for other purposes than intended? (scale 1-5)
- (xii) To which degree do you trust that the authorities are able to detect misuse of personal data you have given your mobile operator? (scale 1-5)
- (xiii) To which degree do you trust that the authorities have the capability to stop such misuse by mobile operators? (scale 1-5)
- (xiv) If you can give personal data anonymously, so that they cannot be directly linked to you, which information would you then be willing to release to your mobile operator? (scale yes, no)
- (a) Age
 - (b) E-mail address
 - (c) Hobbies and interests
 - (d) Marital status
 - (e) Education
 - (f) Position
 - (g) Travel destinations (business and leisure)
 - (h) Shopping practice
 - (i) Income
 - (j) Number of children
- (xv) How often do you use your mobile phone? (scale: > 1 hour, > 1 call/day, 1 call/day, 2-5 calls/week, seldom, never)
- (xvi) Gender
- (xvii) Age (scale: < 18, 18 – 30, > 30)
- (xviii) Income (scale in kNOK: < 50, 50 – 100, 100 – 300, 300 – 500, > 500)