ACIS 2016 Proceedings | Australasian (ACIS)

2016

Who's in to Win?: Participation Rate in a Primary Personal Information Market

Ross Farrelly
Datamilk, rfarrelly@datamilk.com

Eng Chew
UTS, Eng.Chew@uts.edu.au

Who's in to Win?: Participation Rate in a Primary Personal Information Market

Ross Farrelly
School of Systems, Management and Leadership
University of Technology Sydney
Sydney, Australia
Email: ross.w.farrelly@student.uts.edu.au

Eng Chew
School of Systems, Management and Leadership
University of Technology Sydney
Sydney, Australia
Email: eng.chew@uts.edu.au

Abstract

Understanding individuals' willingness to share their personal data with companies is an important theme in social media research. Yet there is a dearth of research into the issue of granting access to social media data in exchange for financial compensation. Currently there is no readily available means by which individuals can reap a financial benefit by selling their personally generated data. One solution which could address this is a permissions-based Primary Personal Information Market (PPIM). This paper investigates the willingness of digital citizens to grant access to their social media data in exchange for financial compensation. We simulated requests to access personal information and found that the 90% confidence interval for the proportion of digital citizens who accepted one or more request was [79.8%, 91.3%] with a sample estimate of 86.5%. We found significant factors in this decision were, age, ethnic background, price offered, contact channel, use and company type.

Keywords Social Media, Personal Information Markets, Information Systems

1 Introduction

The widespread adoption of Social Media changed the way personal information is generated, stored and used (Rawassizadeh et al. 2013; Wiese 2013). There is now more personal information generated than ever before (Radicati 2013). That information is increasingly detailed and captures an increasing number of aspects of our lives, and as a consequence it is increasingly valuable to organisations (Rees 2014) . Furthermore, it is well known that B2C companies have multiple uses for the social media and other personal information of both customers and prospects (Gualtieri 2013; Holdren and Lander 2014; Rose et al. 2012; Teevan et al. 2005) and the strategies companies employ to access this information has been well researched (Marsden 2011). Yet research into the effect of offering financial compensation for access to individuals' social media and other personal information is still lacking. The question of obtaining legitimate access to the social media data of both customers and prospects is an important one and needs to be answered by companies as they adapt to the wide ranging impact social media is having on the way many businesses operate (Aral et al. 2013).

Currently there is no widely adopted means by which companies can offer financial compensation for access to individuals' personal information. de Montjoye et al. (2014, p. 2) argue for the need for individuals to retain ownership of their personal information and for the establishment of a "fair and efficient market" in personal information. We have argued elsewhere (Farrelly and Chew 2016a; Farrelly and Chew 2016b) that one way to address this is the Primary Personal Information Market (PPIM).

A PPIM is a market in which the original producer of the personal information sells access to that information in some way to a consumer who wishes to benefit from it. This stands in contrast to the secondary personal information market (Conger et al. 2013) in which a secondary party gains financial benefit by selling other individuals' personal information. We have argued elsewhere (Farrelly and Chew 2016b) that a PPIM is of more value to companies than a secondary market as it provides access to a joined view of multiple steam of personal information.

1.1 Research Questions

The aim of this paper is to study whether or not a PPIM would be a viable solution to the problem outlined above. It is written in the context of a broader design science based research project to design and develop a Primary Personal Information Market (PPIM) (Farrelly and Chew 2016a; Farrelly and Chew 2016b). One of the key requirements of a viable market is thickness, defined as the ability of a market to "attract a large enough proportion of the potential participants" (Roth 2008, p. 79).

Following Alvesson and Sandberg (2011) who propose gap spotting and problematization as two distinct but not mutually exclusive methods for developing research questions, we challenge the (often unstated) underlying ideological assumption that personal information is not well suited to commodification, by proposing our research questions as follows:

RQ1: Would a sufficiently large proportion of digital citizens be willing to participate in a permissions-based PPIM to make such a market viable?

RQ2: What factors determine whether or not individuals would be willing to participate on a permissions-based PPIM?

The question of whether or not a permissions-based PPIM is feasible has wide ranging implications and significance for both individuals and companies. Should such a market prove to be feasible it would enable any internet-connected individual who was so inclined to benefit financially from their personal information. The magnitude of such a market should not be underestimated. The value of personal information in the European economy alone has been estimated at €330 billion annually for organisations and €670 billion annually for individuals (Rose et al. 2012). A permissions-based PPIM would also affect the way in which companies acquire and use personal information of both prospective and existing customers. A working PPIM would enable companies to conceive of and purchase novel personal data products which would benefit them in many ways, some of which are discussed in section 3.2.

2 Literature Review

We take social media to be "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content" (Kaplan and Haenlein 2010, p. 61). The literature on Social Media is vast and varied - see for example Cao et al. (2015), Ngai et al. (2015a), Ngai et al. (2015b) and Roch and Mosconi (2016). Since our research is concerned with the design and development of an m-sided platform market in personal information we focus on three aspects of Social Media. We review the literature which concerns itself with the individual's motivations to share and also the monetary value individuals place upon their social media data. We then turn to the willingness individuals have to share their Social Media personal information.

2.1 Motivation to share

Numerous motivations for sharing personal data have been identified in the literature. Drawing on Reiss's model of 16 basic desires (Reiss 2004), Kraut et al. (2012) argue that individuals participate on Social Media Platforms (SMPs) because it is intrinsically rewarding to do so. They argue that external incentives can have the effect of undermining intrinsic motivation. Hau and Kim (2011) found that online gamers were motivated to share innovative knowledge by intrinsic motivations as well as external motivations such as the strengthening of social capital. Wang et al. (2016) identified trust and appetite for risk as factors which strongly influence individuals behaviour on Social Media Platforms (SMPs). Kietzmann et al. (2011) identifies ability to share as a functional building blocks which motivate individuals to participate on SMPs. According to reciprocity theory, individuals share personal information on SMPs in the belief that such sharing will increase the cohesiveness for their social network and, by implication, their own welfare will be enhanced (Hsu and Lin 2008). Other factors in sharing include: enjoyment, altruism and reputation, community identification (Hsu and Lin 2008).

There are a number of factors which negatively impact on an individual's motivation to share personal data on SMPs. (Hu et al. 2011) found that perceived risks associated with sharing personal data was a contributing factor to individuals decision to not to adopt SMPs. They also found that perceptions about ease-of-use and loss of control were significant in the decision not to share on SMPs.

2.2 Value of personal information

There have been a number of attempts to put a price on some aspects of personal information. Researchers have attempted to estimate the worth of individual users to various Social Media Sites (Brustein 2012; Li et al. 2013). Taylor (2002) reports on value of targeted mailing lists and Carrascal et al. (2013) estimated the monetary value of personal information such as web browsing behaviour and demographic details. Cvrcek et al. (2006) found that an individual's location data was worth around €50-100 EUR a month while Danezis et al. (2005) found location data to be worth around £10. Benndorf and Normann (2014) found that, in a one-off experiment, individuals were willing to sell their contact details and Facebook details for €15 and €19 respectively. AT&T offered fibre internet subscribers the opportunity to opt out of their deep packet inspection program for a price of for $29 per month (Schneier 2015). Hann et al. (2007) found that the disallowance of secondary use of personal information is worth between $39.83 and $49.78.

Using a series of in laboratory experiments, Benndorf and Normann (2014) found that 80% – 90% of participants were willing to sell personal data. They found that participants were willing to accept approximately €15 for their contact details and €19 for Facebook details. Grossklags and Acquisti (2007) compared willingness to sell with willingness to protect and found that participants had a clear preference for money in exchange for data in both the protection and release scenarios, even when the amount of money received was very small.

Zannier (2013) explored the feasibility of selling his personal information. He sold detailed data on many aspects of his personal life in exchange for contributions to his kick-starter project. He raised $2,734 USD from 213 backers.

Regardless of the exact monetary value of personal information, Katell et al. (2016) found that individuals generally considered the services they received on SMPs to be fair reward for the personal information they contributed, although this was somewhat mitigated when participants learned more about current datamining and profiling practices. However, there is also a growing body of research (Bagust 2014; Doyle 2015) which examines the Social Media phenomenon from the perspective of the commodification of affective labour, suggesting that the time and effort individuals expend creating personal information on SMPs is undervalued.

2.3 Willingness to share

A number of related approaches have been taken to assess whether or not people would be willing to exchange their personal information. Spiekermann and Novotny (2014) studied the research question of how individuals can share more personal information with companies while maintaining their personal privacy. They proposed a four-space model of personal information management by focussing on the type of relationship which exists between the individual and the company. Their focus was on increasing transparency and efficiency in the personal information market rather than allowing individuals to obtain financial compensation by selling access to their personal information.

Shibchurn and Yan (2014) found that individuals are more willing to share personal information on social networking sites (SNSs) when offered a monetary reward and that a number of other factors such as gender, marital status and educational attainment are significant when predicting whether or not individuals are willing to share personal information on SNSs. Aperjis and Huberman (2012) suggested that individuals should be compensated for allowing their data to be included in a sample from which the buyer sought to infer a statistic of interest about a population.

Yassine et al. (2011) studied the willingness of individuals to share personal information in return for a payoff value that balances out their loss of privacy. They explored the use of consumer agents which act as brokers on behalf of individuals to manage access to their personal information. Gabisch and Milne (2014) found that receiving a monetary reward reduces consumer expectations for privacy and that one of the factors influencing an individual's decision to share personal data was whether or not the personal data was sensitive in nature. de Montjoye et al. (2014) demonstrated that individuals were willing to grant access to their personal information if their privacy was preserved. They found that 81% of participants would archive personal data store in a personal data store and that participants were willing to share personal meta data with health care professionals. Rose et al. (2012, p. 25) found that while individuals expressed concern about use of private data by companies, this did not affect their willingness to share personal information. Chang and Chuang (2011) found that altruism, identification, reciprocity, and shared language were significant factors influencing knowledge sharing on SMPs. Chen and Hung (2010) identified reciprocity, interpersonal trust, knowledge sharing self-efficacy, and perceived relative advantage as important factors determining whether or not individuals would participate on professional virtual communities.

2.4 Summary and critique

The literature indicates the central issue pertaining to participation on SMPs is the question of whether individuals are motivated by intrinsic motivations, extrinsic motivations or a combination of both. Intrinsic motivations such as a desire to share, altruism, enjoyment of comradery are cited as motivation for participation while other authors argue that extrinsic motivations such as reputational enhancement, increasing one's status and the development of the cohesiveness of one's social group are the predominant motivations. The literature also confounds motivations with inhibitors and catalyst. These are features of SMPs which facilitate or impede individual's participation and should be treated separately from motivational impulses. Concerns about trust, loss of control and risk aversion are examples of inhibitors while ease of use should be considered a catalyst rather than a motivator.

It is also clear that there is a dearth of research investigating the effect of monetary reward on individual's willingness to participate on SMPs. While there has been a disparate and multifaceted approach to attempting to estimate the value of personal information of various types, the nexus between perceived value and willingness to exchange permission to access that information has yet to be determined.

3 Method

We conducted a survey to test participants' willingness to exchange personal information on a permissions-based PPIM similar to the one proposed by Farrelly and Chew (2016b). To do so we followed the design science methodology and use a simulation (Gregor and Hevner 2013; Peffers et al. 2006) to generate 1534 requests to access personal data. Randomly selected requests were then presented to each respondent. Comparable simulation approaches have been used in other contexts to evaluate such phenomena as the efficacy of information retrieval systems (Borlund 2016) and online consumers' browsing patterns (Islam and Miah 2012). Each request comprised the following components: a company making the request, the use to which the data would be put, a contact channel through which the company would contact the individual (if any), the data to be accessed, the device from which the data would be collected and a price to be paid for access to the personal information. These components are described in the following sections.

3.1 Company Types

The companies included in the survey questions were based on the Australian and New Zealand Standard Industrial Classification (ABS 1993). We chose representatives of the following sectors: Finance and Insurance, Education, Electricity, Gas and Water Supply, Accommodation, Cafes and

Restaurants, Personal and Other Services, Government Administration and Defence, Health and Community Services, Communication Services, Property and Business Services, Retail Trade, Construction, Manufacturing, Transport and Storage and Cultural and Recreational Services.

3.2 Uses

We drew on the literature to identify end uses to which personal data could be put. We included both existing end uses and potential uses, which have been suggested by researchers but not yet realised in practice. We then matched these end uses with companies in appropriate categories. These end uses were: personalized search (Teevan et al. 2005), predictive marketing (Gualtieri 2013; Rose et al. 2012, p. 25), predictive customer service (Gualtieri 2013; World Economic Forum and Bain & Company 2011), customer self-service (Rose et al. 2012, pp. 11, 25), demographic studies (de Montjoye et al. 2014, p. 1), process automation (Rose et al. 2012, p. 11), personalized medicine (Rose et al. 2012, p. 81), personalized marketing (Rose et al. 2012, p. 25), personalized products (Rose et al. 2012, p. 10), provide critical public services more efficiently and effectively (World Economic Forum and Bain & Company 2011, p. 5), personalized education (Holdren and Lander 2014; Kyriacou and Davis 2008; Van Kleek and O'Hara 2014, p. 30), service innovation (Laney et al. 2013; Lee et al. 2014), personalized pricing (Holdren and Lander 2014, p. 11; Swan 2013; Taylor 2002), personalized health (Holdren and Lander 2014; Shah 2015; Shilton et al. 2009, p. 10; Swan 2013) , personalized services (Holdren and Lander 2014, p. 41), personalized recommendations (de Montjoye et al. 2014, p. 1) and research and development (Rose et al. 2012, p. 9; World Economic Forum and Bain & Company 2011, p. 5)

3.3 Price

Estimating a reasonable price for access to personal information is an inexact science since we are proposing a novel permissions-based PPIM which has not been implemented previously. However, from the literature (Benndorf and Normann 2014; Carrascal et al. 2013; Cvrcek et al. 2006; Danezis et al. 2005; Hann et al. 2007; Li et al. 2013; Muschalle et al. 2013; Schneier 2015; Taylor 2002; Yassine et al. 2011) we derived estimates of the potential worth of a number of different personal information streams. By converting these estimates into 2015 Australian dollar equivalents we took as a working hypothesis that access to a single stream of personal information could be worth a little as a few cents and as much as $3 per month. We took a conservative estimate of the worth of personal information streams so that we would get a realistic estimate of the number of potential participants.

3.4 Requests

Having created database tables of organisations, uses, contact channels, devices we created three intermediate tables: uses_data, data_devices and org_uses. uses_data matched the uses to which personal data could be put with the appropriate personal data sources. data_devices matched personal data sources to the devices from which they could be collected. org_uses matched organisation types with relevant uses of personal data. These tables were then used to generate 1534 distinct requests.

3.5 The survey

We used an online survey to collect data for this study because it has been shown to be highly effective with regards to both cost of data collection and the time taken to collect the data (Wright 2005). Respondents were recruited by the chain-referral sampling technique via social media (Roth 2008, p. 79) which has been shown to be a cost effective and accurate way to sample a population (Baltar and Brunet 2012; Brickman-Bhutta 2012). The survey was conducted by presenting five webpages to the respondents. The first page was an overview of the research, the second page presented a description of the permissions-based PPIM and how it would work in practice, the third page asks the participant to enter personal details such as age, gender etc. Name and email address were optional for those who wished to be contacted with the results of the research. The forth page presented twenty randomly selected requests from the requests table and presented each one consecutively to the respondent. The respondent either accepted or rejected each offer by clicking on the appropriate button. Figure 1 is an example of one such request. The fifth and final page thanked participants for their participation and invited them to share a link to the research via email and social media.

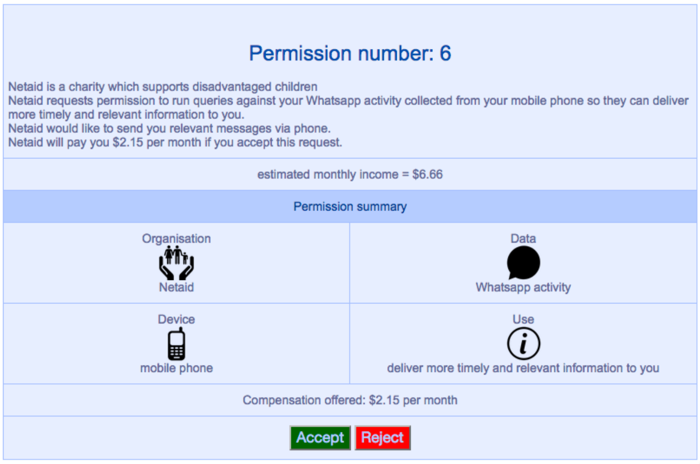

Figure 1: Screen shot of example permission as presented to respondents

Since we wish to obtain an initial indication of the proportion of digital citizens who would be willing to participate in permissions-based PPIM we use sample size calculations based on random sampling guidelines to calculate the sample size. With a margin of error of 0.05, a confidence interval of 0.9 and a conservative estimate of the proportion of 0.8 based on prior work by Benndorf and Normann (2014), our required sample size is:

$$0.25(1-0.25)\left(\frac{1.645}{0.05}\right)^2 = 203 \text{ (Hinkle et al. 1985)}$$

4 Results

204 individuals responded to the survey, 62 females and 141 males with ages ranging from 10 to 72. A total of 2060 requests were presented to respondents of which 767 were accepted (37.2%). Of the 204 individuals who participated, 163 accepted one or more request (79.9%).

4.1 RQ1

Would a sufficiently large proportion of digital citizens be willing to participate in a permissions-based PPIM to make such a market viable?

Using the 1 sample proportion test in R (R Core Team 2015) we estimate the proportion of digital citizens who would participate in a permissions-based PPIM to be 79.9% and we can be 95% confident that the proportion of digital citizens who would participate in a permissions-based PPIM lies between 74.6% and 84.3%.

This is the 90% confidence interval for the proportion of digital citizens who accept one or more request was χ^2 = 56.0111, df = 1, p-value = 7.206e-14.

4.2 RQ2

What factors determine whether or not individuals would be willing to participate on a permissions-based PPIM?

To address this RQ we first examine individual factors and then examine their combined effect in a multivariate logistic regression model to identify which explanatory variables are significant in explaining the response variables (accept or reject). Multivariate logistic regression is a commonly used technique to estimate the effect of multiple explanatory variables on a single binary response variable. The covariates we have are relate to the both the respondent and the permission being sought namely: *age*, *gender*, *highest educational attainment*, *ethnic background*, *type of data* (to which permission will be granted), *device* (from which the data will be collected), *contact channel* (by which the individuals would be contacted), *price* offered to access the personal information, *type of use* (to which the information will be put) and *type of organisation* (which is seeking access to the information).

The multivariate logistic regression model was built using forward selection using R package glmulti (Calcagno 2013). We test goodness of fit using Pearson chisquare statistic (p>0.05), and significance of the included variables (p<0.05)

Multivariate logistic regression can be expressed in the following model:

$logit(p) = \beta_0 x_1 + \beta_1 x_2 + \ldots + \beta_k x_k$

where p is the probability the request will be accepted , β_i is the i^th coefficient, x_i is the i^th variable and logit is defined as the natural log of the odds of the outcome or $ln\left(\frac{p}{1-p}\right)$.

The variables together with the statistically significant levels ($p < 0.05$) are shown in Table 1.

variable / level	Estimate	exp(estimate)	Std. Error	z value	Pr(>|z|)
Intercept	0.850087		0.327931	2.592	0.00953
age	-0.013061		0.003997	-3.267	0.00109
price	0.290256		0.055372	5.242	1.59e-07
contact_channel_email	-0.465816	0.627622756	0.203564	-2.288	0.02212
contact_channel_Four Square	-0.446096	0.640122317	0.206553	-2.160	0.03079
contact_channel_Google plus ads	-0.439082	0.644627918	0.205076	-2.141	0.03227
contact_channel_phone	-0.439653	0.64425994	0.205017	-2.144	0.03200
contact_channel_sms	-1.026743	0.358171628	0.219081	-4.687	2.78e-06
use_type_personalized services	-2.013606	0.133506382	0.837175	-2.405	0.01616
use_type_provide critical public services more efficiently and effectively	0.474013	1.60642787	-2.490	0.01277	0.01277
ethnic_background_Asian	0.445742	1.561648509	0.165421	2.695	0.00705
ethnic_background_Black, Afro-Caribbean, or African American	1.297544	3.660295932	0.503999	2.574	0.01004
org_type_Finance and Insurance	-1.308181	0.270311306	0.649671	-2.014	0.04405

Table 1: Logistic Regression Model

The coefficients of the model are interpreted as follows:

Age: Holding all other variables fixed, for every one year increase in age of the recipient, the odds of permission request being accepted decreases by a factor of $e^{-0.013}$ = 0.987, a decrease of 1.3%.

Price: Holding all other variables fixed, for every one dollar increase in price offered, the odds of permission request being accepted increase by a factor of $e^{0.290}$ = 1.337, an increase of 33.7%.

variable / level	Estimate	reference category	exp(estimate)	% change in odds
age	-0.013	n/a	0.987	-1.30%
price	0.290	n/a	1.337	33.68%
contact_channel_email	-0.466	will_not_contact	0.628	-37.24%
contact_channel_Four Square	-0.446	will_not_contact	0.640	-35.99%
contact_channel_Google plus ads	-0.439	will_not_contact	0.645	-35.54%
contact_channel_phone	-0.440	will_not_contact	0.644	-35.57%
contact_channel_sms	-1.027	will_not_contact	0.358	-64.18%
use_type_personalized services	-2.014	personalized_medicine	0.134	-86.65%
use_type_provide critical public services more efficiently and effectively	-2.014	personalized_medicine	1.606	60.64%
ethnic_background_Asian	0.474	non_hispanic_white_euro	1.562	56.16%
ethnic_background_Black, Afro-Caribbean, or African American	0.446	non_hispanic_white_euro	3.660	266.03%
org_type_Finance and Insurance	1.298	health_and_community_services	0.270	-72.97%

Table 2: Statistically significant variables and associated changes in odds.

contact_channel_email: Holding all other variables fixed, compared to the reference level of will_not_contact, including contact_channel_email in a permission increases the odds of the permission request being accepted by a factor of $e^{0.290}$ = 0.628, a increase of 33.64%. The interpretation of the other categorical variables follow a similar pattern and is summarised in Table 2.

Conclusions

As discussed in section 2, extant literature shows that individuals are willing to share their social media and other personal information for reasons such as altruism, intrinsic reward and strengthening of social capital. This research extends and these finding by showing that large proportion of digital citizens would be willing to grant permission to use their social media data while retaining ownership of those data. Specifically, this research shows that younger citizens are more willing to participate in such a market and that offering higher prices for access to personal information increase the odds of the request being accepted. We also found that the contact channel also had a significant impact on citizen's willingness to be contacted. Being contacted by email was more popular than not being contacted at all, while being contacted by phone, SMS and via ads was less popular. Collecting personal information in order to personalise services and to inform the provision of public services were less favourably received than other uses to which personal data could be put.

5 Discussion

These findings are significant because they lend weight to the arguments in favour of a permissions-based PPIM and they will guide the developers of such a market as to which factors are significant in individuals' decisions about participating in a permissions-based PPIM. The findings in this paper represent important information for researchers concerned with the viability and design of a PPIM. First, the overall estimated participation rate (86.5%) indicates that the concept of a PPIM is worth pursuing. There seems to be significant interest among the general population in exchanging personal information in exchange for financial compensation. Secondly, the significant factors in the logistic regression model inform researchers who are looking to develop a working PPIM about requests which are most likely to be accepted by individuals and therefore mostly likely to be traded successful on a PPIM. For example, it tells us that younger individuals are more likely than older individuals to accept request to access their personal data. It shows that requests which include a component which allows the company to contact individuals by email are more likely to be accepted than those which seek permission to contact individuals by SMS. Each coefficient in Table 2 interpreted in a similar manner informs researchers about how a PPIM might be expected to operate.

6 Limitations and Further Work

The main limitation of this paper is that it is based on simulated requests from companies to access individuals' social media and other personal information. To obtain a more informative and accurate understanding of individuals' willingness to grant access to their personal information it would be necessary to undertake a pilot or proof-of-concept in which actual payments were made to individuals.

Researching and implementing a permissions-based PPIM is a multi-faceted research undertaking and there is much work that remains to be done to understand the feasibility of this market. While this research seeks to understand the willingness of individuals to participate in a permissions-based PPIM, further research is needed to understand whether or not companies would be willing to purchase personal information products in a permissions-based PPIM. There is also a need to explore appropriate pricing models. The current research proposed a purchase price but further research is needed to explore the application of alternative pricing models (Koutris et al. 2012b) to a PPIM. Other areas for further research include how best to attract and retain a critical mass of users (possibly through network effect), without which the market would not be viable, and the development of a more detailed and technically sound solution to the problem of storing, modelling and querying the information in the personal information store. Finally, it would also be useful to analyse the business model inherent in a permissions-based PPIM as service system (Maglio and Spohrer 2013).

7 References

ABS. 1993. "Australian and New Zealand Standard Industrial Classification." Retrieved 15th Sept, 2015, from http://www.abs.gov.au/AUSSTATS/abs@.nsf/66f306f503e529a5ca25697e0017661f/7cd8aebba7225c4eca25697e0018faf3!OpenDocument

Alvesson, M., and Sandberg, J. 2011. "Generating Research Questions through Problematization," *Academy of Management Review* (36:2), pp. 247-271.

Aperjis, C., and Huberman, B. 2012. "A Market for Unbiased Private Data: Paying Individuals According to Their Privacy Attitudes," *SSRN 2046861 (2012).*).

Aral, S., Dellarocas, C., and Godes, D. 2013. "Introduction to the Special Issue-Social Media and Business Transformation: A Framework for Research," *Information Systems Research* (24:1), pp. 3-13.

Bagust, P. 2014. "'Honey, They Stole My Flickr!' Social Network Typologies, Online Trust and Dissent, and the Monetisation of Immaterial Labour," *Media International Australia* (151:1), pp. 89-96.

Baltar, F., and Brunet, I. 2012. "Social Research 2.0: Virtual Snowball Sampling Method Using Facebook," *Internet Research* (22:1), pp. 57-74.

Benndorf, V., and Normann, H.-T. 2014. "The Willingness to Sell Personal Data." DICE Discussion Paper.

Borlund, P. 2016. "A Study of the Use of Simulated Work Task Situations in Interactive Information Retrieval Evaluations: A Meta-Evaluation," *Journal of Documentation* (72:3), pp. 394-413.

Brickman-Bhutta, C. 2012. "Not by the Book: Facebook as a Sampling Frame," *Sociological Methods & Research*.

Brustein, J. 2012. "Start-Ups Seek to Help Users Put a Price on Their Personal Data." *The New York Times*, http://www.nytimes.com/2012/02/13/technology/start-ups-aim-to-help-users-put-a-price-on-their-personal-data.html?_r=0

Calcagno, V. 2013. "Glmulti, Model Selection and Multimodel Inference Made Easy." R package version 1.0.7. http://cran.r-project.org/package=glmulti.

Cao, J., Basoglu, K. A., Sheng, H., and Lowry, P. B. 2015. "A Systematic Review of Social Networks Research in Information Systems: Building a Foundation for Exciting Future Research," *Information Systems* (36), p. 37.

Carrascal, J. P., Riederer, C., Erramilli, V., Cherubini, M., and de Oliveira, R. 2013. "Your Browsing Behavior for a Big Mac: Economics of Personal Information Online," *Proceedings of the 22nd International Conference on World Wide Web*, pp. 189-200.

Chang, H. H., and Chuang, S. 2011. "Social Capital and Individual Motivations on Knowledge Sharing: Participant Involvement as a Moderator," *Information & Management* (48:1), pp. 9-18.

Chen, C., and Hung, S. 2010. "To Give or to Receive? Factors Influencing Members' Knowledge Sharing and Community Promotion in Professional Virtual Communities," *Information & Management* (47:4), pp. 226-236.

Conger, S., Pratt, J. H., and Loch, K. D. 2013. "Personal Information Privacy and Emerging Technologies," *Information Systems Journal* (23:5), pp. 401-417.

Cvrcek, D., Kumpost, M., Matyas, V., and Danezis, G. 2006. "A Study on the Value of Location Privacy," *Proceedings of the 5th ACM workshop on Privacy in electronic society*: ACM, pp. 109-118.

Danezis, G., Lewis, S., and Anderson, R. J. 2005. "How Much Is Location Privacy Worth?," *WEIS* (5:1).

de Montjoye, Y. A., Shmueli, E., Wang, S. S., and Pentland, A. S. 2014. "Openpds: Protecting the Privacy of Metadata through Safeanswers," *PloS one* (9:7).

Doyle, K. 2015. "Facebook, Whatsapp and the Commodification of Affective Labour," *Communication, Politics & Culture* (48:1), p. 51.

Farrelly, R., and Chew, E. 2016a. "Designing a Personal Information Transaction Object," *System Sciences (HICSS), 2016 49th Hawaii International Conference on*, Hawaii: IEEE, pp. 4061-4071.

Farrelly, R., and Chew, E. 2016b. "Towards a Primary Personal Information Market," *Twelfth International Conference on Technology, Knowledge, and Society*.

Gabisch, J. A., and Milne, G. R. 2014. "The Impact of Compensation on Information Ownership and Privacy Control," *Journal of Consumer Marketing* (31:1), pp. 13-26.

Gregor, S., and Hevner, A. R. 2013. "Positioning and Presenting Design Science Research for Maximum Impact," *MIS Quarterly* (37:2), pp. 337-356.

Grossklags, J., and Acquisti, A. 2007. "When 25 Cents Is Too Much: An Experiment on Willingness-to-Sell and Willingness-to-Protect Personal Information," *WEIS*.

Gualtieri, M. 2013. "Predictive Apps Are the Next Big Thing in Customer Engagement," Forrester, https://sandhill.com/wp-content/files_mf/predictive_apps_are_the_n.pdf.

Hann, I.-H., Hui, K.-L., Lee, S.-Y. T., and Png, I. P. 2007. "Overcoming Online Information Privacy Concerns: An Information-Processing Theory Approach," *Journal of Management Information Systems* (24:2), pp. 13-42.

Hau, Y. S., and Kim, Y.-G. 2011. "Why Would Online Gamers Share Their Innovation-Conducive Knowledge in the Online Game User Community? Integrating Individual Motivations and Social Capital Perspectives," *Computers in Human Behavior* (27:2), pp. 956-970.

Hinkle, D. E., Oliver, J. D., and Hinkle, C. A. 1985. "How Large Should the Sample Be? Part Ii—the One-Sample Case for Survey Research," *Educational and psychological measurement* (45:2), pp. 271-280.

Holdren, J. P., and Lander, E. S. 2014. "Big Data and Privacy: A Technological Perspective." 2016, from https://www.whitehouse.gov/sites/default/files/microsites/ostp/PCAST/pcast_big_data_and_privacy_-_may_2014.pdf

Hsu, C.-L., and Lin, J. C.-C. 2008. "Acceptance of Blog Usage: The Roles of Technology Acceptance, Social Influence and Knowledge Sharing Motivation," *Information & Management* (45:1), pp. 65-74.

Hu, T., Poston, R. S., and Kettinger, W. J. 2011. "Nonadopters of Online Social Network Services: Is It Easy to Have Fun Yet," *Communications of the Association for Information Systems* (29:1), pp. 441-458.

Islam, H., and Miah, S. J. 2012. "Motivation-Based Is Evaluation Strategy: A Perspective of Marketing Information Systems," *ACIS 2012: Location, Location, Location: Proceedings of the 23rd Australasian Conference on Information Systems 2012*: ACIS, pp. 1-10.

Kaplan, A., and Haenlein, M. 2010. "Users of the World, Unite! The Challenges and Opportunities of Social Media," *Business Horizons* (53), p. 59—68.

Katell, M. A., Mishra, S. R., and Scaff, L. 2016. "A Fair Exchange: Exploring How Online Privacy Is Valued," *2016 49th Hawaii International Conference on System Sciences (HICSS)*: IEEE, pp. 1881-1890.

Kietzmann, J., Hermkens, K., McCarthy, I., and Silvestre, B. 2011. "Social Media? Get Serious! Understanding the Functional Building Blocks of Social Media," *Business Horizons* (54), p. 241—251.

Koutris, P., Upadhyaya, P., Balazinska, M., Howe, B., and Suciu, D. 2012b. "Query-Based Data Pricing," *Proceedings of the 31st symposium on Principles of Database Systems*: ACM, pp. 167-178.

Kraut, R. E., Resnick, P., Kiesler, S., Burke, M., Chen, Y., Kittur, N., Konstan, J., Ren, Y., and Riedl, J. 2012. *Building Successful Online Communities: Evidence-Based Social Design*. MIT Press.

Kyriacou, D., and Davis, H. 2008. "Moving Towards Life-Long User Modeling," *Advanced Learning Technologies, 2008. ICALT '08. Eighth IEEE International Conference on*), pp. 647-648.

Laney, D., Buytendijk, F., and Linden, A. 2013. "Predicts 2014: Innovating with Information Will Demand New Data, Organizations and Ideas," Gartner.

Lee, J., Kao, H.-A., and Yang, S. 2014. "Service Innovation and Smart Analytics for Industry 4.0 and Big Data Environment," *Procedia CIRP* (16), pp. 3-8.

Li, C., Li, D. Y., Miklau, G., and Suciu, D. 2013. "A Theory of Pricing Private Data," in: *Proceedings of the 16th International Conference on Database Theory*. Genoa, Italy: ACM, pp. 33-44.

Maglio, P. P., and Spohrer, J. 2013. "A Service Science Perspective on Business Model Innovation," *Industrial Marketing Management* (42:5), pp. 665-670.

Marsden, P. 2011. "Ebranding and Social Commerce," in *Brand Evolution*. Springer, pp. 357-372.

Muschalle, A., Stahl, F., Löser, A., and Vossen, G. 2013. "Pricing Approaches for Data Markets," in *Enabling Real-Time Business Intelligence*. Springer, pp. 129-144.

Ngai, E. W., Moon, K.-l. K., Lam, S., Chin, E. S., and Tao, S. S. 2015a. "Social Media Models, Technologies, and Applications: An Academic Review and Case Study," *Industrial Management & Data Systems* (115:5), pp. 769-802.

Ngai, E. W., Tao, S. S., and Moon, K. K. 2015b. "Social Media Research: Theories, Constructs, and Conceptual Frameworks," *International Journal of Information Management* (35:1), pp. 33-44.

Peffers, K., Tuunanen, T., Gengler, C. E., Rossi, M., Hui, W., Virtanen, V., and Bragge, J. 2006. "The Design Science Research Process: A Model for Producing and Presenting Information Systems Research," *Proceedings of the first international conference on design science research in information systems and technology (DESRIST 2006)*), pp. 83-106.

R Core Team. 2015. "R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria".

Radicati, S. 2013. "Mobile Statistics Report, 2013-2017," The Radicati Group Inc.

Rawassizadeh, R., Tomitsch, M., Wac, K., and Tjoa, A. M. 2013. "Ubiqlog: A Generic Mobile Phone-Based Life-Log Framework," *Personal and Ubiquitous Computing* (17:4), pp. 621-637.

Rees, C. 2014. "Who Owns Our Data?," *Computer Law & Security Review* (30:1), pp. 75-79.

Reiss, S. 2004. "Multifaceted Nature of Intrinsic Motivation: The Theory of 16 Basic Desires," *Review of General Psychology* (8:3), p. 179.

Roch, J., and Mosconi, E. 2016. "The Use of Social Media Tools in the Product Life Cycle Phases: A Systematic Literature Review," *2016 49th Hawaii International Conference on System Sciences (HICSS)*: IEEE, pp. 1830-1839.

Rose, J., Rehse, O., and Röber, B. 2012. "The Value of Our Digital Identity," *Boston Cons. Gr*).

Roth, A. E. 2008. "What Have We Learned from Market Design?," *NBER Innovation Policy & the Economy (University of Chicago Press)* (9), pp. 79-112.

Schneier, B. 2015. "At&T Charging Customers to Not Spy on Them." *Schneier on Security* Retrieved 29th Jan, 2016, from https://www.schneier.com/blog/archives/2015/02/att_charging_cu.html

Shah, M. 2015. "Big Data and the Internet of Things," *Big Data Analysis: New Algorithms for a New Society*. Springer International Publishing, 2016. pp. 207-237.

Shibchurn, J., and Yan, X. B. 2014. "Investigating Effects of Monetary Reward on Information Disclosure by Online Social Networks Users," *System Sciences (HICSS), 2014 47th Hawaii International Conference on*: IEEE, pp. 1725-1734.

Shilton, K., Burke, J. A., Estrin, D., Govindan, R., Hansen, M., Kang, J., and Mun, M. 2009. "Designing the Personal Data Stream: Enabling Participatory Privacy in Mobile Personal Sensing," *TPRC*.

Spiekermann, S., and Novotny, A. 2014. "The Vision: Personal Information Markets and Privacy,").

Swan, M. 2013. "The Quantified Self: Fundamental Disruption in Big Data Science and Biological Discovery," *Big Data* (1:2), pp. 85 - 99.

Taylor, C. R. 2002. "Private Demands and Demands for Privacy: Dynamic Pricing and the Market for Customer Information," *Durham, NC, Duke University*), pp. 1-30.

Teevan, J., Dumais, S., and Horvitz, E. 2005. "Personalizing Search Via Automated Analysis of Interests and Activities," *SIGIR*, pp. 449-456.

Van Kleek, M., and O'Hara, K. 2014. "The Future of Social Is Personal: The Potential of the Personal Data Store," *Social Collective Intelligence*, pp. 125-158.

Wang, Y., Min, Q., and Han, S. 2016. "Understanding the Effects of Trust and Risk on Individual Behavior toward Social Media Platforms: A Meta-Analysis of the Empirical Evidence," *Computers in Human Behavior* (56), pp. 34-44.

Wiese, J. 2013. "Enabling an Ecosystem of Personal Behavioral Data," *Proceedings of the Adjunct Publication of the 26th Annual ACM Symposium on User Interface Software and Technology*, pp. 41-44.

World Economic Forum and Bain & Company, I. 2011. "Personal Data: The Emergence of a New Asset Class," *An Initiative of the World Economic Forum*.

Wright, K. B. 2005. "Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services," *Journal of Computer-Mediated Communication* (10:3).

Yassine, A., Nazari Shirehjini, A., Shirmohammadi, S., and Tran, T. T. 2011. "Online Information Privacy: Agent-Mediated Payoff," *Privacy, Security and Trust (PST), 2011 Ninth Annual International Conference on*: IEEE, pp. 260-263.

Zannier, F. 2013. "A Bite of Me." Retrieved 20th April, 2015, from https://www.kickstarter.com/projects/1461902402/a-bit-e-of-me.