Privacy Literacy In the Era of the Internet of Things and Big Data

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By

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Abstract

The aim of this study was to investigate people's privacy management practices in the digital environment, especially on platforms that generate and collect personal data as part of larger Big Data practices. The use of digital technologies have become part of our everyday life with the increased use of social networking sites for socialisation, sharing information, and entertainment, among other benefits. In addition, in the current digital age, there is increased use of Internet-connected devices like fitness trackers for monitoring various aspects of our physical activities, and also the use of digitally-tracked consumer loyalty systems. All these technologies generate and provide access to personal data to organisations and other individuals. In our current data-driven economy, personal data has become an important resource for service providers to mine data and gain insights into users' behavioural activities in return for services. Increasingly, consumers are required to protect themselves, and "privacy in YOUR hands" is a common public service message by governments to protect their citizens.

This study used an empirical approach to understand the extent to which users manage their privacy and their personal information, while enjoying the benefits and affordances of such technologies. Semi-structured interviews were used to collect qualitative data from twenty-one (n=21) users who used all three technologies — social media, consumer loyalty systems, and fitness trackers. In addition to participant interviews, a Facebook walkthrough of the participants' profiles was undertaken to understand their use of privacy settings and their online behaviours. Sandra Petronio's *Communication Privacy Management* (CPM) theory was used as the main lens in analysing the resulting data. The CPM theory, originally proposed in 2002, uses a boundary metaphor to explain how people make decisions about revealing or concealing personal information with various communication partners; they do so through boundary rule formation (who to share with) and boundary coordination (between people they shared with), and readjust if there is a boundary turbulence or breach of confidence. It was originally developed to understand interpersonal communication, but in this study, it is used as a framework to understand communication in digital technologies, where both people and organisations are

involved.

The findings show that people balance benefits against risks in information disclosure; they selectively disclosed personal information on social media and segmented their professional and social worlds as a privacy management strategy to delineate and distinguish the boundaries of the various privacy levels they desired in their personal and professional lives. The findings also show that individuals make a cost-benefit analysis –- or use privacy as a negotiation tool –- in trading their social and personal data for certain benefits, but also expect "contextual integrity" of their data; that is, they expect privacy protection against that data reaching outside the boundaries of the entity they were trading the data with.

Participants' privacy literacy around social media platforms was the most evolved, for it was a new public-facing technology where they had a huge learning curve, and hence they were used to being somewhat careful already. In the case of loyalty systems, participants were somewhat aware of the risk of sharing too much personal information, but since these systems were generally run by companies that they trusted and had done business with for many years, they did not perceive as much of a threat in disclosing personal information to them, although these same companies had merged since and were now sharing data. In the case of fitness trackers and other wearable technologies, participants were generally much more open to sharing their health data with third-party organisations, as they clearly perceived some health (and sometimes monetary) benefits from doing so, among other derived value, and did not clearly envision the future risks such as higher health insurance premiums in the future in case their fitness routine falls short.

While privacy knowledge is important for individuals in protecting their privacy, participants' use of privacy protection strategies was often exercised after experiencing privacy breaches. Hence, boundary rule formation and boundary coordination are both an evolving process and change continually based on privacy knowledge gained and boundary turbulence experienced. The study also uncovered some challenges users face in their effort to manage their online information privacy including usability and an understanding of the reasons for privacy protection.

This study provides evidence of how individuals use digital technologies in their everyday lives and participate in the digital economy, while also trying to protect their informational privacy. There is often a tension between individual and organisational motives in this environment, which can only be overcome through some level of privacy awareness and privacy literacy for individuals in addition to regulatory controls for organisations to maintain a level of "contextual integrity" when handling user data.

Dedication

I dedicate this thesis to my late father.

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Certificate of original authorship

I, Zablon Pingo, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy at the University of Technology Sydney.

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of the requirements for a degree at any other academic institution except as fully acknowledged within the text.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Signature:

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List of works published from this thesis

Book Chapters

1. **Pingo Z.,** Narayan B. 2019, Users' Responses to Privacy Issues with the Connected Information on Ecologies Created by Fitness Trackers", In M. Dobreva, A. Hinze, & M. Zumer (Eds.), *Maturity and Innovation in Digital Libraries, Lecture Notes in Computer Science series* (Vol. 11279). Springer International Publishing, Berlin, pp. 240-55.
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3. **Pingo, Z.** & Narayan, B. 2019, "Privacy Literacy and the Everyday Use of Social Technologies" In S. Kurbanoğlu, S. Špiranec, E. Grassian, D. Mizrachi & L. Roy (eds.), *Information Literacy in Everyday Life*, Springer International Publishing, Berlin, pp. 33-49.
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