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Privacy Concerns and Data Sharing in the Internet of Things: Mixed Methods Evidence from Connected Cars

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Abstract

The Internet of Things (IoT) is increasingly transforming the way we work, live, and travel. IoT devices collect, store, analyze, and act upon a continuous stream of data as a by-product of everyday use. However, IoT devices need unrestricted data access to fully function. As such, they invade users' virtual and physical space and raise far-reaching privacy challenges that are unlike those examined in other contexts.

Connected cars, as advanced IoT devices, are a unique setting to review and extend established theory and evidence on privacy and data sharing. Employing a sequential mixed methods design, we conducted an interview study (n = 120), a survey study (n = 333), and a field experiment (n = 324) among car drivers to develop and validate a contextualized model of individuals' data sharing decisions. Our findings from the three studies highlight the interplay between virtual and physical risks in shaping drivers' privacy concerns and data sharing decisions, with information privacy and data security emerging as discrete yet closely interrelated concepts.

Our findings also highlight the importance of psychological ownership, conceptualized as drivers' feelings of possession toward their driving data, as an important addition to established privacy calculus models of data sharing. This novel perspective explains why individuals are reluctant to share even low-sensitivity data that do not raise privacy concerns. The psychological ownership perspective has implications for designing incentives for data-enabled services in ways that augment drivers' self-efficacy and psychological ownership and thereby encourage them to share driving data. These insights help reconcile a fundamental tension among IoT users: how to avail the benefits of data-enabled IoT devices, while reducing the psychological costs associated with the sharing of personal data.

Keywords: Privacy, privacy concerns, cybersecurity, psychological ownership, data sharing, data disclosure, Internet of Things, IoT, connected car, smart products