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Do Micro-Mobility Services Take Away Our Privacy? Focusing on the Privacy Paradox in E-Scooter Sharing Platforms

Research-in-Progress

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Abstract

E-scooter sharing is gaining popularity while riders' privacy concerns still remain, due to their destructive threat to individuals. Based on the APCO macro model, this study examines the relationships among antecedents (i.e., privacy experiences, privacy awareness, usage regularity, and geographical regularity), privacy concerns, and the outcome (i.e., continuance intention to use e-scooter sharing platforms). An interesting phenomenon is that quite a few users have continuance intention to use even when they have privacy concerns, which has rarely been explored with the concept of psychological distance. This research therefore further investigates the relationship between privacy concerns and users' continuance intention by adding four different types of psychological distance (i.e., temporal, spatial, interpersonal, and platform-self distances) as moderating variables in our research model, drawing on construal level theory. Research findings are expected to contribute to literature on privacy paradox, the APCO macro model, and construal level theory, along with some practical implications.

Keywords: Privacy paradox, APCO macro model, construal level theory, psychological distance, sharing economy, micro-mobility service, e-scooter sharing

Introduction

Electronic scooters (e-scooters), one of dockless ride-sharing alternatives are on the rise, and they have populated the streets of Los Angeles, San Francisco, Santa Monica, and other 40 U.S. cities (Hawkins, 2019). By downloading the app and uploading the payment information with the driver's license photo, users can easily rent a scooter, which is available at around $1 per ride or $0.15 per minute (Satola, 2018). Due to its convenience, fun, and affordability, the adoption of this new type of micro-mobility service has become quicker than its direct competitor, a dockless bike. According to a survey conducted by the research firm Populous, among 7,000 individuals across the U.S., about 70 percent of participants

show a positive attitude towards e-scooter sharing services (Raphelson, 2018). Moreover, e-scooters are considered a good solution to solve the 'last mile' issue of urban residents when their destinations are too short to drive yet too far to walk, cope with growing congestion, and further build a smart transportation city (Franklin-Hodge, 2018; Li et al., 2018; Satola, 2018).

Although this recent boom of micro-mobility programs, including e-scooter and bike sharing services, has brought many benefits to users, it has also come with a risk to one of the cornerstones of civic life, individual privacy (Franklin-Hodge, 2018). To be more specific, e-scooter sharing services depend on the global positioning system (GPS) and cellular connectivity in order to track scooters being rented (Hern, 2018). It however would create a lethal blow to individuals' safety if an information breach occurred or the location information were used for undesired (e.g., criminal) purposes, as riders' movements can be tracked by analyzing the whole movement trajectory. Even worse, the information on a driver license and its photo image can also be leaked at the same time, so that individuals could be easily identified. Furthermore, recently, it is alleged that e-scooter sharing platforms are collecting unnecessary amount of personal information for their commercial purposes, and even the U.S. government is already using the private information to surveil citizens and target activists or immigrants (Satola, 2018).

Some riders therefore state their privacy concerns and stop or resist to use them, but most others end up continuously using the scooters as the adoption rate of scooters is accelerating, even when they have concerns, more or less. The phenomenon that their behaviors do not match up to their intentions or concerns is referred to as the privacy paradox (Norberg et al., 2007). This phenomenon has rarely been studied in the sharing economy, in particular, the micro-mobility platform context, while it has been investigated most extensively especially in the information systems (IS) research area. We therefore intend to fill this research gap, build our research model based on the theoretical framework of the APCO (Antecedents → Privacy Concerns → Outcomes) macro model (Smith et al., 2011), and examine it using a survey method in the context of e-scooter sharing platforms.

The importance of this study is that it proposes an innovative perspective to solve the privacy paradox, rather than the traditional viewpoint of 'privacy calculus,' as it has already become a common awareness that users calculate consciously (or unconsciously) and expect benefits in return if their privacy is revealed (Dinev & Hart, 2006). A psychological approach however has rarely been attempted to explain this phenomenon, despite the fact that some psychological reasons can profoundly lead to users' behaviors (Melone, 1990). We therefore attempt to crack this privacy paradox phenomenon by focusing on users' perception about whether the privacy leakage is concrete or abstract (i.e., distance towards events) and how they think of the distance towards others and e-scooter sharing platforms (i.e., distance towards objects) drawing on construal level theory.

Therefore, the psychological distance proposed by this research is expected to solve the privacy paradox innovatively and expand the theoretical scope of APCO macro model and construal level theory in e-scooter sharing platforms. Practically, this study intends to provide practical psychological reasons for users' privacy concerns and help e-scooter sharing platform managers increase users' continuance intention to use by soothing these concerns, as well as evaluate and update organizational privacy practices.

Literature Review

Privacy Paradox

Information privacy is defined as an individual ability to decide which information to give and who can get access to them (Malhotra et al., 2004), and it is considered one of the hottest topics among IS studies (Smith et al., 2011). Privacy paradox shows the contradiction between individuals' privacy concerns and their actual actions (Acquisti & Grossklags, 2005).

Acquisti and Grossklags (2005) attempted to explain the privacy paradox phenomenon by treating privacy as a tradable commodity, and Norberg et al. (2007) stated that the balance between risk and trust explains private concerns. Utz and Krämer (2009) found that narcissism and impression management are triggering factors for the privacy paradox phenomenon in social media. In the context

of the sharing economy, Teubner and Flath (2016) argued that economic benefits affect the relationship between privacy concerns and intention to share accommodations on Airbnb. However, little effort has been made to investigate the impact of non-economic factors between privacy concerns and continuance intention to use, especially in the context of e-scooter sharing platforms. Individuals' psychology has been shifted from being considered an irrational 'black box' to an unneglectable factor in terms of consumers' intention and decision-making processes (Antons & Piller, 2015). We therefore focus on the non-economic, more specifically, psychological factors (i.e., users' psychological distances) to see how they influence the relationship between privacy concerns and continuance intention to use e-scooter sharing platforms.

APCO Macro Model

The APCO macro model is an interdisciplinary theoretical framework that integrates journal articles and book chapters on privacy, which summarizes the relationship among information privacy and major constructs proposed in studies from IS, organizational behavior, and marketing (Smith et al., 2011). It originally includes privacy experiences, privacy awareness, personality differences, demographic differences, and culture as antecedents. However, this meta-model based on their literature review is not a fixed or static formula that suits every context (Smith et al., 2011), so we modify this model by keeping privacy experiences and privacy awareness as antecedents for our outcome variable (continuance intention to use), but personality difference is excluded because it is not our main research focus. As to demographic differences, they are included as control variables, and cultural difference is not considered since the users of e-scooter sharing platforms in the U.S. are solely chosen for the target population. In addition, we add both usage regularity and geographical regularity as other antecedents, as we believe whether users ride shared scooters on a daily basis/once a year or on a routine/special route can dramatically influence their concerns for privacy in a different way.

Privacy concern seems to be one of the most frequently studied constructs in information privacy research (Malhotra et al., 2004). More specifically, it shows users' perceptions of what will happen to their online information, and their worries of organizational information privacy practices and possible personal information breach (Dinev & Hart, 2006; Smith et al., 1996). In this study, we propose that individuals' continuance intention to use as an important outcome of privacy concerns in the context of the users of e-scooter sharing platforms.

Construal Level Theory

Construal level theory (CLT) explains the relationship between the psychological distance and the degree to which individual's thinking is concrete or abstract (Trope & Liberman, 2010). The general idea of CLT is that an individual considers an object as abstract if the psychological distance between the object and her/himself is far, but if s/he think that the psychological distance is close, s/he thinks the object as concrete, so that s/he cares more about something concrete (psychologically close) (Simandan, 2016). The concept of psychological distance includes four dimensions, namely, temporal, spatial, social, and hypothetical distances, which describe time, physical, interpersonal distance, and imaginable likelihood of events (Trope & Liberman, 2010).

This research adopts temporal, special, and interpersonal (social) dimensions of psychological distance and adds 'platform-self' distance, instead of hypothetical distance, in order to represent the special characteristics of the users of e-scooter sharing platforms. In specific, we categorize psychological distance into two groups; one is distance towards events, which includes temporal and spatial distance towards the privacy leakage, and the other is one towards objects (i.e., other individual users and e-scooter sharing platforms), which refers to as interpersonal and platform-self distance. We replace hypothetical distance with platform-self distance for the following two reasons. First, hypothetical distance is related to the likelihood or the hypotheticality of an event happening; we however argue that the privacy leakage has already become a reality instead of a hypothetical probability, so that hypothetical distance is not applicable to e-scooter sharing platforms. Second, platform-self distance refers to a sense of distance between e-scooter sharing platforms and the user her/himself, and it has been acknowledged that brand-self distance has a strong psychological impact on users (Chiu et al.,

2017); we thus extrapolate it to the concept of platform-self distance. We think that platform-self distance is an essential dimension that is as important as interpersonal distance, as both distances emphasis on the perception on emotional attachment towards objects, which are proximal constructs to explain e-scooter users' behavior reactions from the psychological perspective. Therefore, we believe that these dimensions of psychological distance are more suitable in the context of e-scooter sharing platforms and hold higher research value especially in the micro-mobility program context.

Research Model and Hypotheses

As shown in Figure 1, by integrating the modified APCO macro model and construal level theory (CLT), the research model with nine hypotheses are developed. Privacy concerns variable plays a mediating role in the relationship between antecedents (i.e., privacy experience, privacy awareness, usage regularity, and geographic regularity) and outcome (i.e., continuance intention to use e-scooter sharing platforms), and four psychological distance-related variables (i.e., temporal, spatial, interpersonal, and platform-self distances) play a moderating role in the relationship between privacy concerns and the outcome variable.

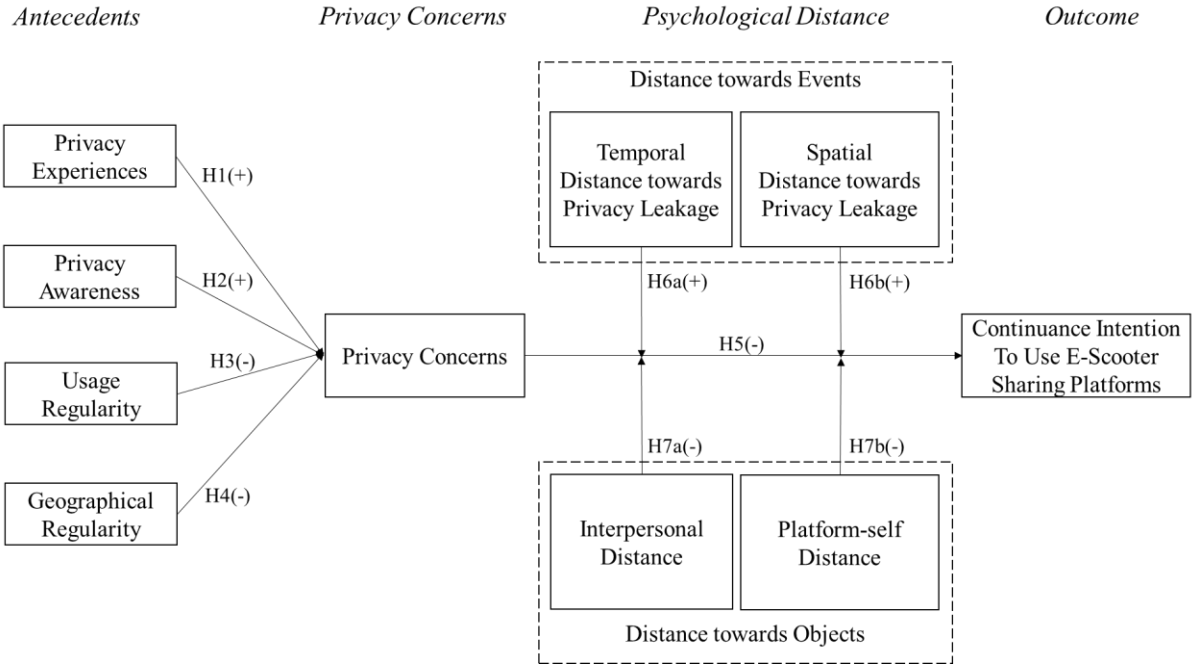

Figure 1. Research Model

For privacy experiences, Smith et al. (1996) found that if an individual has suffered from personal information abuses or other undesired cases related to information privacy leakage before, s/he would have stronger concerns about private information and a couple of other studies also found the positive relationship between an individual's privacy related experience and the level of her/his concern (e.g., Dinev & Hart, 2006; Malhotra et al., 2004). In the context of the sharing economy, Lutz et al. (2018) argued that one's adverse experience of using online platforms will increase the level of privacy concerns using the sharing economy services. Therefore, we argue that in the context of the sharing economy platforms, including e-scooter sharing, if an individual has an experience that information leakage in the sharing economy platform had done harm to her/his personal life or incurred financial loss, s/he will have more privacy concerns than those who has less or no experience with information privacy problems. We thus hypothesize:

H1: Privacy experiences are positively associated with privacy concerns.

Privacy awareness refers to the extent to which a user is aware of the privacy practices of companies (Malhotra et al., 2004; Phelps et al., 2000). We argue that the positive relationship between privacy awareness and privacy concerns will hold in the context of the sharing economy services. The reason is

that if a user takes the time to read terms of agreement and is aware of company privacy practices, s/he might be more sensitive about their privacy in nature and even can be more negative to company' practices of collecting unnecessary personal data than expectation (Okazaki et al., 2009). Thus, the users who are aware of privacy practices and policies could have more concern about privacy issues than those who are not. Therefore, we propose the following hypothesis:

H2: Privacy awareness is positively associated with privacy concerns.

Usage and geographical regularities present the frequency in riding the shared scooters and the predictability of the riding routes, respectively (Lee, 2010; Zhong et al., 2016). To be specific, a high usage regularity indicates using shared scooters many times, while a high geographical regularity means riding the scooters to more pre-fixed locations (e.g., commuting between home and workplaces). We propose that in the e-scooter sharing platforms, if riders use the scooters more frequently, they will become more familiar with the platform company's privacy practices and policies, which in turn results in less concerns about their privacy. As to the geographic regularity, if users go various places, including their private or secret locations, they will have more concerns about their physical identity exposure. Our hypotheses, then, are as follows:

H3: Usage regularity is negatively associated with privacy concerns.

H4: Geographical regularity is negatively associated with privacy concerns.

Numerous studies have proposed and examined the relationship between perceived privacy issues and continuance usage intention in various contexts. For example, Wang and Lin (2017) found that perceived privacy risk is indirectly and negatively associated with users' continuance intention in the context of using location-based systems (LBS)-enabled mobile apps. Based on these findings, in the context of micro-mobility platforms such as e-scooter sharing services, we propose that the relationship between privacy concerns and continuance intention to use be negative, even with the existence of the privacy paradox phenomenon; people tend to disclose individual private information to use a service for their convenience. That is, those who concern more about their individual private information such as their trip-data, and other demographic information are less likely to continue to use micro-mobility platform services than those do not have much concerns about their privacy. Therefore, we hypothesize:

H5: Privacy concerns are negatively associated with continuance intentions to use e-scooter sharing platforms.

Although we proposed the negative relationship between privacy concerns and continuance intention to use, we still attempt to explain the phenomenon of privacy paradox especially in using e-scooter sharing services. This phenomenon can be explained by adopting construal level theory (CLT) with four dimensions of users' psychological distance in two categories: distance towards events (i.e., temporal and spatial distances), and distance towards objects (i.e., interpersonal and platform-self distances). More specifically, we believe that the results of this study can provide further understanding of the privacy paradox in the micro-mobility (the sharing economy) context, by validating their moderating effects in the relationship between privacy concerns and continuance intention to use e-scooter sharing platforms.

Our argument is that psychological distances towards events could mitigate the negative relationship between privacy concerns and continuance intention to use. That is, if a scooter rider thinks that any issue regarding the event of privacy leakage will happen in the future (far temporal distance) or somewhere far away from her/himself (far spatial distance), s/he will think of privacy leakage as something abstract. With this less psychological proximity, the user is more likely to continue to use e-scooter sharing platforms although they have privacy concerns. Thus, we hypothesize:

H6a & H6b: Distance towards events (temporal and spatial distances) positively moderates the relationship (i.e., attenuate the negative relationship) between privacy concerns and continuance intentions to use e-scooter sharing platforms.

As to psychological distances towards objects, if a user believes that s/he receives social recognition from other users (close interpersonal distance) and perceives e-scooter sharing platforms like a close friend (close platform-self distance), these shortened psychological distances will let her/him think of

others and platforms (objects) as more concrete and detailed, so that s/he will continue to use e-scooter sharing platforms, regardless of a high level of privacy concerns. On the other hand, if a user thinks that s/he is socially denied and untrendy (far interpersonal distance) and indifference to the e-scooter sharing platforms (far platform-self distance), s/he would consider these objects as abstract, and then accentuate the negative relationship between privacy concerns and continuance intention to use. Hence, we hypothesize:

H7a & H7b: Distance towards objects (interpersonal and platform-self distances) negatively moderates the relationship (i.e., accentuate the negative relationship) between privacy concerns and continuance intentions to use e-scooter sharing platforms.

Research Methodology (Tentative)

To test our hypotheses, we will collect survey data from the users of e-scooter sharing platforms in the U.S. Measurement items, still under-development, will be developed from the extant literature to increase the validity and reliability of the variables. Table 1 shows the operational definitions of our research constructs. A seven-point Likert scale will be used for all items.

Table 1. Operational Definitions of Constructs

Construct	Operational Definition	References
Independent Variables		
Privacy Experiences	The extent to which a user perceives that her/his personal information has been abused or attacked before	Smith et al. (1996)
Privacy Awareness	The extent to which a user is aware of privacy practices of e-scooter sharing platforms	Malhotra et al. (2004); Phelps et al. (2000)
Usage Regularity	The degree to which a user perceives how regularly s/he rides shared scooters	Zhong et al. (2016)
Geographical Regularity	The degree to which a user perceives that how predictable her/his riding routes are when using shared scooters	Lee (2010)
Mediating Variable		
Privacy Concerns	The extent to which a user perceives that s/he concerns about the possible loss of privacy as a result of information disclosure to e-scooter sharing platforms	Xu et al. (2011)
Moderating Variables		
Temporal Distance towards Privacy Leakage	The extent to which a user perceives a sense of distance in time (a near distance being near in time and a far distance being far future)	Trope and Liberman (2010)
Spatial Distance towards Privacy Leakage	The extent to which a user perceives a sense of distance in physical locations (a near distance being nearby areas and a far distance being remote areas)	Ozcelik and Acarturk (2011); Trope and Liberman (2010)
Interpersonal Distance	The extent to which a user perceives a sense of distance towards other users in social recognition (a near distance being socially accepted and recognized and a far distance being socially denied and untrendy)	Lwin and Williams (2003)
Platform-Self Distance	The extent to which a user perceives a sense of distance between e-scooter sharing platforms and the user her/himself (a near distance being intimate to the platforms and a far distance being isolated from the platforms)	Chiu et al. (2017)
Dependent Variable		
Continuance Intention to Use E-Scooter Sharing Platforms	The extent to which a user perceives that s/he has the intention to continue using e-scooter sharing platforms	Bhattacherjee (2001)

Expected Implications

The key theoretical contribution of this research is that it incorporates two overarching theories in the context of micro-mobility (e-scooter sharing) platforms: the APCO macro model (Smith et al., 2011) and construal level theory (Trope & Liberman, 2010). This study is among one of the first attempts that examine privacy concerns in the context of the sharing economy businesses (especially in e-scooter sharing platforms) and that explain the phenomenon of privacy paradox using the concept of psychological distance to privacy issues. Therefore, this study expands theoretical scope of construal level theory by adapting the concept of psychological distance that suits the characteristics of e-scooter sharing platforms. Moreover, it will empirically validate and expand the research area the APCO macro model can be applied with our data gathered from e-scooter riders in the U.S.

Our research findings will also have some practical contributions that benefit all parties involved. First, practical psychological reasons can be provided to crack the privacy paradox, which offers a new perspective for managers of e-scooter sharing platforms. That is, when some privacy leakage cases occur (or are widely press-released) or users feel socially denied with no emotional attachment to the platforms, the degree of psychological distance would possibly change, and then it is possible that users will leave the sharing economy service because their initial privacy concerns can be strengthened with changed psychological distance. Therefore, a wakeup call can be provided for managers of e-scooter sharing platforms that users are getting more aware of information privacy. Second, e-scooter sharing platform managers are encouraged to evaluate and update their organizational information privacy practices to build a privacy shield for their users. Last, the ways to soothe users' privacy concerns and increase their continuance intention to use e-scooter sharing platforms could be learned from the psychological distance approach of this study.

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