Privacy in the Sharing Economy

Timm Teubner Christoph M. Flath

2016

Abstract

Sharing economy platforms such as Airbnb have experienced considerable growth over the last years and are projected to do so in the future. These novel consumer-to-consumer marketplaces have started to obliterate the boundaries between private and economic spheres. Marketing personal assets online is inherently associated with the disclosure of personal, sometimes intimate information, raising unprecedented questions of privacy. Despite its increasing relevance, there is a marked lack of research on privacy in the sharing economy literature. Leveraging the theoretical perspective of privacy calculus, we address this gap by investigating how privacy concerns and economic prospects shape a potential provider's intentions to share via different communication channels. We relate privacy concerns back to an interaction of the provider's channel-specific perceptions of her personal connection to the audience as well as its size. We evaluate our research model by means of a scenario-based online survey, providing broad support for our reasoning.

Introduction

Information and communication technology (ICT) has changed the character of social and economic interactions. In an increasingly digital and information-driven world, platforms such as Airbnb, Homestay, BlaBlaCar, Zimride enable users to share personal economic assets (PEA) in exchange for money and thus act as providers of accommodation or rides. Thereby these novel consumer-to-consumer (C2C) platforms have started to obliterate the boundaries between private and economic spheres (Slee 2016; Sundararajan 2016). Einav et al. (2015, p. 629) note that peer-to-peer marketplaces "rely extensively on user data and algorithms to match buyers and sellers, set prices, and monitor behavior." The availability of personal information is considered a crucial prerequisite for creating trust among peers on such platforms (Hawlitschek, Teubner, and Weinhardt 2016; Proserpio et al. 2016; Ufford 2015). Given this widening in scope of areas in which privacy becomes relevant, it is not surprising that also Internet user's privacy concerns become increasingly important (Goldfarb and Tucker 2012). Against this backdrop, information disclosure, economic considerations, and privacy concerns interact in manifold ways. Enabled by online and mobile ICT, private individuals have become able to monetize their idle or under-used personal assets as micro-entrepreneurs on a large scale, but at the cost of bringing personal data to the table. The norms and boundaries between social and economic matters are thus shifting – or as Acquisti et al. (2015, p. 509) put it: "If this is the age of information, then privacy is the issue of our times."

It is important to understand that novel C2C sharing platforms differ from traditional C2C platforms such as eBay in several ways. Most importantly, platforms such as Airbnb and the advertised products thereon enable intimate insights into the personal realms of the providers. Furthermore, these assets are typically marketed through

vivid user profiles which often include real names, residence, self-descriptions, photographs, and many further aspects (Dambrine et al. 2015; Ma et al. 2017). Such transparency is considered a prerequisite for online reputation and hence economic success in the sharing economy (Gebbia 2016; Teubner et al. 2016). Consequently, providers will only be able to effectively market their resources if they disclose personal information as signals of their trustworthiness and their product/service's quality (Huang and Liu 2010). Since providers are private individuals, this immediately raises the question how privacy is balanced against economic prospects (Dinev and Hart 2006; Krasnova et al. 2012).

Despite the growing importance of novel C2C platforms in the sharing economy (PwC 2015), there is still a lack of research and understanding on this *privacy calculus* (Culnan and Armstrong 1999; Kordzadeh and Warren 2017) within the emerging sharing economy domain. In particular, it is important to note that existing conceptualizations of privacy concerns are grounded in B2C e-commerce and hence take the consumer's perspective (Malhotra et al. 2004; Smith et al. 1996). In these settings, sensitive information such as credit card information, address, passwords, etc. are transferred to an e-vendor. Privacy concerns in this traditional sense must be understood as apprehension of potential "catastrophic" events at the e-vendor (server corruption, fatal mistakes, mischief), resulting in spam, identity theft, or data breaches (Acquisti et al. 2016; Dakhlia et al. 2016). In contrast, providers in C2C platforms publish personal information in the first place.

At the same time, novel C2C platforms create new social spaces. While for the last two decades, transaction in electronic commerce were conducted with businesses or anonymous strangers (such as on eBay), the emerging C2C platforms for renting and sharing emphasize personal aspects and with that, the identities and personal

characteristics of consumers and providers alike. Figure 1 displays a localization of novel C2C platforms for renting and sharing within the broader sharing economy landscape. The tendency towards users as "brands" (e.g., in accommodation and ride sharing) is amplified by the incorporation of social media and online social networks in C2C sharing platforms (Ma et al. 2017; Tussyadiah 2016a; Yannopoulou 2013). From the provider's perspective, this introduces the possibility that a *personal connection* with the addressed audience may exist when advertising a resource online. This may include unidirectional or mutual knowing, taking interest in, or other types of social relations (Barasch and Berger 2014; Gremler and Gwinner 2000; Kim et al. 2015). Information disclosure can thus potentially yield negative social consequences such as impaired reputation/status due to gossip and other social repercussions (Debatin et al. 2009; Kordzadeh and Warren 2017; Krasnova et al. 2009).

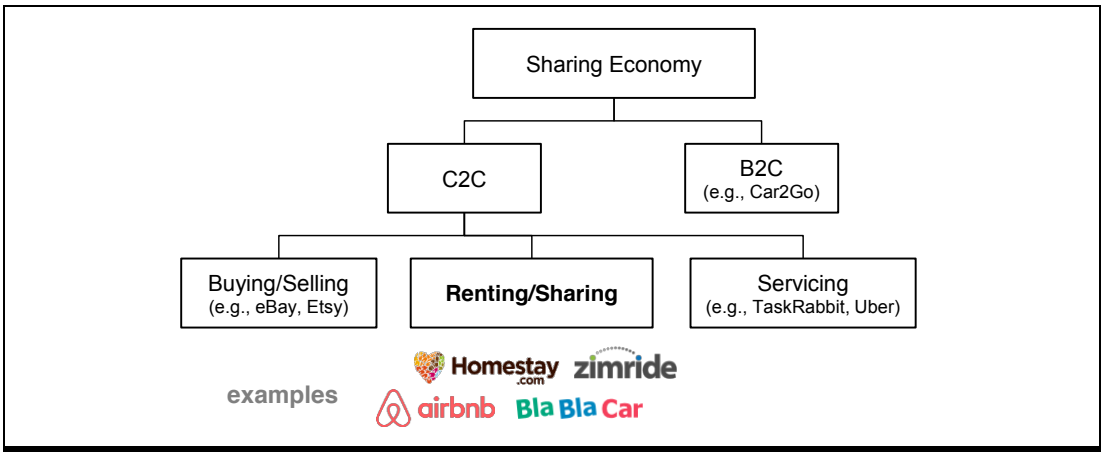

Figure 1. Delineation of Sharing Economy Platform Types

Consider, for instance, someone who seeks to rent out a spare guest room for short-term stays occasionally. Besides a high level of trust into potential guests, this also requires an upfront disclosure of intimate insights into one's home to potentially any audience. Such detailed information facilitates inferences on habits and preferences,

and often on personal circumstances and personality traits. Advertising one's apartment with photos of the living room may leak preferences and personality traits through furniture, photos, or literature on the bookshelf. In the context of ride sharing, posting a ride (from A to B on day X and time Y) enables inferences on the provider's whereabouts to any interested observer. Especially the *aggregation* of different informational sources (e.g., from online social networks and C2C platforms) can be very revealing (Mitrou et al. 2014). It is well conceivable that many providers would prefer personal information on their homes and whereabouts not to reverberate among their acquaintances such as co-workers, neighbors, fellow club members, etc.

The social dynamics among acquaintances, however, represent almost unchartered territory (Morgan 2009). The distinct role of acquaintanceship can be observed in the most mundane settings. Going to a public sauna or gym with close friends is fine and also the presence of complete strangers does typically not bother us – but running into colleagues or acquaintances may be awkward (Wanderer 2016). Similarly, we sometimes share surprisingly personal information with the stranger next to us on an airplane – information we would otherwise only share with close friends or family, but certainly not with our co-workers or more casual social contacts (Acqusisti et al. 2015). Such examples illustrate that personal information sometimes is shared easily both at close *and* far social distances, but less so at intermediate ranges of this scale. This points to the special position of acquaintances which are defined "not so much as people who are not intimates but as people with whom there are […] fragments of intimacy" (Morgan 2009, p. 4).

This paper seeks to demonstrate that this logic also applies to the communication of information related to personal economic assets. Specifically, we show that a (potential) provider's privacy concerns associated to a certain communication channel

follows an inverse U-shaped form, where information is easily shared within very small scopes, that is, close circles of friends or family, *and also* on large-scope platforms, publicly accessible, and targeted to potentially any Internet user, *but much less* so on intermediate levels. In particular, we investigate

1) the role of privacy concerns and economic prospects for a C2C provider's intentions to share, and
2) how privacy concerns in C2C sharing emerge from the channel-specific factors *perceived audience size* and the provider's expected *personal connection* with the audience.

In the next section, we develop our research model and derive our hypotheses from theory and empirical evidence. Drawing upon the theoretical lens of privacy calculus (Dinev and Hart 2006; Krasnova et al. 2012), we model a provider's *intention to share* as a tradeoff between privacy concerns and economic prospects related to sharing. Privacy concerns, in turn, emerge from the interacting factors *perceived audience size* (i.e., a user's perception of how large the audience of a given communication channel would be; Chiu et al. 2013) and *personal connection* (i.e., a user's expectation of recognition, taking interest, and social relation with the audience; Gremler and Gwinner 2000). To test our research model and to locate novel C2C platforms within the scope of online communication, we empirically evaluate a set of conceivable communication channels with respect to these factors.

In doing so, this research makes three core contributions to the IS literature. First, embedded in the theoretical framework of privacy calculus, we consider privacy concerns from the provider's perspective in C2C sharing. This is a particularly important contribution because privacy concerns did thus far not apply for the providers in B2C (i.e., the businesses). Consequently, the majority of the existing

sharing economy literature takes a consumer-centered perspective, whereas the *providers'* perspective has experienced far less attention (see Ikkala and Lampinen (2015) and Karlsson et al. (2017) for exceptions).

Second, based on the outlined factors, we contribute to explaining driving factors of privacy concerns with regard to advertising personal economic assets online. In particular, we explore to which extent audience size and social distance act as inhibitors of information disclosure. In this, we follow Morgan (2009) in highlighting the special role acquaintances. In particular, we find that that intimate insights are considered particularly problematic in view of audiences of intermediate social distance.

Third, we contribute to the general understanding of novel electronic markets and their relation to online social networking. Our study informs the information systems design of C2C platforms since the appropriate use of elements such as social media integration, tools/options for privacy management, and user representation determines whether providers will engage in C2C sharing or not.

The remainder of this paper is organized as follows. After locating our study within the broader sharing economy landscape and privacy calculus theory, we derive our hypotheses and research model in Section 2. In this model, the factors actual/perceived audience size, personal connection, economic benefit, and privacy concerns are linked to explain whether PEA information is likely to be shared via certain channels or not. The focus of this research lies on C2C sharing platforms for PEA advertisement and we employ a set of other, "non-sharing-economy" channels as benchmarks for user perceptions. This said, we then take our hypotheses to data and explore Internet users' willingness to disclose personal information in varying C2C settings by means of a scenario-based online survey with 237 participants. Sections

3 lays out the survey design while Section 4 presents the results which provide strong support for our hypotheses. We discuss implications and limitations of our study in Section 5. Section 6 concludes.

Theoretical Background and Research Model

Under the impression of the emerging photography technology, Warren and Brandeis (1890, p. 193) first defined privacy as "the right to be left alone." Today's Internet users have come a far way since then. They permissively share personal information online, knowingly or unknowingly, often with the emphatic desire *not* to be left alone, but to experience feedback, emotional support (Koroleva et al. 2011), and connectedness (Krasnova and Kift 2012).

Advertising one's personal economic assets online inherently creates an overlap between private and economic spheres (Sundararajan 2016). Providers must hence balance economic aspiration (e.g., reflected in audience type and size) and individual privacy preferences – both by choosing which information to disclose, to whom, and via which channel. While research on audience effects has primarily focused on how tie strength affects communication and self-disclosure behavior, audience size represents a fundamental parameter too (Barasch and Berger 2014). Emerging C2C platforms as one possible type of channel for advertisement put their users into a tricky position of minding both. They require the disclosure of personal data as an investment in the provider's micro-entrepreneurial endeavor – for purposes of information provision, self-marketing, and to create trust (Dakhlia et al. 2016). Yet both consumers and providers also "have an interest in disclosing as little information about themselves as they can and to remain anonymous to the extent feasible" (Dambrine et al. 2015, p. 7). For accommodation sharing, the necessary information

include object description and photos, personal background information (typically name, photo, self-description), as well as a pricing scheme (Teubner et al. 2016). Once disclosed information on any platform can readily be (mis-)used for economic and social discrimination, hidden influence and manipulation, coercion, or censorship (Acquisti et al. 2015). In light of the relevance of privacy-related user behavior and the associated technology to the field of IS, "the information age has rendered information privacy a core topic in IS research" (Pavlou 2011, p. 977). In this section, we thus first locate our work within the broader literature on privacy in the sharing economy and outline the theoretical foundations for our research model. We then present our research model and derive our hypotheses.

Privacy in the Sharing Economy

Novel C2C sharing platforms have experienced tremendous growth and increasing attention in the academic and popular press for several years (Slee 2016; Stephany 2015; Sundararajan 2016). They continue to attract a wide range of users and have established as a viable alternative to traditional modes of consumption (Cusumano 2015; Hellwig et al. 2015). Most studies focus on shared mobility (e.g., Cohen and Kietzmann 2014; Shaheen 2016; Teubner and Flath 2015) and accommodation sharing (Ikkala and Lampinen 2015; Karlsson et al. 2017; Möhlmann 2015; Tussyadiah 2016b), where providers advertise and share their vehicles and homes. Despite several critical voices accompanying the rise of C2C platforms,[1] the literature on *privacy* in the sharing economy is still sparse, but the findings suggest that privacy concerns in fact inhibit C2C sharing (Frick et al. 2013; Hawlitschek, Teubner, and Gimpel 2016). In view of the users' online presence on sharing platforms, visual

[1] For example there are reports on false claims made by platforms, the undermining of work standards and regulation, as well as issues of discrimination (Avital et al. 2015; Edelman et al. 2017; Hartl et al. 2015; Malhotra and Van Alstyne 2014; Slee 2016).

avatars were suggested as a compromise between creating social presence and trust, and at the same time preserving higher levels of anonymity (Riedl et al. 2014; Teubner et al. 2014).

Beyond the direct means of user representation, sharing economy platforms yet hold another potential source for privacy invasions: textual peer-reviews on the provider's profile page (Zervas et al. 2015). Many platforms list such written testimonials authored by prior transaction partners, potentially including highly intimate cues ("... the lavatory was a mess") or character descriptions (Abramova et al. 2015). Accidental privacy invasion may also occur due to items visible in the background of ad photos or from context, for instance, when offering a ride to a certain location on a certain dates gives a broad hint to purpose (e.g., pointing to a certain conference or festival). Beyond the limited empirical insights into the role of privacy within the sharing economy, we are not aware of scientific contributions on this matter, marking a clear research gap.

Privacy Calculus

Regarding privacy as an absolute, untouchable value fails to explain behavior in many scenarios involving the voluntary disclosure of personal information – a common phenomenon in the online context. Although consumer polls regularly suggest that people value privacy, such claims often stand in stark contrast to observed behavior (Acquisti et al. 2015). This deviation of stated preferences and actual behavior is referred to as the *privacy paradox* (Barnes 2006; Jensen et al. 2005; Norberg et al. 2007). This has inspired the idea of a *privacy calculus* under which users deliberately trade off privacy against economic or other benefits, thus considering personal information as a tradeable commodity (Dinev and Hart 2006; Xu et al. 2010).

Privacy calculus is rooted in libertarian political sciences and economics where authors such as Culnan and Armstrong (1999) and Bennett (2001) turned away from previous, more value-laden views and attributed an economic component to privacy, subject to economic cost-benefit analysis (Culnan and Bies 2003; Smith et al. 2011). It seems especially useful in the context of voluntary information disclosure as it enables the analysis of the implicit rationale behind such decisions. In traditional e-commerce settings, privacy calculus assumes the perspective of an Internet user who is required to provide some personal data (e.g., address, credit card number, or information beyond that) to an e-commerce vendor (Malhotra et al. 2004). This reflects one side of the scale, where individuals either risk a "loss of privacy as a result of information disclosure to an online business" (Xu et al. 2008, p. 4) or "surrender a certain degree of privacy in exchange for outcomes that are perceived to be worth the risk of information disclosure" (Dinev and Hart 2006, p. 61). Rewarding outcomes may be enjoyment (Sledgianowski and Kulviwat 2008), financial discounts, or convenience (Dinev 2014). The privacy concern itself is centered around the uncertainty of whether the e-commerce vendor could (technically) be incapable of maintaining the data secure, whether the communication could be intercepted, whether third party advertisement could occur in the future, or whether users would face the risk of being "vulnerable to a company's potential opportunistic behaviors" in general (Malhotra et al. 2004, p. 338). In that sense, privacy calculus inherently considers trusting beliefs towards ecommerce operators (Gefen and Straub 2004; Krasnova et al. 2012). Providing some sealed personal data was hence either thought of as necessary precondition for a transaction or as a somewhat risky, but profitable part of the deal. In the following, we illustrate that this calculus is just as relevant when considering the trade-off between privacy and expected economic benefits in C2C sharing platforms.

Research Model and Hypotheses

To better understand the providers' Intention to Share resources online, we conflate the aforementioned aspects in a concise research model (Figure 2). Privacy calculus suggests that a provider's intention to share is *decreasing* for higher Privacy Concerns (H1) and *increasing* for higher (expected) economic benefits (H2), which in our model are driven by larger Perceived Audience Sizes (H3). Beyond describing the existence of privacy concerns, prior research has called for investigating *why* certain privacy-related behaviors are observed (Pavlou 2011). In this sense, we model privacy concerns to emerge from the *interaction* of the provider's Personal Connection with the targeted audience (which decreases in Perceived Audience Size, H4) and Perceived Audience Size itself (H5). Finally, based on insights from numerical cognition and social network analysis (Dehaene et al. 2008; Jackson 2010), the user's perception of audience size originates from a channel's Actual Audience Size (H6).

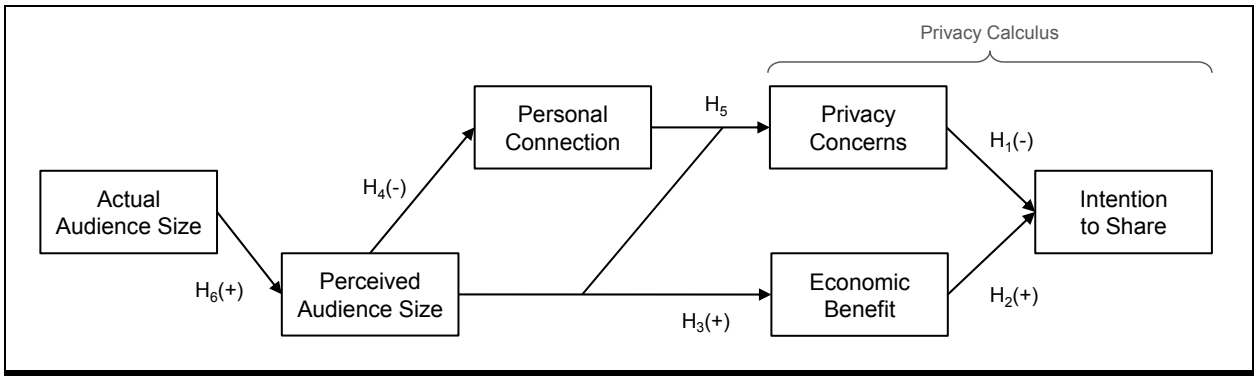

Figure 2. Research Model

Beyond the theoretical lens of privacy calculus, we draw upon the rich privacy literature in closely related contexts such as electronic commerce (Hong and Thong 2013; Malhotra et al. 2004) and online social networks (von Stetten et al. 2011; Taddicken 2014) to establish our hypotheses. The definitions of all constructs in the

context of our study are summarized in Table 1. We develop our hypotheses in the following subsections.

Table 1. Construct Definitions		
Construct	**Context-specific Definition**	**Source**
Intention to Share	The provider's intention to advertise (and thus share) personal economic assets online through a given channel.	Gefen and Straub (2003)
Privacy Concerns	The provider's perception that advertising personal economic assets through a given channel negatively affects her privacy.	Dinev and Hart (2006)
Economic Benefit	The provider's expectation that sharing through a given channel will benefit her economically.	X. Li et al. (2011)
Personal Connection	The provider's perception that there exists a personal connection with the audience reached through a given channel.	Gremler and Gwinner (2000)
Perceived Audience Size	The provider's perception of a channel's magnitude of communication reach.	Wang et al. (2005)
Actual Audience Size	The communication channel's reach in terms of audience size as induced by the scenario.	-

The impact of Privacy Concerns and Economic Benefit on a Provider's Intention to Share (H1, H2)

While our work builds upon the extant MIS literature on Internet information privacy (Bélanger and Crossler 2011; Hong and Thong 2013; Smith et al. 2011), it is important to highlight that C2C platforms introduce an additional, fundamentally different facet of privacy compared to B2C commerce. In contrast to communication with traditional e-vendors, much of the personal information provided is not meant to remain private between user and platform operator in the first place, but is effectively disclosed to all platform users (or even the general public). This may be done with the vague conception that the information is received only by users with an admissible business interest and no social ties to the sender. The platforms, however, neither warrant this, nor is it in their interest – after all, additional information reduces uncertainty and hence facilitates peer-to-peer transactions (Cheung et al. 2012). In this sense, the source of privacy concerns shifts from unintended (B2C) to deliberate information disclosure in C2C platforms (Xu and Bélanger 2013). Platforms such as Airbnb and BlaBlaCar require the provision of comprehensive personal information such as user

demographics, peer reviews, social connections, and behavioral data, which may discourage users from adoption (Lee et al. 2016; Xu et al. 2015).

As one side of the scale of Internet users' privacy calculus, prior research confirms a negative relationship between privacy concerns and online activity. Examples include studies on instant messaging (Jiang et al. 2013; Lowry et al. 2011), purchase decisions in electronic commerce (Dinev and Hart 2006; Eastlick et al. 2006; H. Li et al. 2011; Malhotra et al. 2004; Tsai et al. 2011), self-disclosure in online social networks (Chen et al. 2009; Hajli and Lin 2016; Krasnova et al. 2009; Staddon et al. 2012; Young and Quan-Hasse 2009), and the adoption of other technologies such as biometrics, web-based healthcare services, and mobile applications (Bansal et al. 2010; Kehr et al. 2015; Kordzadeh and Warren 2017; Miltgen et al. 2013). In the context of C2C platforms, only few studies have considered privacy at all. Along with other motives, Hawlitschek, Teubner, and Gimpel (2016) found privacy concerns to inhibit usage behavior in peer-to-peer rental. Frick et al. (2013) identified privacy concerns as the single most important reason for users *not* to share certain items. Considering the platforms Lyft, TaskRabbit, Airbnb, and NeighborGoods, Dillahunt and Malone (2015) found privacy concerns to have detrimental effects on sharing among disadvantaged communities, including job seeking or financially struggling individuals.

Based on the principles of privacy calculus and the substantial empirical evidence, we suggest that a provider's privacy concerns will negatively affect his or her intentions to share information on personal economic assets.

H_1: *Privacy Concerns negatively affect the provider's Intention to Share.*

On the other side of the scale, individuals involved in exchange settings seek to maximize positive outcomes. As economic prospects are an important behavioral motive in any area of (electronic) commerce, it is not surprising that the primary motivation for C2C sharing is of economic nature as well (Hamari et al. 2016; Hawlitschek, Teubner, and Gimpel 2016). This is also reflected in how sharing platforms target potential providers, e.g., by promising fuel cost savings (BlaBlaCar) or by emphasizing the potential earnings associated with a requested stay (Airbnb). A provider will thus evaluate whether sharing is worth it *economically*, where we contend that greater economic benefit increases the provider's intention to share.

Previous research supports this assessment. Hann et al. (2007) found that usage-based economic rewards significantly promote individuals' preferences for financial brokering websites with varying privacy policies. Xu et al. (2010) found that providing financial compensation increases the acceptance of personal information disclosure in the context of location-based services. Similarly, Beldad et al. (2011, p. 220) note that people "often trade their personal information for tangible or intangible benefits." This body of literature coherently suggests that Internet users actively balance extrinsic material factors against intrinsic costs of disclosure which is summarized in our second hypothesis:

H_2: *Economic Benefit positively affects the provider's Intention to Share.*

The effect of Perceived Audience Size on Economic Benefit (H3)

C2C platforms bring together demand (i.e., consumers) and supply (i.e., providers). Both groups benefit from a larger network size as there exist positive cross-side network externalities (Easley and Kleinberg 2010). These will enhance a market participant's likelihood to find a counterparty in a larger compared to a smaller market

(Weber 2014), representing a tangible economic benefit. This is particularly relevant in peer-based markets with highly heterogeneous products. Conversely, limited liquidity impedes users to engage in C2C renting and sharing. This is especially aggravating for providers who "complained that no one had yet requested their items" (Philip et al. 2015, p. 1318). Consequently, potential resource providers will benefit more if they perceive if a platform reaches a larger number of potential customers. Concerning the adoption of peer-to-peer file sharing, Song and Walden (2007) found that perceived network size enhances perceived network externalities, which in turn drive adoption. In the case of communication services, this positive effect of (perceived) network size on usefulness is well established (Palka et al. 2009; Strader et al. 2007; Zhao and Lu 2012). In summary, given the maturity of online marketplaces and platforms, we posit that users are well aware of the underlying network externalities and should attribute higher economic benefits to larger networks. Therefore, we hypothesize:

H_3: *Perceived Audience Size positively affects Economic Benefit.*

The interplay of Perceived Audience Size, Personal Connection, and Privacy Concerns (H4 & H5)

Having established the notions of perceived audience size, economic benefits, and privacy concerns as driving forces of a provider's privacy calculus, we now take a closer look at how privacy concerns emerge specifically. Research on online communication has found larger audiences to inhibit (Camacho et al. 2014; Vitak 2012; Wang et al. 2016) or alter disclosure behavior (Barasch and Berger 2014) and to increase users' privacy concerns (Stutzman and Kramer-Duffield 2010). Specifically, larger audiences promote strategies of protective self-presentation, that

is, avoiding negative impressions (Barasch and Berger 2014). This is often related to a lack of tools for audience management which makes disclosed information available to a broad, undifferentiated audience, and hence decreases the amount of information that is considered appropriate for all potential recipients (Hogan 2010; Ollier-Malaterre et al. 2013). C2C sharing platforms usually do not provide tools and practices for audience management. Moreover, research on differences in disclosure behavior in different types of online communities is lacking (Schrammel et al. 2009). With such undifferentiated online interactions, as Acquisti et al. (2015, p. 512) put it, “we no longer have a clear sense of the spatial boundaries of our listeners.” Consequently, a main source of concern stems from users’ inability to control their audiences (Tufekci 2008).

Besides such potential a priori effects of perceived audience size, the personal connection between sender and audience was also found to affect privacy concerns, for instance, based on the information’s potential for social repercussions and consequences such as individual embarrassment, dismissive evaluations, prejudices, loss of respectability, or calumny and mobbing (Dowling 1986; Hauff et al. 2015). It speaks to reason that privacy concerns are positively associated with vulnerability (Dinev and Hart 2004; Mohamed and Ahmad 2012), where closer personal relations bear more intimate knowledge, hence higher levels of vulnerability, and hence greater reason for privacy concerns.

In this regard, Krasnova and Kift (2012) found that Facebook users – remarkably – experience their own (Facebook-) friends as stronger privacy threats than hackers, criminals, or other third parties. Also Krasnova et al. (2009) found privacy concerns to be based on underlying social threats, resulting in increased consciousness about the information revealed, and hence higher selectivity in information disclosure. Similarly,

Chen et al. (2009) considered user concerns about their peers' behaviors and found that concerns arise especially if their social networks overlap, suggesting that unintended disclosure is particular harmful within one's own inner social sphere. Adams (1999) put forward that information sensitivity depends on context, specifically on the relationship with the information receivers, where one subject reported: *"I personally wouldn't mind the supermarket knowing what I consume considering, like many, that it is low sensitivity information. However, if close friends or relatives, who could make valued judgements about me, knew how much chocolate or alcohol I consumed, the information becomes highly sensitive"* (p. 13). Also Livingstone (2008) reports that insights of strangers into their online social networks were of limited concern to many teenagers, whereas closer contacts (e.g., parents) were considered much more problematic. Thus, privacy concerns will depend not only on perceptions of audience *size*, but also on one's *personal connection* with the audience.

Next, research on traditional social networks suggests that people maintain about 10 to 20 close relationships (Parks 2007). This suggested natural limit of maintained strong ties follows directly from the "strong tie" definition based on time spent together, emotional intensity, intimacy, and reciprocity (Krackhardt 1992). One can maintain only a limited number of intimate personal relationships, since such relations demand time and effort and manifest in joint experiences and physical closeness. After all, a day has only 24 hours and people can physically be present only at one place at a time. Beyond this inner circle, the number of more casual social relationships people manage and maintain is estimated at about 150 (Dunbar 1993). Hence, larger audiences will typically involve people of lower degrees of personal closeness and connection (Watts et al. 2002). In particular, the social spheres and audiences in online social networks can be thought of as mainly comprising acquaintances who

"have something in common with strangers that can be defined […] as a measure of social distance" (Morgan 2009, p. 5). Consequently, *personal connection* can be expected to decay in social distance, that is, for larger perceived audience sizes.

H_4: *Perceived Audience Size negatively affects Personal Connection.*

For privacy concerns associated with a given communication channel, we posit that personal connection and perceived audience size interact, that is, the value of one aspect is weighted by the value of the respective other. Given that privacy concerns *increase* and personal connection *decreases* in perceived audience size it can be conjectured that privacy concerns will be highest for audiences of intermediate size. In contrast, privacy concerns will be less pronounced if either the audience size is negligible or if the audience is dominated by strangers. Consequently, there occurs an intermediate maximum. Gross and Acquisti (2005, p. 72) insinuated a similar notion when stating that in certain cases "we want information about ourselves to be known only by a small circle of close friends, and not by strangers," but that in other cases "we are willing to reveal personal information to anonymous strangers, but not to those who know us better." We suggest that disclosure of information related to personal economic assets exhibits a similar pattern.

H_5: *Privacy Concerns follow an inverse U-shaped function in Perceived Audience Size.*

The impact of Actual Audience Size on Perceived Audience Size (H6)

Users can choose from different communication channels to engage in PEA advertisement, where a key difference between is audience size. To illustrate this idea, consider the following examples as candidate channels for the case of PEA advertisement. One can send the offer to personal contacts through direct

communication, for example, a WhatsApp chat, or publish it on a personal blog website, which should lead to relatively small audiences.[2] A circular email or electronic black boards (e.g., for university groups or at the workplace) are typically targeted towards intermediate numbers of recipients, whereas posts on social networking sites (e.g., Facebook, Twitter) can typically reach larger crowds.[3] Finally, an advertisement on a C2C platform (e.g., Airbnb) reaches very large audiences in the magnitude of 100 million active users, 150 million guests, and around 10 million daily page impressions (Airbnb 2017; Alexa 2016; Smith 2016). These scenarios illustrate how much the reach of different platforms for PEA advertisement may vary. Furthermore, actual audience size, that is, how many people ultimately get to see an advertisement, is essentially impossible to assess for an individual actor, and user estimates are usually far off (Bernstein et al. 2013). Consequently, we adopt a user-centered approach by focusing on an individual's *perceived* audience size (Chiu et al. 2013).

Given the wide range of possible realizations, perceived audience size should primarily be understood as an assessment of magnitude. The Weber-Fechner law posits that subjective perception behaves proportional to the logarithm of the corresponding objective (physical) stimulus. Building atop this foundation, modern numerical cognition research has demonstrated that this relation also holds for cognitive stimuli. Humans *intuitively* respond to diffuse quantitative assessment tasks (e.g., due to size or lack of separation) by applying a log-relationship to the underlying quantity (Dehaene 2011; Dehaene et al. 2008). Thus, perceptions of numbers and magnitudes do not follow the actual (objective) quantity in a linear, but in a systematically discounting manner. Perceived audience size corresponds, in this

[2] Seufert et al. (2016) report an average size of WhatsApp groups of 9.
[3] Sagioglou and Greitemeyer (2014) report an average number of Facebook contacts of 352. Bullas (2014) reports an average number of followers on Twitter of 208.

sense, to an intuitive assessment of the number of members of a given network. This constitutes a diffuse numerical assessment given the large and dynamic nature of these networks.

In this regard, empirical analysis of online communities has shown that compactness, that is, the average shortest path within the network, increases in a logarithmic manner in network size (Lancichinetti et al. 2010). Since this measure is of high functional significance to the network's members, the perceived magnitude of a community is closely linked to it and hence perceived network size grows more slowly than the underlying number of community members. Such perceptions correspond to considerations on network value, where a (social) network's value to an individual member is proportional to the logarithm of network size as additional members exhibit decreasing marginal value to the individual (Briscoe et al. 2006). Similarly, Henrich et al. (2010) note that for assessing the group mechanics of social actions, the logarithm of community size is a better measure than actual size. For online social networks, Bernstein et al. (2013) found that a) perceived audience size is systematically under-estimated and b) that audience size is concave-increasing in the number of contacts, that is, exhibiting logarithmic structure. Numerical cognition theory and insights from social network theory therefore suggest that perceptions of audience size should increase logarithmically in actual audience size, resulting in the following hypothesis:

H_6: *Perceived Audience Size is proportional to the logarithm of actual audience size.*

Figure 3 visualizes the posited relations between the provider's intention to share, privacy concerns, economic benefit, personal connection, as well as perceived and actual audience size.

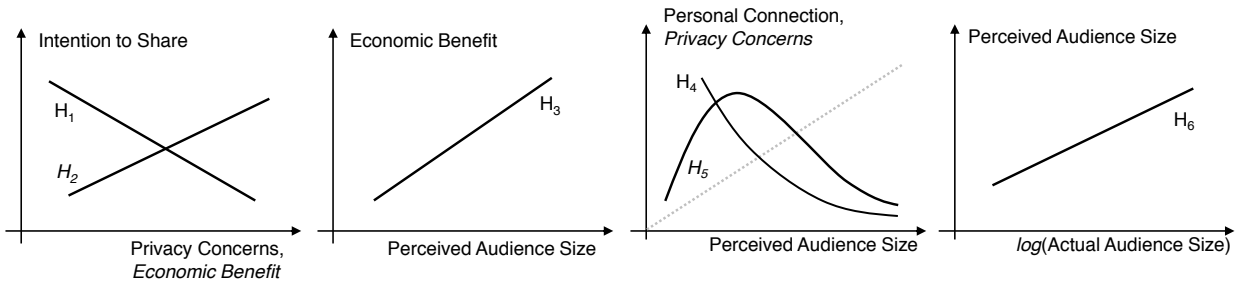

Figure 3. Overview of hypothesized relations between the provider's intention to share, privacy concerns, economic benefit, personal connection, and perceived and actual audience size

Survey Design

To evaluate our hypotheses, we conducted a scenario-based online survey in which participants assume the role of a potential provider in C2C accommodation sharing. We employ the illustrative case of accommodation sharing for sake of clarity. However, the general reasoning should also apply to other contexts such as ride sharing.

Stimulus Material

Participants were asked to imagine a scenario in which they would think of renting out a spare guest room within their apartment. The survey introduction as presented to the participants illustrates the created scenario. It read as follows:

> Welcome and thank you very much for participating in this survey. Please consider the following scenario. You seek to rent out a spare guest room in your apartment occasionally for short-term stays. For this purpose, you have already taken several photographs of the room itself, but also of the other parts of the flat and its environment. Now you have find a suitable subtenant and consider different marketing channels, or means of communications to this end. Independent of whether these channels are suitable to find a tenant, you notice that (depending on the channel) different audiences will gain quite detailed insights into your personal and private life and in particular *where* and *how* you live (e.g., pictures and location of the apartment, height of the rent, descriptive texts and equipment, etc.) In this survey, we present you with eight

> possible channels of advertising your guest room. For each possibility, please indicate your agreement or disagreement to a set of repeated questions. Please try to project your thoughts as much as possible into the depicted scenario. Assume that on all channels the same information will be disclosed. Please answer all questions as honest and intuitive as possible.

This scenario touches upon a typical personal economic asset, targeted by C2C platforms such as Airbnb, but may also be advertised via other channels. After introducing the general scenario, participants were presented eight potential channels for advertising their room. These were (1) WhatsApp group chat, (2) personal blog, (3) electronic blackboard, (4) circular email, (5) Twitter posting, (6) Facebook posting, (7) ImmobilienScout24[4] listing, and (8) Airbnb listing.

Our channel scenarios were guided by actual numbers and archetypical assumptions. First, WhatsApp group chats typically comprise three to ten members (magnitude $\sim 10^0$-10^1; Seufert et al. (2016) report an average group chat size of nine). Next, the vast majority of personal blogs are usually viewed by only few readers, typically family, friends, maybe few colleagues or acquaintances, where most blogs have less than 50 visitors per day (magnitude $\sim 10^1$-10^2; Brotherton 2015).[5] The electronic black board is stated to access 30 colleagues directly and may reach a small fraction of the company's other members (magnitude $\sim 10^2$). The circular email is stated to reach 100 immediate recipients and may be forwarded by some of them via other lists (magnitude $\sim 10^2$-10^3). The Twitter posting is stated to reach 200 followers directly which is in line with the average number of followers (209) as reported by Bullas (2014). Several (e.g., 25%) of the followers are stated to retweet the ad, yielding a magnitude of $\sim 10^4$. The propagation on Facebook works in a similar manner, where

[4] ImmobilienScout24 is the largest German broker platform for private and commercial real estate (rental and buying/selling).
[5] Richard Jalichandra, CEO of Technorati (blog index and publisher ad platform), stated that "there's a joke within the blogging community that most blogs have an audience of one" (Quenqua 2009)

the average number of contacts is higher than on Twitter (Sagioglou and Greitemeyer (2014) report a mean of 352; our sample is in line with these values; Table 3). Thus, the Facebook posting is stated to reach 350 contacts directly which is line with average numbers reported in the literature. Several (e.g., 25%) of the friends are stated to like, comment, or share the ad, yielding a magnitude of ~10^4-10^5. To assess the magnitudes of audience size on the platforms ImmobilienScout24 and Airbnb, we leveraged data from Alexa.com, the leading source for web traffic data which has been widely adopted by academic and practical research (Luo et al. 2013; Palmer 2002). ImmobilienScout24 is reported to have 3.26 million page visits daily (Alexa 2016), yielding a magnitude of $10^{6.5}$. Lastly, Airbnb is reported to have 7.92 million page visits daily (Alexa 2016), yielding a magnitude of $10^{6.9}$.

All channels and descriptions are illustrated in Table 2. After being introduced to a particular channel, participants were asked to evaluate the channel with regard to our research model's constructs. The questions were presented in random sequence. The sequence of channels was also randomized.

Table 2. Communication channels and descriptions as presented in the survey.

	Channel	**Description**
	WhatsApp	The advertisement is posted within a WhatsApp group with few good friends (1 – 10 people).
	Blog	The advertisement is presented on your own, personal website or blog (10 – 100 people).
	Blackboard	The advertisement is posted on your department's intranet on the electronic black board (addressing 30 colleagues). The ad will not actively be presented company-wide (3,000 employees), but may be found via active search or at random by a few percent of those.
	Email	The advertisement is sent via bulk email (e.g., your university or sports club) comprising approximately 100 recipients, of whom you do not know all in person. This email may be forwarded by these recipients to their contacts and email lists.
	Twitter	The advertisement is posted on Twitter, where you have approximately 200 followers. It is likely, that several (e.g., 25%) of your followers will retweet your ad.
	Facebook	The advertisement is posted on Facebook (assume 350 contacts). It can be expected that several (e.g., 25%) of your Facebook contacts will like, comment, or share the post and hence it will get to the attention of several of your second degree contacts too.
	Immoscout24	The advertisement is posted on Immoscout24.

Table 2. Communication channels and descriptions as presented in the survey.		
	Channel	**Description**
	Airbnb	The advertisement is posted on Airbnb.

To better understand the different scopes of these potential channels, Figure 4 depicts several scenarios. Besides differing audience size, the communication channels also differ with respect to the social composition of the targeted audience. While small-scale personal communication (WhatsApp, Blog) addresses intimates (e.g., friends and family), a posting on major C2C platforms (Airbnb, ImmobilienScout24) will by and large only be seen by strangers. The other channels sit in between these extremes, as they will also address acquaintances. In particular, a post in one's wider social periphery (e.g., on a corporate blackboard or a circular email) typically addresses acquaintances only (e.g., colleagues, neighbors, lose contacts, etc.), while a posting on a social network site addresses a both intimates and acquaintances.

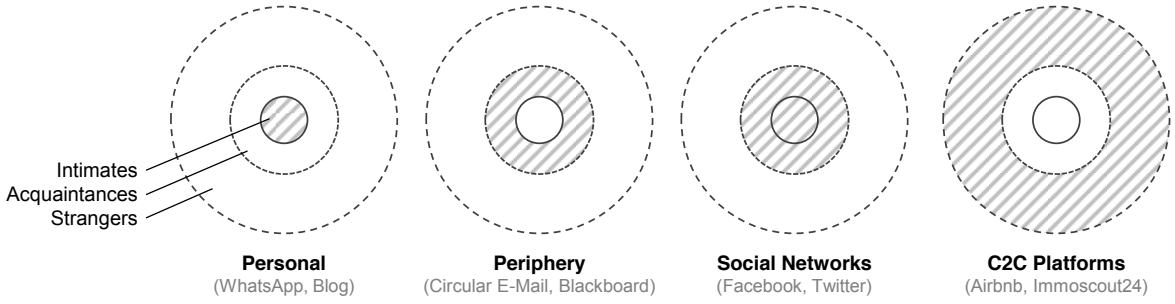

Figure 4. Audience scenarios.

Measurements

In order to ensure content validity, previously validated scales were used and adapted to the context of this study. The (Provider's) Intention to Share was adapted from Gefen and Straub (2003), Privacy Concerns from Dinev and Hart (2006), Personal Connection from Gremler and Gwinner (2000), Economic Benefit from (X. Li et al. 2011), and Perceived Audience Size from Chiu et al. (2013). All items were measured

on 7-point Likert scales (from 1 = “strongly disagree” to 7 = “strongly agree”), representing a common and established method for privacy research (Pavlou 2011). All items are shown in Table A1 in the Appendix. In addition to these focal constructs, demographic and trait information was collected as control variables. These included age, gender, individual risk propensity (Dohmen et al. 2011), number of Facebook contacts, and WhatsApp usage (yes/no). Moreover, we assessed the participants’ willingness to accept a monetary discount on a fictive online purchase, if the e-vendor would in exchange be allowed to forward some accrued personal data (cloth size, gender, age, email address) to its marketing partners. The participants entered a number between 0 and 40 EUR (the price of the assumed product), representing a proxy for the individual values of privacy (Hann et al. 2007).

Procedure

Participants were recruited from the student subject pool at (blinded for review). Participation was incentivized by a prize draw of 2 × 50 EUR and 20 × 20 EUR among all participants who completed the survey. To take part in this lottery, participants could enter their email address at the end of the survey on a voluntary basis. The survey was accessible for 7 days. Altogether, 258 participants completed the survey. To ensure data quality, we excluded subjects who did not pass understanding or attentiveness questions. This resulted in a final set of n = 237 observations. All demographic control variables are summarized in Table 3.

Table 3. Sample statistics on demographic control variables (n = 237)

	Mean	St. Dev.	Median	Min	Max
Gender: Female	.31	-	-	-	-
Age	24.65	3.05	24	19	40
Risk Affinity	5.35	1.98	6	0	10
Individual Valuation for Privacy	23.39	13.55	20	0	40
# Facebook Contacts	362.40	271.90	300	0	1324
Uses WhatsApp	.93	-	-	-	-

Results

As a first step, we assess our hypotheses on the channel level. Figure 5 depicts plots and fits between the main constructs. Intention to Share exhibits a negative slope in Privacy Concerns (H_1, R^2 = .444, p < .10) and a positive slope in Economic Benefit (H_2, R^2 = .531, p < .05). Economic Benefit, in turn, exhibits a positive slope in Perceived Audience Size (H_3, R^2 = .847, p < .01). Turning to Personal Connection, we observe a negative slope in Perceived Audience Size (H_4, R^2 = .599, p < .05). Moreover, the second-order polynomial fit between Perceived Audience Size and Privacy Concerns provides support for our fifth hypothesis (H_5, R^2 = .776, p < .05). Lastly, Perceived Audience Size exhibits a positive slope in the logarithm of Actual Audience Size (H_6, R^2 = .964, p < .001).

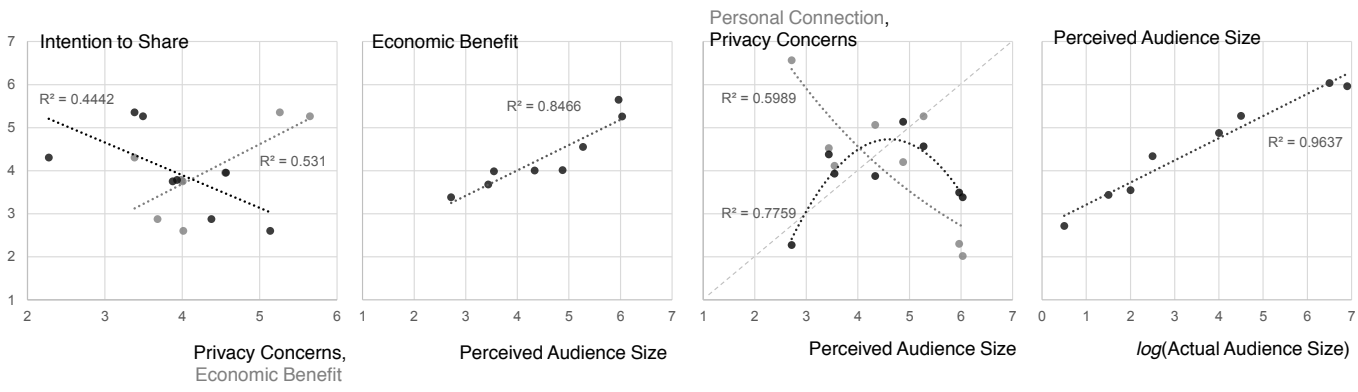

Figure 5. Hypotheses graphical evaluation

Next, we consider the data on subject level via different methodological approaches to ensure robustness. First, the research model was validated using Partial Least Squares (PLS; Ringle et al. 2015) due to its flexibility with regard to sample size and robustness regarding data and residual distributions (Chin 1998). The sample size exceeded the minimum required to validate a model in PLS which, as a rule of thumb,

should be at least 10 times larger than (1) the number of path coefficients and (2) the number of items of the most complex construct (Gefen et al. 2000).

Measurement Validity

Table 4 provides descriptive statistics on construct, reliability measures, and correlations. Composite reliability (> .60) and construct reliability (Cronbach's alpha, > .70) were established (Bagozzi and Yi 1988; Nunnally and Bernstein 1994). Next, construct validity was established by testing convergent validity (Average Variance Extracted, AVE > .50 for all constructs; Fornell and Larcker 1981) and discriminant validity (HTMT criterion below .90; Henseler et al. 2015). Moreover, item reliability was established (all indicator loadings larger than .70; Chin 1998).

Table 4. Construct Descriptives, Reliability Measures, and Correlations

	Descriptives		**Composite**	**Cronbach's**	**AVE**	**Q^2**	**Correlation Matrix**				
	Mean	**SD**	**Reliability**	**Alpha**			**ITS**	**PRV**	**EB**	**CON**	**PAS**
ITS	3.99	1.87	.963	.942	.897	.409	*.947*	-.501	.465	-.172	.317
PRV	3.88	1.74	.960	.938	.890	.077		*.943*	-.032	-.076	.141
EB	4.32	1.43	.893	.831	.736	.218			*.858*	-.324	.543
CON	4.26	1.79	.959	.935	.885	.151				*.941*	-.425
PAS	4.52	1.69	.973	.959	.924	.386					*.961*

Note: Diagonal elements in the correlation matrix contain the square root of AVE (average variance extracted) for each construct. ITS = Intention to Share; EB = Economic Benefit; PRV = Privacy Concerns; CON = Personal Connection; PAS = Perceived Audience Size.

Structural Model and Hypotheses Testing

The results of the structural model are provided in Figure 6. Overall, the hypothesized relationships are supported, explaining 48.2% of the variance in a provider's intention to share through the paths of privacy concerns (H_1, b = -.484, p < .001) and economic benefit (H_2, b = .481, p < .001). As hypothesized, perceived audience size represents a potent antecedent of economic benefit (H_3, b = .585, p < .001) and personal connection (H4, b = -.425, p < .001). We also find significant evidence that privacy concerns indeed depend on an interaction between perceived audience size and

personal connection (H_6, b = .277, p < .001). Lastly, also the relation between actual (logarithmic) and perceived audience size is confirmed (H_6, b = .665, p < .001).

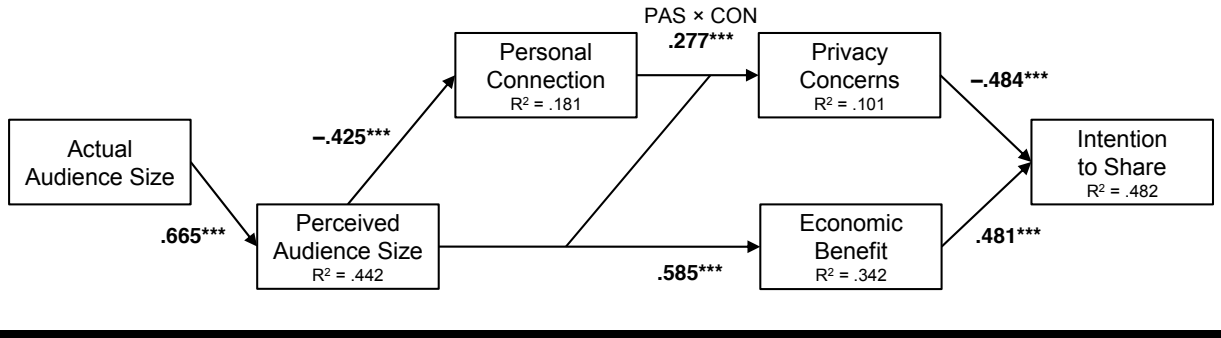

Figure 6. Research Model Results (PAS = Perceived Audience Size, CON = Personal Connection)

Overall, the effect sizes obtained in the model are consistent with results of previous research in social sciences (Ferguson 2009). Moreover, we utilized the Stone-Geisser criterion where Q^2 values larger than zero indicate the path model's predictive relevance for a construct. As can be seen in Table 4, all Q^2 values exceeded this threshold, pointing to predictive validity in terms of how well the model reconstructs the observed variables (Chin 1998).

To assess our results' robustness, we replicated the model by a set of regression analyses based on the construct item's averaged values (Table 5). This included a set of control variables such as the survey participants' gender, age, their risk affinity (Dohmen et al. 2011), as well as an approximation of their individual valuation for privacy (IVP; Hann et al. 2007). Moreover, for better understanding the non-linear behavior of privacy concerns in perceived audience size, we conducted an additional analysis including a squared term (PAS^2).

Table 5. Regression models (Standard errors in parentheses)

	Intention to Share (ITS)	Economic Benefit (EB)	Personal Connection (CON)	Privacy Concerns (PRV)		Perceived Audience Size (PAS)
PRV	-.522*** H1					
	(.018)					
EB	.590*** H2					
	(.022)					
PAS		.462*** H3	-.454*** H4	-.589***	1.107***	
		(.016)	(.022)	(.060)	(.117)	
CON				-.791***		
				(.063)		
PAS × CON				.160*** H5		
				(.012)		
PAS^2					-.115*** H5	
					(.014)	
log(n)						.515*** H6
						(.013)
Female	.069	-.127*	.290***	-.017	-.012	.268***
	(.071)	(.062)	(.084)	(.085)	(.087)	(.065)
Age	.021*	-.014	-.005	-.002	-.001	.005
	(.011)	(.009)	(.012)	(.013)	(.013)	(.010)
Risk Affinity	-.051**	.027	.002	-.078***	-.079***	.033*
	(.017)	(.015)	(.020)	(.020)	(.020)	(.015)
IVP	-.008***	-.001	-.001	.014***	.015***	-.004
	(.002)	(.002)	(.003)	(.003)	(.003)	(.002)
Intercept	3.390***	2.497***	6.369***	7.201***	1.653***	2.389***
	(.297)	(.246)	(.331)	(.467)	(.393)	(.252)
R^2	.460	.300	.186	.121	.073	.448

Note: *** p<.001; ** p<.01; * p<.05; IVP = Individual Valuation for Privacy

This analysis confirms all reported effects as the hypothesized relationships (H_1–H_6) exhibit robust magnitude, sign, and significance values also when controlling for demographic factors. Thus, controlling for gender, age, risk propensity, and individual valuations for privacy does not alter the conclusions derived from this study.

Interestingly, we observe several marked effects related to the demographic variables. First, women appear to systematically perceive higher levels of personal connection to a channel's audience than men do (b = .290, p < .001). This observation is in line with literature on social roles, suggesting women to attribute more importance to communication and bonding with others (Eagly 1987; Kimbrough et al. 2013). Moreover, compared to men, woman also state to perceive larger audience sizes (b = .268, p < .001). Age, in contrast, does not seem to play an all too important role, where this observation may be due to the rather narrow age distribution in our sample. We return to this aspect in the limitations section. Next, risk affinity is associated with lower degrees of privacy concerns (b = -.078/-.079, p < .001), which appears intuitively. Last, the participants' individual valuations for privacy (IVP) negatively affect their intention to share (b = -.008, p < .001) and emerge as a rationale behind privacy concerns (b = -.014/-.015, p < .001).

As an additional assessment of our model, we control for the specific types of targeted audiences as illustrated in Figure 4. To this end, we use the binary variables "Periphery," "Social Network," and "C2C Platform" as contrasts against the baseline ("Personal"). The results of these additional regressions are summarized in Table B1 in the Appendix. Overall, we make the following observations. First, the additional factors contribute markedly to explaining variance for the constructs Personal Connection (R^2 = .504 ≫ .186) and Privacy Concerns (R^2 = .200/.165 ≫ .121/.073). Second, all hypothesized effects persist in terms of sign, magnitude, and significance.

Under this augmented specification the effect of Perceived Audience Size on Personal Connection (PAS ⟶ CON) remains only marginally significant ($p < .10$) when concurrently controlling for the *type* of audience. This may suggest that there is some prevalence of type over size when it comes to assessing the degree of personal connections. In a further set of regressions, we control for type of communication. For this, we distinguish between "push" messages that will trigger the recipient (e.g., E-Mail, WhatsApp, Facebook) and "pull" messages which the recipient will only observe when actively looking for them (e.g., Blackboard, Airbnb). Also, we distinguish between environments explicitly designed for the purpose of accommodation advertisement ("commercial," e.g., Airbnb, ImmobilienScout24) and those channels with different primary purposes. All results of these additional analyses are summarized in Table B2 in the Appendix, yielding no impairments of the reported effects and findings of this study.

Discussion

Sharing economy platforms have experienced considerable growth over the last years and are projected to do so in the future (PwC 2015). Advertising to large audiences enables the exploitation of otherwise idle economic assets and hence to take up micro-entrepreneurial activity at putatively no cost. However, bringing such assets to market is inherently associated with the disclosure of personal, sometimes intimate information. While Internet users are accustomed to privacy-related peculiarities in online social networks and B2C e-commerce, C2C sharing platforms have introduced a novel factor to the game. Yet, there is a marked lack of consideration on privacy in the sharing economy literature, where from the various motives for adopting or evading sharing economy platforms, only few have empirically investigated the role

of privacy concerns at all (Dillahunt and Malone 2015; Frick et al. 2013; Hawlitschek, Teubner, and Gimpel 2016).

As we have pointed out in this paper, the providers' intention to share is subject to an implicit privacy calculus weighting economic benefits against privacy concerns. Overall, the willingness to disclose and share intimate information appears to be on the decline (Acquisti et al. 2015; Goldfarb and Tucker 2012). One could assume that this is due to perceptions psychological privacy risks (Hauff et al. 2015). Still, any inhibiting concerns apparently take a backseat in some of the most expansive communication channels conceivable (e.g., Airbnb). With this paper, we have set out to explore this puzzling observation.

Theoretical Implications

This research makes three core contributions to the Information Systems literature. First, we propose an approach to explain Internet users' willingness (or reluctance) to engage in C2C sharing, based on the inherent privacy calculus associated to this kind of novel e-commerce activity. We validate our research model empirically and, in doing so, provide first systematic and documented insights into how users evaluate different channels for marketing *personal economic assets*. The inherent privacy trade-off between economic benefits and the associated disclosure of embedded personal information for providers in the sharing economy adds a new facet to the literature on the economics of privacy (Brandimarte and Acquisti 2012).

Second, we relate the involved economic and privacy-related factors back to the more grounding concepts of perceived audience size and type (i.e., one's personal connection with the audience), pointing out the particular role of acquaintances in this regard (Morgan 2009). In doing so, we provide a novel perspective on *how* privacy

concerns emerge specifically (Pavlou 2011). By identifying such audience-related factors as crucial drivers in the privacy calculus, we extend previous research on personal (e.g., self-efficacy; Mohamed and Ahmad 2012), system-related (e.g., control, opt-in/out; Dinev and Hart 2004; Eastlick et al. 2006), situational (e.g., affect, own anonymity; Jiang et al. 2013; Kehr et al. 2015), general (e.g., perceived risks; Dinev and Hart 2006), or demographic antecedents of privacy concerns (e.g., gender; Phelps et al. 2000). The non-monotone relationship between audience size and privacy concerns originates, first, from *a loss of intimacy* when transitioning from close relationship to the social periphery and, second, from *anonymity by scale* when moving from loose ties to stranger-dominated spheres.

Last, this study contributes to the general understanding of novel forms of electronic commerce and its relation to online social networking. We provide first clues for the design of platforms and communication channels for sharing personal economic assets. This is an important aspect as the adequate use of social media integration, tools for privacy management, and user representation may greatly determine whether providers engage in C2C sharing or not.

Practical Implications

C2C platforms constitute two-sided markets and as such, their success critically hinges on the activity of customers *and* providers. Our research provides first evidence that both economic and privacy motifs govern the providers' Intention to engage in resource sharing. Therefore, we put forward the following guiding principles to improve platform viability in the face of privacy calculus settings.

Limit social media integration: On their striving to create trust and promote their service, C2C platforms often borrow elements from online social networks and social

commerce, that is, “a form of commerce that is mediated by social media” (Wang and Zhang 2012, p. 106). While social shopping mainly relies on social influence, C2C platforms would rather embed a user’s contacts to establish a trustworthy identity or to discover shared interests or even common friends. We suggest, however, that integrating social network information can be detrimental from a privacy perspective since it may establish an uncomfortable proximity to contacts with a much higher level of personal connection than anonymous strangers. C2C sharing platforms should hence carefully evaluate whether an aggressive social media strategy may harm their business interest by fueling customers’ privacy concerns. In this regard, the failure of Facebook’s early marketplace may too be due to linking users’ economic affairs to an (inappropriate) social environment (Hickey 2015).

Offer privacy management tools: Platforms may seek to mitigate the effects of uncertainties about audience size and social appropriateness by providing tools for privacy management. First, this may be achieved by limiting which information is demanded from the users (Dambrine et al. 2015), or by providing mechanisms to mask this data with some degree of obscurity, for instance, using abbreviations, pseudonyms, blurred photos, avatars, hazy location data, and so on. Second, tools for privacy management on C2C platforms could include settings to manage which other users can access one’s data. This may deliberately exclude visitors from the same geographical region (e.g., based on IP address) or from close social distances (e.g., inferred from social network data). From a practical perspective, however, the implementation of such measures may be challenging, as it would stand in contrast to the platforms’ paramount need to create trust among users.

Nevertheless, providing users with the tools to better *control* their information disclosure may be worthwhile. In this regard, Brandimarte et al. (2012) found that

greater explicit control over which personal information to be published lead subjects to share more sensitive information – also with broader audiences.

Another way to guide user behavior and safeguard privacy to some extend could be *privacy nudges* (Almuhimedi et al. 2015). Based on visual processing of uploaded images, a platform's privacy protection system could alert users about highly informative clues such as one's license plate number (in car or ride sharing) or faces (e.g., on photographs in the background of one's Airbnb presence) – and offer to automatically blur this information. Moreover, platforms could *emphasize* privacy protective measures to mitigate their users' concerns.

The mechanisms described in this paper may have contributed to the rapid growth and success of C2C sharing. Before the advent such dedicated online platforms, the promotion of personal economic assets was limited to narrow, personal circles. Any expansion was associated with the unease of presence in the intermediate social spheres, for instance by posting bills in the neighborhood (e.g., for private tutoring) or advertising on social network sites. Today, C2C platforms allow to tap into large and anonymous audiences, explicitly *not* rooted in one's immediate or peripheral social spheres. We suggest that the design and management of how peers and audiences are linked is crucial to the success of C2C sharing platforms but has thus far only attracted very limited research attention.

Limitations and Future Work

There are several considerations that should be taken into account prior to generalizing from this study's results. First, our assessment of the interactions between privacy and the sharing economy rests on a scenario-based survey approach. There exist natural methodological limits in view of external validity, that is,

for transferring results from hypothetical situations to actual behavior of actual subjects on actual platforms. Similarly, inducing scenarios with respect to varying audience size is potentially less robust than relying on real cases. By eliciting participants' intention to engage in sharing activity together with multiple demographic control variables, we follow a well-established approach to yet ensure reliability in view of the methodology's boundaries. Future research may consider data collection from real sharing economy transactions, that is, based on natural experiments or field studies.

Second, while accommodation sharing constitutes a major segment of the sharing economy, our survey's focus on this setting may limit the generalizability of some of our findings. For example, privacy concerns may be particularly pronounced in the context of someone's home compared to other personal economic assets (e.g., ride sharing). Similarly, other sharing scenarios may require more direct communication patterns and/or shorter response times, introducing a need for other modes of communication such as chat, or live audio/video conferencing, inducing other, additional privacy hazards. Corroborating our findings' applicability to other areas of the sharing economy will hence require further investigation of other contexts. After all, insights into the users' bed- and living rooms on Airbnb are certainly more sensitive than insights into their attics and box rooms (e.g., on eBay).

Third, a limitation of our study's generalizability may be due to the sample, comprising mainly young, well-educated, and tech-savvy participants of Western culture. Since the behaviors and perceptions under investigation are grounded in social and cultural norms, cross-cultural and cross-generational studies should further enrich our initial findings (Bellman et al. 2004; Harris et al. 2003).

Finally, our research has not explicitly explored the potentials of introducing tools for privacy management. While we argue that privacy management techniques are difficult to apply when marketing personal economic assets in general, it may be worthwhile to identify which aspects of information disclosure are particularly problematic. Operators of C2C sharing platform could leverage such insights by incorporating appropriate functionalities in their information systems. In creating explicit scenarios for our survey's participants, we created comparable settings in terms of the disclosable information across all communication channels. While holding as many factors as possible constant represents a methodological necessity, in reality subjects will intuitively adapt type and amount of disclosed information to the respective channel and expected audience (e.g., publishing an add *without* pictures on a social network). Future research should hence explore which information *is* actually disclosed in view of different audiences (Barasch and Berger 2014).

We want to point to another relevant aspect. When thinking of different communication channels for advertisement, different scopes are usually associated with different *spatial* distances and hence also imply different social distances to the audience. Potential guests in an accommodation sharing scenario are most likely not to live in one's own home town. In contrast, potential passengers for a shared ride in fact are. In view of our findings on the role of personal connection, this distribution skewness of potential customers may also affect the calculus of information disclosure. This should benefit platforms with complementary effects in spatial or social distance (e.g., accommodation sharing). Yet, by the same token, it may impair those with complementary effects of co-location (car sharing, tools, etc.). We suggest that future work will have to incorporate this important dependency.

Conclusion

In this paper, we developed a set of tangible conjectures for addressing information disclosure on personal economic assets via different communication channels. In doing so, we extended the theoretical lens of privacy calculus to C2C sharing scenarios. Moreover, we proposed a rationale for a non-linear structure of privacy concerns within this context. An online survey provided support for this perspective on Internet user psychology. Our study suggests several implications for the players in the sharing economy, in particular with regard to social media integration, which we suggest to review carefully. It is yet not foreseeable how social norms for the conflict between personal advertisement and privacy will evolve. Novel C2C platforms such as Airbnb, however, have already shaped how users deal about this conflict, what information they provide, and upon which aspects of their private life they allow markets to encroach. We hence call for more research to better understand how users can take an active and responsible part and how Information Systems can offer tools towards a development for the better – not alone for the more commercial.

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Appendix

Appendix A: Measurement Items

The constructs in this study were assessed using the items summarized in Table A1, measured on 7-point Likert scales from “strongly disagree” to “strongly agree.”

Table A1. Measurement Items	
	Intention to Share (ITS); Gefen and Straub (2003)
ITS1	I am very likely to advertise my guest room through this channel.
ITS2	I would offer my guest room through this channel.
ITS3	I would not hesitate to provide the necessary information about me for advertising my guest room through this channel.
	Privacy Concerns (PRV); Dinev and Hart (2006)
PRV1	I am concerned that the information I provide through this channel could be misused.
PRV2	I am concerned that anyone will be able to find private information about me through this channel.
PRV3	I am concerned about submitting information through this channel, because it could be used in a way I did not foresee.
	Economic Benefit (EB); X. Li et al. (2011)
EB1	Advertising through this channel will increase the likelihood of renting out my guest room.
EB2	Advertising through this channel will generate financial profits.
EB3	Advertising through this channel will improve my economic situation.
	Personal Connection (CON); Gremler and Gwinner (2000)
CON1	I feel like there is a “bond” between the recipients and myself.
CON2	The recipients are likely to take a personal interest in me.
CON3	It is likely that there exists a close relationship between the recipients and me.
	Perceived Audience Size (PAS); Wang et al. (2005)
PAS1	It is likely that my ad will be read by many people.
PAS2	It is likely that my ad will reach a lot of recipients.
PAS3	It is likely that a wide range of people will get to see my ad.

Appendix B: Additional regression analyses

Table B1. Regression models including control variables for audience type

	Intention to Share (ITS)	Economic Benefit (EB)	Personal Connection (CON)	Privacy Concerns (PRV)		Perceived Audience Size (PAS)
PRV	-.500*** H1					
	(.019)					
EB	.482*** H2					
	(.025)					
PAS		.351*** H3	-.041 + H4	-.233***	.768***	
		(.021)	(.023)	(.070)	(.116)	
CON				-.599***		
				(.064)		
PAS × CON				.081*** H5		
				(.014)		
PAS^2					-.074*** H5	
					(.014)	
log(n)						.515*** H6
						(.013)
Female	.068	-.098	.179**	-.023	-.011	.268***
	(.070)	(.061)	(.066)	(.082)	(.083)	(.065)
Age	.020 +	-.014	-.008	-.002	~.000	.005
	(.010)	(.009)	(.010)	(.012)	(.012)	(.010)
Risk Affinity	-.045**	.030*	-.012	-.079***	-.077***	.033*
	(.016)	(.014)	(.015)	(.019)	(.019)	(.015)
IVP	-.009***	-.001	~.000	.014***	.014***	-.004 +
	(.002)	(.002)	(.002)	(.003)	(.003)	(.002)
Periphery	.245**	.160*	-.923***	.067	.344**	
	(.089)	(.078)	(.084)	(.110)	(.108)	
Social Network	.089	.049	-.733***	.886***	1.153***	
	(.094)	(.086)	(.094)	(.120)	(.119)	
C2C Platform	.850***	.896***	-3.267***	-.928***	-.277*	
	(.100)	(.097)	(.106)	(.166)	(.134)	
Intercept	3.489***	2.687***	5.858***	6.167***	1.919***	2.389***
	(.292)	(.240)	(.261)	(.471)	(.374)	(.252)
R^2	.484	.347	.504	.200	.164	.448

Note: *** $p<.001$; ** $p<.01$; * $p<.05$; + $p<.10$; IVP = Individual Valuation for Privacy

Table B2. Regression models including control variables for audience type

	Intention to Share (ITS)	Economic Benefit (EB)	Personal Connection (CON)	Privacy Concerns (PRV)		Perceived Audience Size (PAS)
PRV	-.495*** H1					
	(.018)					
EB	.486*** H2					
	(.024)					
PAS		.365*** H3	-.193*** H4	-.167*	.927***	
		(.019)	(.020)	(.072)	(.115)	
CON				-.647***		
				(.065)		
PAS × CON				.090*** H5		
				(.014)		
PAS^2					-.074*** H5	
					(.014)	
log(n)						.515*** H6
						(.013)
Female	.068	-.101	.220***	-.007	-.055	.268***
	(.070)	(.060)	(.064)	(.083)	(.085)	(.065)
Age	.020 +	-.014	-.007	-.003	-.001	.005
	(.010)	(.009)	(.009)	(.012)	(.013)	(.010)
Risk Affinity	-.045**	.030*	-.007	-.083***	-.083***	.033*
	(.016)	(.014)	(.015)	(.019)	(.020)	(.015)
IVP	-.009***	-.001	~.000	.014***	.015***	-.004 +
	(.002)	(.002)	(.002)	(.003)	(.003)	(.002)
Push Type	.153*	.141*	1.109***	-.083	-.403***	
	(.076)	(.067)	(.071)	(.099)	(.095)	
Commercial	.837***	.706***	-1. 677***	-1.497***	-1.369***	
	(.097)	(.089)	(.094)	(.152)	(.130)	
Intercept	3.460***	2.801***	5.131***	6.362***	2.083***	2.389***
	(.295)	(.240)	(.253)	(.463)	(.387)	(.252)
R^2	.483	.347	.532	.169	.128	.448

Note: *** p<.001; ** p<.01; * p<.05; + p<.10; IVP = Individual Valuation for Privacy