



Sharing by proxy: Invisible users in the sharing economy

by Gemma Newlands, Christoph Lutz, and Christian Pieter Hoffmann

Abstract

With the future of work increasingly data-driven, platforms automate decisions based on the collection of vast quantities of user data. However, non-users constitute a challenge as they provide little to no data for either platforms or other users. We focus on a category of (non-)users that has not received any attention in research: users-by-proxy. Users-by-proxy make use of sharing services but they are not themselves part of the sharing transaction. Platforms cannot analyze their behavior to tailor services or allocate labor most effectively. Users-by-proxy also have significant implications for trust and reputation mechanisms. In this conceptual contribution, we provide a definition of users-by-proxy as a third category between users and non-users, developing a typology of users-by-proxy based on motives of non-/use. We focus on the ramifications of users-by-proxy for the future of work and their significance for the limits of data-driven decision-making.

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Introduction

In line with the broader field of e-commerce, online peer-to-peer sharing services are reliant on the establishment of trust between strangers (Botsman and Rogers, 2010; Ert, *et al.*, 2016; Guttentag, 2015; Hawlitschek, *et al.*, 2016; Mukerjee and Nath, 2007). Trust is primarily established through the provision of information by peers, with the surrender of private information considered a gateway to access (Lampinen and Cheshire, 2016). Common means of trust building include profile images (Ert, *et al.*, 2016; Fagerstrøm, *et al.*, 2017), identity verification, self-descriptions (Ma, *et al.*, 2017; Tussyadiah, 2016), and connections to pre-existing social networking accounts (Chaube, *et al.*, 2010; Furuhata, *et al.*, 2013). This information anchors an online profile to an off-line identity, forging trust between two otherwise strangers (Zhao, *et al.*, 2008). Information is also used to build trust through the use of bilateral reputation mechanisms, since ratings capture a user's prior record of behavior (Ma, *et al.*, 2017; Resnick and Zeckhauser, 2002; Mayzlin, 2016; Zervas, *et al.*, 2017).

This user data is necessary for platforms to operate. With the future of work being increasingly data-driven, platforms in the digital economy automate decisions, such as the allocation of labor, based on the collection of vast quantities of user data (Sax, 2016; Whelan, 2017). Data is now collected from online transactions and peer-to-peer information exchanges, as well as clickstreams, logs, and search queries (Florida, 2005; Lutz and Hoffmann, 2017; Martin, 2016). Mobile applications, in particular, have emerged as a significant environment for varied media data collection, such as sensitive location based and device movement data (Martin and Shilton, 2016).

The sharing economy is thus predominantly an information economy, reliant on the collection and transfer of vast quantities of data. However, individuals who utilize sharing economy services through proxies constitute a challenge for both users and platforms, since they provide little to no data. Typical examples would be guests, partners, or family members of users who may join in the ride or also stay in the apartment. These

'users-by-proxy' act as both the known-unknowns and the unknown-unknowns; they exist in a category situated between use and non-use and accordingly have not been given sufficient attention. In this conceptual contribution, we provide a definition of users-by-proxy as a third category between users and non-users, developing a typology of users-by-proxy in the sharing economy.

We also provide the first steps towards filling the research gap on users-by-proxy by focusing on their ramifications for the future or work. From a labor perspective, users-by-proxy represent a significant challenge as platforms cannot analyze their behavior to tailor services or allocate labor most effectively. Users-by-proxy are difficult to track and thereby distort information on the actual composition of the user base. Users-by-proxy, whose identities are not known in advance and for whom there is no profile on the sharing platform, also have significant implications for the trust and reputation mechanisms which increasingly shape the working experience within the sharing economy (Fagerstrøm, *et al.*, 2017). Since users-by-proxy receive neither ratings nor reviews, undesirable user behavior faces limited to no repercussions. Since users-by-proxy give neither ratings nor reviews, desirable behavior on behalf of platform providers also receives no reward. Moreover, the presence of users-by-proxy creates a ceiling for trust, as providers cannot be certain about who will make use of their goods and services.

This piece will proceed by briefly discussing digital participation and non-participation as a theoretical context for the ensuing analysis. In the third section, use-by-proxy will be conceptualized and defined. The fourth section will then specify use-by-proxy in the context of the sharing economy. Finally, the fifth section will discuss the implications of use-by-proxy for different user types as well as sharing service providers. We will conclude by outlining a research agenda for the further exploration of use-by-proxy.



Digital participation and non-participation

Digital inequalities research has long been interested in individuals' internet access, skills, use, and outcomes (van Dijk, 2005). As of today, most research on digital inequalities has focused on Internet users, for example by differentiating use types and investigating their social structuration (Blank and Groselj, 2014; van Deursen and van Dijk, 2014) or by looking at user characteristics of specific services such as social media (Blank and Lutz, 2017).

Digital inequality scholarship tends to assume that more connectivity is better. Therefore, the question of voluntary abstention from certain Internet uses has received little attention (Lutz and Hoffmann, 2017). For example, in certain milieus, not being on social media or not engaging actively on the Internet might be an active choice and marker of cultural capital rather than a sign of deprivation (Lutz, 2016).

A few studies have looked into Internet non-use, specifically at the reasons for non-use and the social structuration of non-use (Helsper and Reisdorf, 2013; Reisdorf and Groselj, 2014; Selwyn, 2006). Non-use in industrialized countries is associated with demographic and socio-economic factors such as income, age, educational background, and socio-economic status (Reisdorf and Groselj, 2014). Findings in Western contexts indicate that male, younger, higher educated, and higher income individuals tend to be more engaged online (Correa, 2010; Hargittai and Walejko, 2008; Schradie, 2011). Commonly, this is framed as a disadvantage to older, female, lower educated, and lower income citizens, thus rendering the 'participation divide' a salient socio-political challenge.



Use-by-proxy

Digital participation has largely been considered as a binary variable, where individuals are either participants or non-participants. However a rigid definition which divides between participants and non-participants is too narrow, particularly in light of recent conceptual advances (Dolničar, *et al.*, 2013; Eynon and Geniets, 2012).

Studies have shown that those formally considered non-users often have some experience with the Internet in mediated forms (Reisdorf, *et al.*, 2012; Selwyn, *et al.*, 2016, 2005). For instance, non-participants may not use the internet themselves, but ask others to do things for them on their behalf, such as searching for information, purchasing goods, or banking. They experience the Internet 'second-hand' (Selwyn, 2006). This mediated form of internet use has been termed 'use-by-proxy' [1], where usage is mediated through other 'proxy users' who access online services on their behalf (Selwyn, *et al.*, 2016).

Somewhat confusingly and reflecting the still nascent nature of proxy internet use scholarship, the term 'proxy user' has been used to mean both the individual accessing the internet for others (Selwyn, *et al.*, 2016) and the individual for whom the internet is being accessed (Dolničar, *et al.*, 2013). For clarity, we use here the term 'user-by-proxy' to refer to individuals who use services mediated through a surrogate, who acts on their behalf. Such an example would be a co-host in a home-sharing setting, or a co-rider in a ride-sharing scenario. We use the term 'proxy user' to refer to the individual who accesses services on another's behalf.

Whereas Selwyn, *et al.* (2016) take a narrow definition of users-by-proxy which argues for overall limited use of the internet, our understanding of users-by-proxy takes a broader understanding which regards use-by-proxy as episodic and a reflection on the specific circumstantial modality of use. Users-by-proxy can transition into full users of the Internet, or could otherwise be full users in other circumstances. Noted with regard to

health-related information seeking online, use-by-proxy can occur without their awareness or consent (Cutrona, *et al.*, 2015; Sadasivam, *et al.*, 2012; Zhao, 2009). This idea of passivity has also been inherent in the concept of passive participation (Casemajor, *et al.*, 2015; Lutz and Hoffmann, 2017). Accordingly, we include passive participation as one modality of use-by-proxy.

In the broader digital context, Blank (2013) found that the percentage of users-by-proxy in Britain is roughly 20 percent of Internet non-users. However almost three quarters (72 percent) of Internet non-users have proxy users available if they need them. In other countries, the numbers seem to be higher. In a Pew study (Zickuhr, 2013), 44 percent of Internet non-users in the United States were identified as users-by-proxy; the same proportion is reported in a study about Switzerland with representative data from 2009 (Friemel, 2016). Dolničar, *et al.* (2013) found that over 40 percent of reported non-users had made use of internet intermediaries.

The characteristics of users-by-proxy have also been investigated. In comparison to Internet users, users-by-proxy tend to be older (Friemel, 2016). However, among non-users, users-by-proxy are comparatively young (Blank, 2013; Dolničar, *et al.*, 2013). Next to age, proxy Internet use also depends on socio-economic status and employment status. Among non-users, those of a higher socio-economic status are more likely to be users-by-proxy (Blank, 2013; Neves and Fonseca, 2015). Most often, family members, specifically children or grandchildren, act as the contact point through which the Internet is accessed by users-by-proxy. This is followed by friends, a partner/spouse, or a brother/sister (Blank, 2013).



Use-by-proxy in the sharing economy

Drawing, therefore, on the concept of proxy use in the broader field of digital participation, users-by-proxy in the sharing economy can be understood as those who make use of sharing services but are not themselves part of the sharing transaction. Typical examples would be guests, partners, or family members of users who may join in the ride or also stay in the apartment. Currently, we lack empirical evidence on the demographics, motivations, and prevalence of users-by-proxy in the sharing economy. Antecedents of use-by-proxy in the sharing economy can, however, be reasonably informed by existing studies on motives for participation. Motivations for proxy use are liable to be somewhat similar to motivations for use since, except in cases of passive participation without knowledge or consent, users-by-proxy make an active decision to take part in the sharing transaction.

A Eurobarometer (2016) study found that sharing benefits are largely based on convenience and monetary benefits. A more recent study based on a large-scale survey of European citizens (Andreotti, *et al.*, 2017) found that consumers of sharing services are especially attracted by savings, but also enjoyment of the sharing experience. Similarly, a study conducted by Deloitte (2015) on the sharing economy in Switzerland found that two thirds of the surveyed population consider lower costs a key benefit of sharing services, while 63 percent believe it may offer more sustainable consumption. In the U. S., convenience, low prices, community, and sustainability were seen as key advantages of sharing services in general (Vaughan and Daverio, 2016; Smith, 2016). Similarly, based on a survey of Lithuanian millennials, Grybaitė and Stankevičienė (2016) identified a number of key benefits of various sharing services, including monetary incentives, altruism/mutual support, social connections, and entertainment. Tussyadiah (2016) found that enjoyment and economic benefits are the strongest predictors of repeat sharing use. Bellotti, *et al.* (2015) found that while providers frequently cite social, moral, and altruistic motives, consumers are primarily geared towards instrumental motives. Bucher, *et al.* (2016) identified three key motives for sharing: a monetary motive (generating income or saving on costs), a moral motive (altruism, sustainability, community support), and a social-hedonic motive (bonding, community participation). Social-hedonic motives are shown to have the strongest effect on positive attitudes towards sharing, followed by moral and monetary motives.

Regardless of motivation, individuals wishing to participate in the sharing economy require access to and the ability to use sharing economy platforms. In some instances, these uses can be quite complex, requiring significant skill sets. Accordingly, for some users, a lack of skills or access can hinder their direct uptake of sharing economy services, leading to reliance on others for access. Andreotti and colleagues (2017) found that Internet skills are lower among non-participants in the sharing economy compared to those participating as either consumers or providers. While operational and technical skills certainly matter for effective participation on sharing economy platforms, further types conceptualized more recently, such as privacy-related Internet skills or online content-creation skills, might also have a prominent role (Bartsch and Dienlin, 2016; Hoofnagle, *et al.*, 2010; Litt, *et al.*, 2014; Park, 2013).

Andreotti and colleagues (2017) also found that among the majority of Europeans not participating in the sharing economy (72.2 percent), Internet use occurs less frequently than among sharing participants. This divide is especially pronounced in terms of mobile Internet use. However, relatively few non-participants ascribe their abstention to a lack of requirement necessary for use of sharing services. Rather, they report concerns in terms of privacy and legal security as well as a general unwillingness to use other people's goods or a dislike of interacting with strangers.

In light of the limited empirical evidence, we take a first conceptual step and systematize the issue of use-by-proxy in the sharing economy. We developed a process-based model of users-by-proxy, identifying 10 instances that could be distinguished based on use-modality and phase. Specifically, given its peer-to-peer nature and the fact of a two sided market, use of the sharing economy can occur as either being a provider or

being a consumer. Users-by-proxy can also be defined along the same axis, as providers-by-proxy and consumers-by-proxy.

Participating in the sharing economy also occurs on a spectrum of involvement, with engagement in different consecutive phases. To move further away from the binary concept of use and non-use and to provide useful categorizations to assess implications, we have accordingly further differentiated by phase of use. The phases proceed from the least engaged aspect of use-by-proxy, to highly engaged use-by-proxy. While differentiating phases in a sharing transaction, the framework does not imply that later or more highly engaged phases necessarily encompass or presuppose earlier phases of use-by-proxy. For example, a user can engage in use-by-proxy in phase 4 or 5 of the framework while having been personally engaged (without a proxy) in earlier stages.

	Phase 1: Information	Phase 2: Registering	Phase 3: Search	Phase 4: Matching	Phase 5: Transaction
<i>Provider-by-Proxy</i>	Someone else browsing on their behalf.	Someone else registering on the platform on their behalf.	Someone else indicating availability or searching for consumers on their behalf.	Someone else accepting an offer to provide sharing services on their behalf.	Someone else formally executing the transaction on their behalf.
<i>Consumer-by-Proxy</i>	Someone else browsing on their behalf.	Someone else registering on the platform on their behalf.	Someone else searching for providers on their behalf.	Someone else making a request/ booking sharing services on their behalf.	Someone else formally executing the transaction on their behalf.
<i>Level of engagement</i>					

Table 1: Users-by-proxy in the sharing economy by phase.

Phase 1: Information

Providers-by-proxy

Providers-by-proxy in Phase 1 are identified through their minimal engagement with the sharing economy. Within this stage, simply the interest or intention to provide would be established, though initial interaction with the platform is mediated through another individual. This matches quite closely to certain aspects of proxy-use as identified in the broader digital inequalities literature (Blank, 2013), where individuals may have information searches conducted on their behalf (Friemel, 2016). An example would be an elderly landlord who is not particularly Internet-savvy but has heard of Airbnb. If the landlord asks a family member or friend to explore the local Airbnb market, we would be talking about a provider-by-proxy in Phase 1.

Consumers-by-proxy

Consumers-by-proxy in Phase 1 are similarly identified through their minimal engagement with the sharing economy. Within this stage, simply the interest of intention to consume would be established, though initial interaction with the platform is mediated through another individual. Again, an example would be an elderly person who is not particularly Internet-savvy but eager to find out more about the sharing economy. If this person asks their family members or friends to show them the Uber interface or point them to different sharing economy sites, we would talk about a consumer-by-proxy in Phase 1.

Phase 2: Registration

Providers-by-proxy

Providers-by-proxy in Phase 2 are identified through their initial formal engagement with the sharing economy. Within this stage, providers-by-proxy would be indirectly involved in a formal registration of the platform. An example would be a home-sharing registration by one user on behalf of co-habitants. Passive participation could also occur when the actual proxy user takes pictures of the user-by-proxy’s bedroom to be rented out while s/he is away, as a way to enhance a profile and create trust.

Consumers-by-proxy

Like providers-by-proxy, consumers-by-proxy in Phase 2 engage more formally with the sharing economy than consumers-by-proxy in Phase 1. Within this stage, consumers are indirectly involved through a formal registration of the platform by someone else on their behalf. An example would be a home-sharing

registration by one user on behalf of co-guests. Additionally, in ride-hailing, the registration of a profile on behalf of another user, such as a minor, would fall under this category.

Phase 3: Search

Providers-by-proxy

Providers-by-proxy in Phase 3 are identified through their mediated engagement with the sharing economy in an active sense of someone indicating availability or searching for consumers on their behalf. This occurs with a registered profile or within a downloaded app. For example, the provider-by-proxy from Phase 2 would tell his roommate the dates when s/he is away on holidays, so that the proxy provider can enter this information on Airbnb for potential guests to be searched.

Consumers-by-proxy

Consumers-by-proxy in Phase 3 are identified through their mediated engagement with the sharing economy in an active sense of someone searching for providers on their behalf. An example would be if a couple is on a night out but only one of them uses the Uber app to look for rides in the area.

Phase 4: Matching

Providers-by-proxy

Providers-by-proxy in Phase 4 are identified through their mediated engagement with the sharing economy in an active sense of someone accepting an offer to provide sharing services on their behalf. We also include subsequent communication with the consumer, before the actual transaction occurs, within this phase. For example, we would be talking about a provider-by-proxy in Phase 4 when this person plans to travel and wants the proxy provider to rent out her/his room through Airbnb. Once a guest finds the proxy user and the proxy user accepts the guest, and starts communicating with the guest, the user-by-proxy moves from Phase 3 to Phase 4.

Consumers-by-proxy

Consumers-by-proxy in Phase 4 participate in mediated form with the sharing economy, in the active sense of someone making a request and booking sharing services on their behalf. Here, a family member booking an Airbnb for herself, her husband, and two children would be an example. The mother would be the proxy consumer in Phase 4, and the husband and the two children would be the consumers-by-proxy. In addition if the mother communicates with the host, arranging the upcoming stay, the other family members are consumers-by-proxy in Phase 4.

Phase 5: Transaction

Providers-by-proxy

Providers-by-proxy in Phase 5 engage with the sharing economy in the most active sense, being part of the actual transaction. This stage takes a step beyond existing proxy user discussions as it involves a face-to-face component or an active physical involvement. This can be in the form of proxy providing as a co-host in a home sharing environment. For example, when several parties live in a flat and are present during an Airbnb guest's visit, the individuals who were not involved in arranging the transaction are providers-by-proxy. This is particularly the case when they own the place and directly interact with the guest. It might still be the case when they are in the place during the host's stay but do not interact directly, for example in a large shared apartment. For commercial ride-sharing, providers-by-proxy are unlikely as they are not embedded into the platform architecture and forbidden by platforms. Hypothetical examples would be if two Uber drivers take turns in driving a passenger from A to B and only one of them is registered on the app. For actual peer-to-peer car sharing services, such as Getaround and Sharoo, a person listing and parking a car instead of the actual owner would be a proxy provider, making the actual owner a provider-by-proxy.

Consumers-by-proxy

Like providers-by-proxy in Phase 2, consumers-by-proxy in Phase 5 engage relatively actively in the sharing economy, given that they take part in the actual sharing transaction (booked by another). This stage takes a step beyond existing proxy-user discussions as it involves a face to face component or an active physical involvement. Examples are consuming-by-proxy as a co-guest in a home sharing environment or as a co-passenger in a ride-sharing environment.



Implications

While there are implications of proxy use in the sharing economy from all phases of use, we will focus here on the implications of users-by-proxy in Phase 5 who make use of the actual sharing service. We will address the issues on a stakeholder-basis, considering in turn implications for users-by-proxy, proxy users, users, and sharing platforms.

Implications for users-by-proxy

Use-by-proxy has clear benefits for the individual. They may avoid data collection and do not need to be registered on the platform, thereby enhancing their privacy protection and online security. Also, anonymity may provide benefits in terms of circumventing discrimination. A number of studies have highlighted disadvantages faced by ethnic minorities on sharing platforms such as Uber or Airbnb (Edelman, *et al.*, 2016; Edelman and Luca, 2014; Cansoy and Schor, 2016; Rosenblat, *et al.*, 2016). If users are unaware of the actual participant's demographics, discrimination is less likely to occur. Finally, a recent survey of non-participants in the sharing economy shows that an aversion to interacting with strangers is a widespread motive for abstention (Andreotti, *et al.*, 2017). Use-by-proxy may allow reaping the benefits of the sharing economy without having to overcome personal boundaries.

However, there are also potential disadvantages. Firstly, if we view the sharing economy as a social capital building exercise, as has been argued by some proponents (Botsman and Rogers, 2010; Hellwig, *et al.*, 2015), then users-by-proxy further miss out on opportunities they could otherwise have leveraged. On the other hand, Pais and Provasi (2015) have discussed that on market-based platforms, the act of transacting and evaluating does not entail reciprocity or the creation of a tangible amount of social capital.

More concretely, by abstaining from direct use of the platform, users-by-proxy are unable to build up a reputation. In what is being termed a 'reputation economy', users-by-proxy are disadvantaged if they later transition into users. For instance, they lack the experience and reputation necessary to reach platform-based premiums, in terms of hierarchical status markers. Research by Teubner, *et al.* (2017, 2016) on Airbnb listings in Germany, found that host reputation resulted in price premiums, with similar results being presented by Ikkala and Lampinen (2015), and Wang and Nicolau (2017). In particular, Liang, *et al.* (2017) found that the Airbnb 'SuperHost' badge meant that hosts would set higher prices, with a 6.73 percent markup on price. Gutt and Hermann (2015) similarly found that hosts on accommodation sharing platforms received a price premium once they had achieved three ratings and thus received a publicly displayed rating.

By lacking a reputation, users-by-proxy could also face issues of access since it has been noted that certain providers prefer not to offer their services to unexperienced users. Lee, *et al.* (2015), for example, noted that providers would use consumer ratings to decide whether to accept the ride. Karlsson, *et al.* (2017) have also begun to look at the role of permission in peer-to-peer rentals, since gaining permission to book accommodation is a new element in tourism. Acceptance on platforms is not predictable not guaranteed. As such, it is important for potential users to build up a reputation, where the duration of membership can be important. Teubner, *et al.* (2017) found that duration of membership on Airbnb was significantly and positively correlated with price, with each month of membership translating into a markup of around US\$0.5. Guo, *et al.* (2014) similarly argued that the amount of trust increases with greater number of ratings, where a low number of ratings might raise reliability doubts. However, counterbalancing these results, Ert, *et al.* (2016) found no significant price effects on Airbnb based on number of ratings, and Wang and Nicolau (2017) even found that more reviews resulted in a price markdown.

In line with other digital platforms, the sharing economy has been noted for its opaque communication procedures, with its outsourcing of communication to the disinterested medium of software programs (Tomassetti, 2016). Lee, *et al.* (2015), for instance, in a qualitative study of ride-sharing providers found that provider e-mail messages to company representatives regarding ride rejections would often go without response. Such restrictions on formal channels for communication can become increasingly hindering for users of a service, particularly given the lack of alternative informal communication mechanisms (Klaas, *et al.*, 2012). By integrating customer service communication as well as dispute resolution processes into the platform, as opposed to providing human-based customer service, sharing platforms hinder communications between users, as well as between users and the platform. Such hindrance becomes particularly problematic for users-by-proxy who may not have access to the platform or the proxy user's profile. In instances of dispute or problems, such as gaining access to an apartment or retrieving lost items, users-by-proxy are doubly disintermediated from a solution.

Disintermediation through a proxy user and then a platform further occludes issues of legal liability. Research has begun to address the role of tort liability (Berke, 2017) and consumer protection legislation in the sharing economy (Calo and Rosenblat, 2017; Kassan and Orsi, 2012; Miller, 2016; Rogers, 2015). However, the lack of clarity over situations which involve actual users becomes, again, doubly complicated for users-by-proxy. If a guest of a guest damages a home, who is to be held responsible? It is questions such as these which cause concern for users, but have so far received limited attention by platforms, academics, or policy-makers.

Implications for proxy users

To act as a proxy user is, by definition, a social act. To access services with another or on another's behalf acts as a form of social support. Elsewhere, in digital divide research, proxy users have been noted as being able to provide non-users with the resources, including cognitive, mental, and social, to later appropriate those digital technologies themselves (van Dijk, 2006). The existence of a suitable proxy user, however, can simultaneously hinder future uptake since users-by-proxy can simply rely on the current proxy user going forwards (Bakardjieva, 2005).

There are further implications for proxy users. As mentioned above, there are issues over liability. Proxy users have to take responsibility for any co-hosts or co-guests. The role of reputation mechanisms, such as ratings and reviews (Teubner, *et al.*, 2017; Zervas, *et al.*, 2015), also means that proxy users are liable to be rated negatively due to any unfavorable behavior on behalf of their guests. Due to the lack of feedback reciprocity on the user-by-proxy, there is less incentive to behave most appropriately for the benefit of positive ratings.

The presence of users-by-proxy may, in any case, hinder the success of a proxy user on the platform. For providers, who maintain greater control over the decision to accept bookings than a commercial hotel or taxi,

their agreement to host is an important aspect. Motivations behind offering assets on sharing economy platforms vary (Bucher, *et al.*, 2016; Karlsson and Dolničar, 2016), so it is not always the case that people will accept anyone who books due to profit or income motives. As the sharing economy expands, more providers might join who are not reliant on the income and thus might have more varied reasons for sharing. In a study from Karlsson, *et al.* (2017), 75 percent of hosts surveyed from accommodation-sharing platforms had rejected booking requests, finding that travel party composition was the most influential factor for rejection; trust and insufficient information about the guests was a key driver for rejection, mentioned by 41 percent of hosts. Karlsson, *et al.* (2017) also found that profile pictures of a couple with a child are disadvantaged and more likely to be rejected by accommodation hosts, and that travelling with family or friends also decreases acceptance rates.

Proxy users also take financial responsibility for the payment of services. Some platforms are attempting to overcome this hurdle through including co-pay services, such as Uber's Split Fare's system. However, the parameters of this mechanism are limited, with acceptance of split fares needing to occur before a trip ends, the system requiring both passengers to have an account, and the process incurring an additional cost for each consumer. For providers and providers-by-proxy, the case is more complicated, as issues over income distribution must be resolved. This necessarily becomes difficult in terms of asset ownership. In the case of a family home, for instance, where one individual receives the money for hosting but all family members take part in the providing-by-proxy, it is unclear how the money is to be distributed. Further, the search for authenticity in homesharing may mean that the family unit is commoditized as a part of the experience, thus suggesting that all members should be reimbursed as co-providers. Such issues have not received due attention, but the distribution of income between co-providers certainly requires more research.

Implications for users

For other users in the sharing economy, who are not involved in proxy-usage, there are still implications. As mentioned above, the sharing economy is reliant on trust (Botsman and Rogers, 2010; Ert, *et al.*, 2016; Hawlitschek, *et al.*, 2016), where a lack of information about users-by-proxy can decrease trust. Providers may not know about the full range of their potential consumers, whereas consumers may face an unexpected co-host or co-provider. For providers, concern about potential damage due to consumer behavior is a key concern of providers and, according to Weber (2014) a key impediment to sharing. There is further no mechanism for controlling the behavior of users-by-proxy, since reputation mechanisms have no impact on those not facing ratings. It has been documented that the presence of bilateral ratings mechanisms operate to moderate the behavior of both providers and consumers to more socially conforming ways (Lutz, *et al.*, 2018). Without such mechanisms, providers and consumers face a potentially less satisfying transaction.

For providers, the unknown element of users-by-proxy means that providers also can't target their offerings in the most appropriate manner and are often left to handle difficult situations of unexpectedly larger numbers of guests, or guests of certain profiles that they would prefer not to host. This has particular implications if we view the sharing economy as a context for labor. For instance, if a provider accepts a booking for a couple, but the couple arrives with a baby in tow, the provider is faced with a difficult situation for which there are limited solutions other than attempting to charge for an additional guest. If a ride-sharing transaction is booked by an adult on behalf of a minor, there are similar issues of whether the provider should accept the transaction or reject; such a situation in any case works out for the detriment of the provider who may be faced with penalties, both financial and reputational, for rejecting a pre-booked ride. The risks of such transactions are thus internalized by the providers.

Implications for sharing platforms

For sharing platforms, users-by-proxy are problematic. Most obviously, in terms of profit, users-by-proxy may result in a loss of potential revenue since if one user shares a transaction among a group, rather than each person booking individually, then the platform makes less money in terms of service fees. However, the most significant cost to platforms is the lack of data.

Sharing platforms are data-driven and rely on a steady stream of data to target their users, make decisions, and develop their offerings. By exploiting the possibilities of advanced analytics capable of handling the ever increasing complexities of big data, including the aggregation and cross-referencing of large dispersed data sets (Boyd and Crawford, 2012; Jasanoff, 2017; Martin, 2015; Michael and Miller, 2013), sharing platforms have been able to leverage data to create new insights, learn at an exponential rate, predict consumer behavior, and improve their business models (Sax, 2016; Whelan, 2017). Digital transactions give firms learning data to then assess a consumer's purchasing habits (Calo, 2014). Data mining has become an increasingly essential business process (Danna and Gandy, 2002), with companies getting 'data hungry' [2].

The data approach means that missing data from users-by-proxy can be problematic, particularly for consumer segmentation and targeting. Recent work on consumer segmentation of the sharing economy (Guttentag, *et al.*, 2017; Lutz and Newlands, 2018) has taken steps towards segmenting the user base. However, these consumer segmentations are limited in scope since they can only assess the users, not the broad group of users by proxy who also exist. The nature of users-by-proxy as coming from under-represented groups can make them seem more underrepresented and the picture painted by the user base may not reflect the entire user base when considering use-by-proxy.

For instance, direct participation tends to be prevalent among young and relatively affluent individuals. In large-scale systematic surveys such as Andreotti, *et al.* (2017), Smith (2016) and Eurobarometer (2016), as well as surveys conducted by consultancies such as Vaughan and Daverio (2016), ING (2015), Deloitte (2015), and Vision Critical (2013), age is shown to be roughly inversely correlated with participation in the

sharing economy. In studies from the U. S., much of the available literature on participation in the sharing economy also discusses ethnicity as an antecedent of participation. Access to the sharing economy shows a degree of overrepresentation among the white population (Schor, *et al.*, 2016). Edelman, *et al.* (2016) provide data that African-Americans active on Airbnb have a 16 percent smaller chance of receiving a positive answer on an apartment request. African-American providers on Airbnb also earn around 18 U. S. dollars per less than other providers (Edelman and Luca, 2014). The aforementioned literature also indicates that the sharing economy is used primarily by employed and wealthy people, as higher income (or higher employment status) correlates with participation in the sharing economy (Andreotti, *et al.*, 2017; Eurobarometer, 2016; Smith, 2016).

Already, disability advocates, similarly, argue that freedom from legal obligation entails fewer accommodations for disabilities (Calo and Rosenblat, 2017; Murphy, 2015). The replacement of public services with platforms will make this problem even worse. When new service offerings are being designed, these are catering not to the whole user base of the sharing economy but to the actual identified users.

Conclusion and research agenda

Similar to general proxy Internet use, proxy participation in the sharing economy warrants more research. [Figure 1](#)) shows future research directions and topics. First, the antecedents of proxy use in the sharing are not clearly understood. What are the profiles of users-by-proxy? Why do users-by-proxy choose to rely on someone else rather than using sharing platforms themselves? Are the reasons based on convenience or on moral values and attitudes? These questions could be answered with quantitative methods. However, given the difficulty of recruiting users-by-proxy in large numbers, the potentially different proxy experience depending on the sharing platform, and the exploratory nature of the topic, we would recommend qualitative methods or digital methods in a first step. Research could conduct in-depth interviews or focus groups with users-by-proxy to assess their motivations and look into contextual factors. It could also investigate online communities or social media and conduct a content analysis or sentiment analysis based on posts related to proxy use.

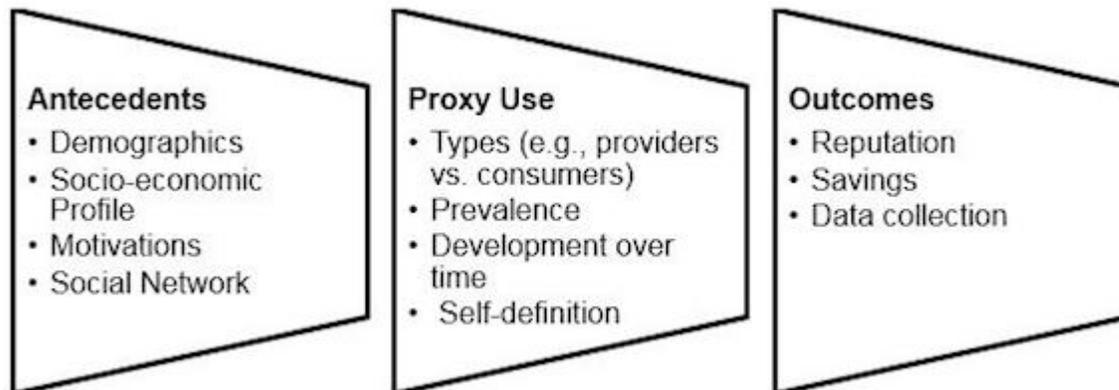


Figure 1: Future research directions for proxy use in the sharing economy.

Second, the phenomenon itself is understudied. We know little about different types of users-by-proxy. For example, which sharing economy sectors — home-sharing, ride-hailing, food sharing, goods sharing, peer-to-peer lending — are particularly affected by proxy use? How many sharing economy non-participants are users-by-proxy? Did the user-by-proxy share increase or decrease over time? Do users-by-proxy see themselves as users or non-users? To answer these questions, quantitative surveys would be particularly suitable. Ideally, such studies would rely on a representative sample of individuals in a given country and region to assess the overall prevalence of sharing economy users-by-proxy and to compare this number with the overall number of sharing participants (both providers and consumers).

Third and finally, the outcomes of proxy use, for example in terms of reputation and data collection, merit further attention. The questions and dilemmas brought up in the previous section (Implications) could be investigated through case studies, including interviews with platform representatives, and through ethnographic research of proxy use in specific settings such as home-sharing and ride-hailing. 

About the authors

Gemma Newlands (MPhil Oxon., BA (Hons) Oxon., University of Oxford) is a Research Associate at the Nordic Centre for Internet and Society, BI Norwegian Business School (Oslo). Her research interests include the sharing economy, the future of work, and youth labour online.
E-mail: gemma [dot] e [dot] newlands [at] bi [dot] no

Christoph Lutz (Ph.D., University of St. Gallen) is an assistant professor at the Nordic Centre for Internet and Society, BI Norwegian Business School (Oslo). His research interests include digital inequality, privacy, participation, the sharing economy, and social robots. Christoph has published widely in top-tier journals in this area.
E-mail: christoph [dot] lutz [at] bi [dot] no

Christian Pieter Hoffmann (Ph.D., University of St. Gallen) is professor of communication management at the Institute of Communication and Media Studies, University of Leipzig. His research is focused on online participation, trust, self-disclosure, and privacy protection in social media.
E-mail: christian [dot] hoffmann [at] uni-leipzig [dot] de

Notes

1. Selwyn, *et al.*, 2005, p. 19.

2. Sax, 2016, p. 25.

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