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Insights from a data privacy perspective**

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Consumer responses to firm-owned devices in self-service technologies: Insights from a data privacy perspective

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ABSTRACT

While self-service technologies (SSTs) enable customers to produce services such as food ordering, hotel check-in, and retail store checkout on their own, they involve the use of devices that are either firm-owned (e.g., the retailer provides a handheld device for self-checkout) or customer-owned (e.g., a customer uses a personal smartphone for self-checkout). With the increasing relevance of customer-owned devices, the role of firm-owned devices is an open question. Therefore, this study examines the role of devices in SSTs. In a series of six empirical studies and drawing on data privacy theory, we explore consumer responses to firm-owned (vs. customer-owned) devices. The findings reveal that consumers prefer firm-owned devices in SSTs and that their general need for data privacy guides these preferences. The findings also show that the interaction with firm-owned (vs. customer-owned) devices is associated with increasing perceptions of data privacy because consumers feel less vulnerable when interacting with firm-owned devices. However, this effect changes depending on the service firm's practices of customer data usage (data sensitivity and transparency). These findings add to knowledge about consumer response to SSTs and devices, and thereby unfold how devices are interwoven with consumer data privacy. Practitioners learn how consumers respond to device ownership in SSTs and when firm-owned (vs. customer-owned) devices induce favorable customer responses.

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1. Introduction

Across service contexts (e.g., travel, retail, health), customers have been increasingly involved in the service delivery process. For example, most people now book and check-in for a flight on their own with the help of self-service technologies (SSTs) not a service employee (Meuter et al., 2000). Given the gains in operational efficiency, firm spending on SSTs has continuously grown in the last few years, and this trend is likely to persist (Allied Market Research, 2022; TotalRetail, 2019). It has a long tradition that service firms implement SSTs, which rely on devices that they supply to the customer (i.e., firm-owned devices, such as terminals for self-checkout at retail stores) (Dabholkar & Bagozzi, 2002; Weijters et al., 2007). The widespread penetration of powerful internet-enabled devices has broadened the scope of SST devices and enabled customers

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to use their personal devices (i.e., *customer-owned devices*, such as smartphones) to co-produce the same services as those with firm-owned devices (Collier & Kimes, 2013). While firms have begun building customer self-service systems with the advance of customers' personal smartphones (Amazon, 2021; Sainsbury, 2020), they have also invested in upgrading the available firm-owned devices by replacing, for instance, terminals with mobile devices (Future Stores, 2020). Thus, the question is whether service firms' investments in their own devices still represent a promising strategy. Surprisingly, while research on SSTs has accumulated in the last years (e.g., Blut, Wang, & Schoefer, 2016), systematic research on how consumers respond to firm-owned devices for self-service is missing, despite the choices that consumers and firms are now facing in this regard. Specifically, empirical evidence is lacking on both (1) the determinants of consumers' preference for different device types in SSTs and (2) the effectiveness of firm-owned (vs. customer-owned) devices for customer self-service.

In six empirical studies, this research provides insights into these two perspectives. To study consumer responses to devices in SSTs, we focus on consumer data privacy (Martin & Murphy, 2017; Smith et al., 2011). Although digital technologies rely on and process a user's information, knowledge on how consumers relate technologies and their characteristics to data privacy is largely missing (Martin et al., 2020; Quach et al., 2022). Therefore, we provide answers to the following questions: (1) What is the role of consumers' general need for data privacy in forming preferences for firm-owned devices for self-service? and (2) How and when do firm-owned (vs. customer-owned) devices shape consumers' situational data privacy perceptions? How do these effects relate to ultimate intentions toward the SST and the SST-providing firm? By providing answers to these questions, we add to the understanding of consumer responses to SSTs in multiple ways. In contrast with prior research, which has assessed SSTs without specifying device types (e.g., Inman & Nikolova, 2017; Reynolds-McInay & Morrin, 2019), we examine the role of device types in SSTs and thereby drive discussion around a nuanced understanding of SSTs to fully grasp consumer responses. To do so, we use the concept of device ownership to build and empirically test a framework that reveals the key role of data privacy in consumer responses to device ownership in SSTs at different stages of the SST interaction (i.e., *before* and *during*). For example, we explore the mechanism responsible for the effect of devices on data privacy perceptions and reveal how such perceptions underlie the effects of devices on responses, such as intentions toward the SST and the SST-providing firm. In this way, we advance the knowledge from the few studies on the effectiveness of SSTs (e.g., Inman & Nikolova, 2017). Furthermore, we consider a potential contingency by testing the moderating role of a firm's customer data usage. We show that both the sensitivity of data the firm collects from its customers and the firm's transparency in using customer data dictate the effects of devices on data privacy perceptions and, ultimately, intentions toward the SST and the SST-providing firm, thus providing practical guidance for firms. Outside the SST literature, this research contributes to the knowledge of the role of devices for consumers (King et al., 2021; Melumad & Meyer, 2020) by revealing the behaviorally relevant psychological processes that device ownership induces. Likewise, this research adds insight into consumer data privacy by showing that the device type as a key technology characteristic is deeply interwoven with consumers' feeling of data privacy and carry information they use to judge data privacy. Previous research on consumer data privacy has predominantly outlined the effects of consumer data privacy (e.g., technology usage, loyalty) and thus has devoted limited attention to the sources of data privacy and, as such, provided limited insights into the important relationship between technology characteristics and data privacy (Okazaki et al., 2020; Quach et al., 2022). Finally, we provide service managers with information about the relevance of device choices in SSTs by unraveling the potentially concealed relevance of device ownership in SSTs. Furthermore, the findings support them in implementing SSTs by showing the conditions under which the use of firm-owned (vs. customer-owned) devices is more favorable in SSTs.

2. Theoretical background and conceptual framework

2.1. SSTs and devices

Three elements are important to describe the idea of an SST: the device/hardware, the software, and the self-service. An SST consists of software and hardware components that enable customers to produce the self-service. While the software (e.g., an app) directs customers in the steps necessary to co-create the service (e.g., by providing the necessary features), the hardware or device represents the component through which they gain access to the software; the device is a tangible part of the SST. Devices in SSTs differ in screen size, input mode, spatial flexibility, and other features. In this research, we refer to the dimension of ownership (firm vs. customer) to further describe SST devices (Gummerus et al., 2019). When referring to firm-owned devices, we mean that the SST-supplying firm provides the customer with a device to use the SST; with customer-owned devices, we mean that a customer uses his or her personal device for SST interaction.

The usage of SSTs is deeply interwoven with the notion that customers co-create services using devices the service firm supplies (for examples, see Table 1). Therefore, many articles on SSTs have defined SSTs by referring to firm-owned devices (see Table 2). With the widespread penetration of reliable and portable internet-enabled devices, customers can now co-create services using their personal devices (e.g., their smartphone for self-checkout in retail stores) that were previously realized using firm-owned devices. Thus, nowadays firm-owned devices exist beside customer-owned devices for the co-creation of services (Inman & Nikolova, 2017). Research on SSTs has implicitly referred to either firm-owned or customer-owned devices (Table 2). However, to our knowledge, SST research has not undertaken an explicit comparison of the two device types, despite likely response-relevant differences, as a recent conceptual study suggests (Gummerus et al., 2019).

Table 1
Examples of SSTs and the respective involvement of devices.

Customer self-service	Context	Exemplary service firm	Device in SST
Check-in	Customers check-in on their own for staying over in a hotel.	Marriot (https://bit.ly/2ZKc1Oh)	Customer-owned device
	Travelers drop off their baggage on their own at the airport.	Air France (https://bit.ly/40Nxg0j)	Firm-owned device
Retrieving information	Customers retrieve additional information about a product when being in a brand's store.	Timberland (https://bit.ly/3KoO1cX)	Firm-owned device
Retrieving information	Visitors can learn about the creation and installation of the artworks that hang in the museum.	Museum of Modern Arts (https://bit.ly/3nBEhmd)	Firm-owned device
Ordering	Customer order products when being in the store for later catch up.	Ikea (https://bit.ly/3G9Ai7g)	Customer-owned device
Registration	Customers order food on their own.	McDonalds (https://nyti.ms/3Zy7VGq)	Firm-owned device
	Customers register for a loyalty program right at the point-of-sale.	The Fresh Company (https://bit.ly/3M4MTw8)	Customer-owned device
Navigation	Customers find location of products in stores on their own.	Walgreens (https://bit.ly/3lRj8V5)	Firm-owned device
	Customers make photos of desired items to find similar products in the store's inventory.	Urban Outfitters (https://bit.ly/40LOgnC)	Customer-owned device
Checkout	Customers check out on their own after making their purchases. They scan selected products and make final payment.	Sainsbury (https://bit.ly/3MaVBsk)	Customer-owned device
		Carrefour (https://bit.ly/40yiMS6)	Firm-owned device

The device type can make a substantial difference in consumer responses to SSTs because it represents a tangible element of the SST and is often used to describe the SST (e.g., a smartphone app for check-in, handheld device for product scanning, terminal for checkout). Research indicates that consumers consider the type of device an important element when making decisions; for example, they are more willing to disclose personal information or to complain on a smartphone than on a computer (Melumad & Meyer, 2020; Zhou, Tian, Mo, & Fei, 2020). Surprisingly, research has not provided empirical insights into the role of devices in SSTs (Gummerus et al., 2019). In particular, knowledge is lacking on (1) how consumers develop preferences for specific device types in SST interaction and (2) how consumers respond to an interaction with a specific device type in SSTs.

The existing literature on SSTs has predominantly investigated the determinants of consumer usage of SSTs, without systematically exploring the role of the respective device type (firm- vs. customer-owned) in consumers' SST usage (Table 2, see Web Appendix 1 for details). For example, researchers have found that both consumer factors (e.g., beliefs and perceptions about using SSTs, consumer traits, socio-demographics) and the characteristics of SSTs (e.g., anthropomorphism, interactivity) explain consumers' decision to use or reuse SSTs. More important, evidence shows that consumers' perceptions of SSTs influence how they respond to the SST-providing firm (e.g., how positive they are about the firm) (Inman & Nikolova, 2017). More recent research has also underscored the relevance of SST by demonstrating that the mere usage of SSTs can shift consumer purchases (Grewal et al., 2020).

2.2. Data privacy

While physical privacy relates to access to one's physical space, data or information privacy is a form of privacy that pertains to access to information about oneself (Smith et al., 2014). Thus, data privacy is given when one can control access to information about oneself (Bélanger & Crossler, 2011). Researchers from different disciplines have examined data privacy from the perspective of a consumer psychological construct (Martin & Murphy, 2017) and developed different perspectives on data privacy (Bandara et al., 2020).

A major distinction is between data privacy at a general or disposition level and data privacy at a situational level. While the disposition to data privacy reflects a "person's general desire or need for privacy across contexts" (Li, 2014, p. 343), it also captures one's need for privacy. This need for data privacy can dictate both consumer decisions (Bandara et al., 2020) and situational privacy perceptions (Li, 2014). Compared with a general need for data privacy, situational data privacy perceptions relate to a specific context or entity. Thus, they reflect perceptions of data privacy, for instance, when interacting with a service firm (Krafft et al., 2017) or technology (Jia et al., 2012; Smith et al., 2014). This contextualization helps develop an understanding of the role of situational variables in the formation of data privacy (Aiello et al., 2020). The theory on privacy, however, suggests that factors in the microenvironment external to an individual determine how he or she experiences privacy (Bélanger & James, 2020; Conger et al., 2013).

We use the two perspectives on consumer data privacy perceptions to develop a framework of hypotheses that enables us to test consumer responses to firm-owned devices in SSTs. In doing so, we draw on the assumption that consumer data privacy and information technology are in an "intertwining relationship" (Wu et al., 2020). With the increasing capabilities of technologies to capture, process, and share information about the user, consumers are likely to tie the usage of technologies

Table 2
Review of the literature on SSTs.

Authors	Type of self-service	Devices in SSTs that implicitly refers to as firm-owned (1) or customer-owned (2) devices	Systematic research on devices in SSTs and comparison of (1) vs. (2)	Consumer responses	
				Preference for (1)	Effects of consumer interaction with (1) vs. (2)
Cao et al. (2022)	transaction	(1)	–	–	–
Cui et al. (2021)	checkout	(2)	–	–	–
van Esch et al. (2021)	checkout	(2)	–	–	–
Park et al. (2021)	ordering	(2)	–	–	–
Grewal et al. (2020)	scanning/checkout	(1)	–	–	–
Heller et al. (2019)	transaction	(1)	–	–	–
Reynolds-McIlroy and Morrin (2019)	transaction, self-checkout	(1) (2)	–	–	–
Inman and Nikolova (2017)	checkout, redeem coupons, retrieving information, transaction	(1) (2)	–	–	–
Blut, Wang and Schoefer (2016)	various	(1) (2)	–	–	–
Fan et al. (2016)	check-in	(1)	–	–	–
Robertson et al. (2016)	retrieving information, updating personal information	(1) (2)	–	–	–
Evanschitzky et al. (2015)	scanning, retrieving information	(1)	–	–	–
Kaushik and Rahman (2015)	scanning/checkout	(1)	–	–	–
Collier et al. (2015)	checkout	(1)	–	–	–
Reinders et al. (2015)	check-in, transaction	(1)	–	–	–
Rosenbaum and Wong (2015)	check-in, checkout	(1)	–	–	–
Brasel and Gips (2014)	transaction	(1)	–	–	–
Gelbrich and Sattler (2014)	checkout	(1)	–	–	–
Collier et al. (2014)	transaction	(1) (2)	–	–	–
Collier and Kimes (2013)	reservation, ordering	(2)	–	–	–
Zhu et al. (2013)	transaction	(1)	–	–	–
Leung and Matanda (2013)	checkout	(1)	–	–	–
Oh et al. (2013)	check-in	(1)	–	–	–
Wang et al. (2013)	transaction/ordering	(2)	–	–	–
Jia et al. (2012)	scanning/checkout	(1)	–	–	–
Wang et al. (2012)	checkout	(1)	–	–	–
White et al. (2012)	scanning/checkout	(1)	–	–	–
Lin and Hsieh (2012)	transaction/ordering	(1) (2)	–	–	–
Lin and Hsieh (2011)	various	(1) (2)	–	–	–
Mattila et al. (2011)	check-in, booking	(1) (2)	–	–	–
Robertson and Shaw (2009)	various	(1) (2)	–	–	–
van Beuningen et al. (2009)	transaction	(2)	–	–	–
Reinders et al. (2008)	transaction, check-in, retrieving information	(1) (2)	–	–	–
Weijters et al. (2007)	scanning	(1)	–	–	–
Curran et al. (2003)	transaction	(1) (2)	–	–	–
Simon and Usunier (2007)	transaction	(1) (2)	–	–	–
Zhu et al. (2007)	transaction	(1)	–	–	–
Walker and Johnson (2006)	transaction	(2)	–	–	–
Curran and Meuter (2005)	transaction	(1) (2)	–	–	–
Curran et al. (2003)	transaction	(1) (2)	–	–	–
Curran et al. (2003)	various	(1) (2)	–	–	–
Dabholkar and Bagozzi (2002)	transaction	(1)	–	–	–
Dabholkar (1996)	transaction	(1)	–	–	–
This study			×	×	×

Notes: × considered, – unconsidered.

to their data privacy (Inman & Nikolova, 2017; Quach et al., 2022). To substantiate the versatile role of data privacy in relation to technologies, we examine how consumers' general need for data privacy shapes their preference for firm-owned devices in SSTs (for details, see Section 2.2.1). Furthermore, we examine how the interaction with firm-owned devices induces data privacy perceptions and how these situational perceptions influence consumers' subsequent decisions about the SST and the SST-providing firm (for details, see Section 2.2.2). In this way, we demonstrate that consumer data privacy perceptions are relevant before and during interactions with SSTs. More important, we aim to show that consumer data privacy is closely linked to the type of device used for SSTs and that this applies in different stages of device involvement.

2.2.1. Consumer preference for firm-owned devices in SSTs

Consumer preference for firm-owned devices in SSTs is a situational preference and is expressed by evaluating the option of using firm-owned devices with some degree of favor (Simon & Usunier, 2007). In general, consumers develop preferences for an option when this option fulfills their needs. In other words, consumer needs direct the development of preferences (Gilal et al., 2019). For example, the need for autonomy can influence a consumer's general intention to use SSTs (Leung & Matanda, 2013). Furthermore, consumers' need for control—in terms of a dispositional trait or as situationally induced—influences situational decisions (e.g., choice of traditional vs. new products) (Faraji-Rad et al., 2017). Against this background, we argue that consumer needs might also shape a preference for firm-owned devices in SSTs. Compared with customer-owned devices, firm-owned devices have several unique qualities (e.g., a single device is usually used only once and shared with others). These qualities might (dis-)satisfy different needs, so we propose that preferences for firm-owned devices are determined by multiple needs. Likewise, we suggest that consumers' need for data privacy occupies a key role in shaping their preference for firm-owned devices. Previous research has shown that consumers prefer self-checkout terminals in retail stores because they relate them to higher levels of anonymity (Leung & Matanda, 2013). Anonymity means the extent to which individuals perceive something to be unidentifiable and thus is closely related to their evaluations of data privacy (Zhu & Grover, 2022). Therefore, we argue that an increasing need for data privacy increases consumers' preference for a firm-owned device in SSTs. Thus:

H1. Consumers' need for data privacy occupies a central role in the formation of their preferences for firm-owned devices in SSTs.

2.2.2. Effects of the interaction with firm-owned devices in SSTs

The environment in which an individual navigates is important for the development of situational privacy (i.e., provides mechanisms to regulate privacy, e.g., by hiding from others) (Bélanger & James, 2020; Conger et al., 2013; Margulis, 2003). The environment comprises both interpersonal (e.g., number of people, presence of others) and external (e.g., objects, barriers) factors (Masur, 2019). Devices represent an example of the external environment because they provide a framework through which one, for instance, can co-create services online (Margulis, 2003). Therefore, prior research has shown that devices (smartphones vs. computers) shape one's view of data privacy (Melumad & Meyer, 2020). As such, we expect that device types will also influence data privacy perceptions during SST usage (i.e., the perception that data privacy is preserved when using the SST; Dinev et al., 2013).

In particular, we hypothesize that device ownership occupies a central position. The type of device ownership determines how personal the environment in which individuals navigate is. Firm-owned (vs. customer-owned) devices provide a less personal environment or an environment that is less close to the self (Song & Sela, 2022). They are used in a targeted way for a limited set of functions, mostly only once, and by multiple people subsequently. Therefore, personal or identifiable information usually cannot be found on these devices. By contrast, consumers store personal information on their own devices to facilitate repeated usage. Thus, when accessing SSTs through a personal device, consumers might perceive less data privacy, as the technology could access the stored information on the personal device. In addition, firm-owned (vs. customer-owned) devices might make consumers feel less vulnerable. Feelings of vulnerability, or the extent to which an individual feels susceptible or threatened (Wottrich et al., 2019), are triggered by external factors and augmented by the increasing closeness of these factor to the self (Aguirre et al., 2015; Wang et al., 2022). Furthermore, feelings of vulnerability inform how much data privacy individuals perceive to have (Dinev & Hart, 2004; Zhang et al., 2018). Thus:

H2a. Firm-owned devices lead to higher data privacy perceptions in SSTs than customer-owned devices.

H2b. Firm-owned devices lead to lower feelings of vulnerability in SSTs than customer-owned devices.

H2c. Feelings of vulnerability mediate the positive effect of firm-owned devices on data privacy perceptions in SSTs.

Consumers' perceptions of data privacy guide different behavior-related responses, such as purchasing decisions (Okazaki et al., 2020), patronage intentions (Inman & Nikolova, 2017), and technology reuse intentions (Smith et al., 2014). As we tie data privacy in this study to SST usage or interaction, we assume that these perceptions positively influence SST reuse intentions. In addition, we assume that SST-related data privacy perceptions might also affect how consumers intend to interact with the SST-providing firm in the future. Previous research has shown that consumer perceptions of an SST have downstream effects on the firm that supplies the SST (Lin & Hsieh, 2011). Therefore, we argue that perceived data privacy perceptions during SST usage enhance consumers' patronage (i.e., willingness to revisit the SST-providing firm) and positive word of mouth (WoM) about the SST-providing firm. Thus:

H3. Increased data privacy perceptions augment (a) SST reuse intentions, (b) patronage intentions, and (c) positive WoM intentions.

Combining H2 and H3, we expect that firm-owned devices indirectly shape consumers' ultimate responses. Thus:

H4. Firm-owned devices have a positive indirect effect on (a) SST reuse intentions, (b) patronage intentions, and (c) positive WoM intentions through feelings of vulnerability and data privacy perceptions.

With the increasing digitalization of customer-facing touchpoints, service firms have access to vast amounts of customer data and use these data for their business (Quach et al., 2022). A firm's usage of customer data encompasses *what* data are used and *how* this data usage is communicated to customers (Morey et al., 2015). While the former angle pertains to data sensitivity, the latter perspective typically involves the level of transparency (Grosso et al., 2020; Martin et al., 2017).

Data of higher (vs. lower) sensitivity are typically associated with increasing intimacy, risk, and identifiability (Markos et al., 2018, 2017; Mothersbaugh et al., 2012). As such, consumers regard the collection of information of increased sensitivity as more privacy invading than the collection of data of lower sensitivity (Hong et al., 2021). Therefore, information about a firm's usage of customer data of lower (vs. higher) sensitivity might decrease consumers' feelings of vulnerability and increase perceptions of data privacy during SST usage. Likewise, we expect that with decreasing data sensitivity, other signals of data privacy or vulnerability, such as the device type in SSTs, are becoming less important to consumers. Recent research has observed a similar effect for the privacy-induced role of anthropomorphism (Xie & Lei, 2022). Thus:

H5. Data sensitivity moderates the effect of firm-owned devices on (a) vulnerability feelings and (b) data privacy perceptions, such that the effect is mitigated (enhanced) when consumers are exposed to a firm's usage of customer data of lower (higher) sensitivity.

H6. Data sensitivity moderates the indirect effect of firm-owned devices on (a) SST reuse, (b) patronage, and (c) positive WoM intentions through the serial effect of feelings of vulnerability and data privacy perceptions, such that the effect is mitigated (enhanced) when consumers are exposed to a firm's usage of customer data of lower (higher) sensitivity.

Firms can communicate usage of data to customers with lower versus higher transparency. Transparency means the extent to which a consumer has a clear, easy-to-grasp, and straightforward understanding of a firm's customer data usage (e.g., data collection and sharing) (Martin et al., 2017). Increasing transparency reduces uncertainty and conveys the impression that the firm cares about its customers (Venkatesh et al., 2016). Thus, both a consumer's felt vulnerability and privacy perceptions can be based on transparency (Guo et al., 2022). We assume that increasing transparency mitigates the effect of firm-owned devices on data privacy perceptions and vulnerability feelings. Thus:

H7. Data transparency moderates the effect of firm-owned devices on (a) vulnerability feelings and (b) data privacy perceptions, such that the effect is mitigated (enhanced) when consumers are exposed to higher (lower) transparency in customer data usage.

H8. Data transparency moderates the indirect effect of firm-owned devices on (a) SST reuse, (b) patronage, and (c) positive WoM intentions through the serial effect of feelings of vulnerability and data privacy perceptions, such that the effect is mitigated (enhanced) when consumers are exposed to higher (lower) transparency in customer data usage.

3. Overview of studies

We summarize the conceptual framework in Fig. 1. Study 1 sheds light on consumer decisions by more specifically examining why consumers prefer firm-owned to customer-owned devices in SSTs. We provide insights into the relative importance of consumers' need for data privacy (H1). In Study 2, we examine how consumers respond to the firm decision to provide access to SSTs through either firm-owned or customer-owned devices. In particular, we explore whether and how firm-owned devices shape situational privacy perceptions (H2) and how important these privacy perceptions are for consumers' subsequent decisions about the SST and the SST-providing firm (H3–H4). In Study 3, we examine *when* an interaction with firm-owned devices in SSTs leads to situational data privacy perceptions and downstream effects (H5–H8).

4. Study 1

4.1. Study 1a

4.1.1. Methods

Study 1a was a prestudy to explore needs that underlie consumers' device preference. We recruited 99 respondents (36.4% female, $M_{age} = 32.0$ years) from Prolific to answer a survey. The survey showed four services presented in a randomized order: (1) food ordering in a restaurant, (2) checkout in a retail store, (3) payment of purchases in a hotel, and (4) registration for a retail store's loyalty program. As an introduction to each scenario, we told respondents to imagine that the

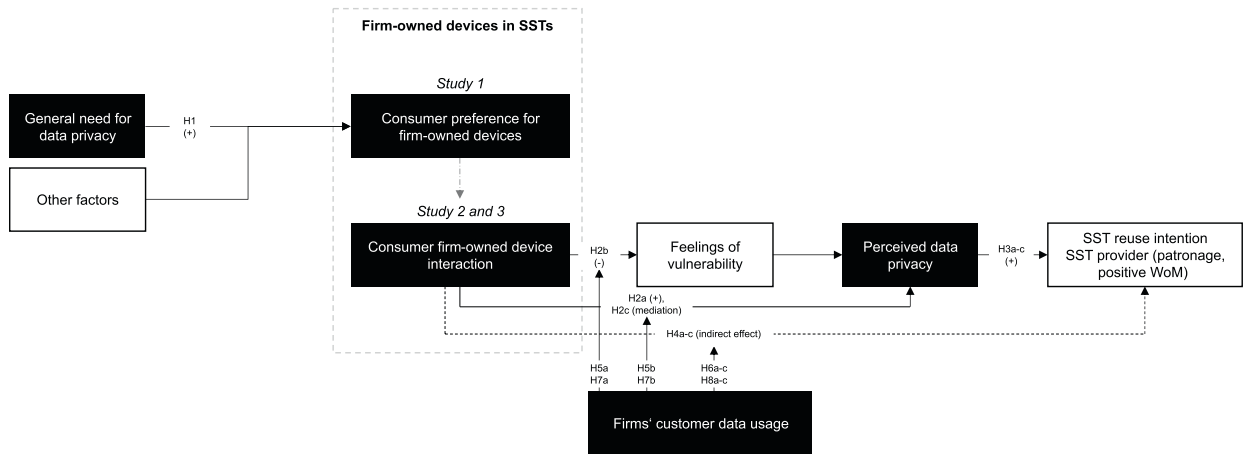


Fig. 1.

respective service provider had gone through a digitalization process and now gives customers the opportunity to use an SST for the respective service and that customers can choose between a firm-owned and a personal device for self-service. After respondents made their device choice, we asked them to explain their decision in writing. To analyze the qualitative data collected from this open-ended question, we used qualitative content analysis. First, two of the authors analyzed the data independently to identify categories summarizing single statements. Informants who reported more than one reason were grouped into multiple categories. Second, the coders came together to discuss any discrepancies in coding and to reach an agreement.

4.1.2. Results

The categorization of responses resulted in six themes that guide consumers' decisions in choosing a device type (see [Web Appendix 2](#) for details): (1) *need for convenience*, or the need to reduce both efforts (mentally and physically) and time investments; (2) *need for saving resources*, or the need to reduce personal expenses and thus reduce the monetary effort (e.g., for the use of mobile data) or expenses of other resources (e.g., battery); (3) *need for data privacy*, or the need for personal information to be protected and not overly collected or shared with uninvolved others; (4) *need for routine*, or the need to keep with the same things rather than trying new ones (i.e., existing solutions satisfy needs, so other solutions are unnecessary); (5) *need for autonomy*, or the need to be free and independent in decisions and activities, which also relates to the need to feel uncontrolled by others; and (6) *need for contamination reduction*, or the need to reduce the likelihood of infection and, thus, the number of touchpoints that might reflect a source of infection. We built these six themes in line with the basic assumption that consumers follow fundamental needs motivating their decisions.

4.2. Study 1b

Study 1b aimed to test whether the needs for data privacy direct consumer preference for firm-owned devices and, thus, to disentangle the relative importance of data privacy needs in relation to the other needs identified in Study 1a. We recruited 203 respondents (41.4% female, $M_{age} = 31.1$ years) from Prolific for this study. We administered the survey through an online questionnaire, which consisted of two parts. The first part asked respondents to rate their general needs in relation to data privacy, contamination reduction, autonomy, routine, savings, and convenience on a 7-point Likert scale. To measure individual needs, we relied on established scales and adapted them to our research (see [Web Appendix 2](#) for details). Both the individual concepts and the items measuring the individual concepts were displayed in a randomized order. The second part explained the nature of SSTs using examples from the pilot study and noted that these SSTs are accessible through different devices (i.e., firm-owned and personal devices). Respondents then rated one item reflecting their preference for firm-owned devices on a 7-point Likert scale (i.e., "I would prefer using firm-owned devices when interacting with SSTs").

We analyzed the data with structural equation modeling and the Mplus software package ([Muthén & Muthén, 2017](#)). A confirmatory factor analysis (CFA) showed that the employed measures were of acceptable reliability and validity (for details, see [Web Appendix 2](#)). The results of the CFA indicated that the proposed measurement model fit the empirical data well, with fit indices meeting the recommended thresholds (Steenkamp and Baumgartner 1995) (comparative fit index = 0.947, Tucker–Lewis index = 0.928, root mean square error of approximation = 0.050, standardized root mean square residual = 0.050). The results of the path analysis revealed that consumer preference for firm-owned devices in SSTs was positively influenced by data privacy needs ($\beta = 0.254$, $p = 0.002$) but not by needs for convenience ($\beta = 0.006$, $p = 0.938$), savings ($\beta = 0.014$, $p = 0.875$), contamination protection ($\beta = 0.020$, $p = 0.825$), autonomy ($\beta = 0.031$, $p = 0.791$), or routine ($\beta = -0.027$, $p = 0.761$).

4.3. Discussion

The results of Study 1 reveal that psychological factors underlie consumer preference for firm-owned devices. Specifically, consumers' need for data privacy occupies a central role in this regard. Study 1a shows a significant level of unprompted mention of the privacy theme. Study 1b provides further support for the key role of data privacy, lending support to H1. Furthermore, Study 1b reveals that the general need for data privacy is positively associated with consumer preference for firm-owned devices. Although the qualitative study (Study 1a) reveals that consumer decisions account for the satisfaction of other needs, such as the need for convenience, the quantitative study does not support the direct effect of these needs on preferences for firm-owned devices. Possibly, other concepts need to be considered to shed light on the indirect effect of these needs.

5. Study 2

5.1. Study 2a

5.1.1. Methods

Study 2a was a between-subjects field experiment with two manipulated conditions (device ownership: firm-owned vs. customer-owned) (Malodia et al., 2023). The experiment took place on the campus of a German university. We told participants that they had the opportunity to register for a new customer loyalty program at an outlet store a short distance from the university. We also informed them that immediate registration would qualify them for a draw of five shopping vouchers redeemable at the outlet store. We randomly assigned the participants who agreed to self-register to one of the two conditions: We asked them to use either (1) their own smartphone or (2) a smartphone we said was provided by the outlet center. We did not encounter a situation in which participants did not have their own smartphones. Independent of the condition, we asked participants to scan a QR code depicted on a display with the respective smartphone to gain access to the website on which they could register. We created the website based on actual websites used for customer loyalty program registration. Thus, participants were invited to reveal their name and date of birth, among other data. After they registered, we asked participants to fill out a paper-based questionnaire that contained several key measures to test our hypotheses (see [Web Appendix 3](#) for details). We also collected information about participants' (1) experience with the SST (i.e., "How experienced do you consider yourself in using the SST?" 1 = very inexperienced, 7 = very experienced), (2) familiarity with the SST-providing firm (i.e., "How familiar are you with the firm X?" 1 = very unfamiliar, 7 = very familiar), (3) overall preference for using a personal device for this self-service (i.e., "To what extent do you prefer to employ your personal device for registration?" 1 = not at all, 7 = very much), and (4) need for data privacy (i.e., "Compared with others, I tend to be more concerned about threats to my data privacy." 1 = not at all, 7 = very much). This information served as covariates in our data analysis. After participants completed the questionnaire, we debriefed them and thanked them. For data analysis, we used the complete data sets of 115 participants (52.2% female, $M_{\text{age}} = 22.6$ years).

5.1.2. Results

An analysis of covariance (ANCOVA) on data privacy perceptions revealed a higher mean in the condition with firm-owned (vs. customer-owned) devices ($M_{\text{firm-owned}} = 4.70$, $SD = 1.37$; $M_{\text{customer-owned}} = 4.05$, $SD = 0.92$; $F(1, 109) = 9.268$, $p = 0.003$), while an ANCOVA on feelings of vulnerability suggested a lower mean in the condition with firm-owned (vs. customer-owned) devices ($M_{\text{firm-owned}} = 1.68$, $SD = 1.01$; $M_{\text{customer-owned}} = 2.82$, $SD = 1.23$; $F(1, 109) = 33.638$, $p < 0.001$), in support of H2a and H2b. Of note, one-way analyses of variance (ANOVAs) yielded the same results (data privacy perceptions: $F(1, 113) = 8.822$, $p = 0.004$; feelings of vulnerability: $F(1, 113) = 29.815$, $p < 0.001$). To test H2c, we conducted a mediation analysis (PROCESS [model 4] with 5,000 bootstrap samples including the covariates; [Hayes, 2018](#)). When we regressed data privacy perceptions on device ownership and vulnerability, the effect of device ownership was non-significant ($b = 0.263$, $SE = 0.24$, $t = 1.09$, $p = 0.277$) and the effect of vulnerability perceptions was significant ($b = -0.352$, $SE = 0.10$, $t = -3.51$, $p = 0.001$). The results further revealed a positive and significant indirect effect through vulnerability ($B = 0.410$, $SE = 0.14$, 95% confidence interval [CI_{95}] = [0.1667, 0.7083]). Therefore, vulnerability perceptions fully mediated the effect of device ownership on data privacy perceptions, lending support to H2c.

Furthermore, we tested H3 and H4 using PROCESS (model 6) with 5,000 bootstrap samples.¹ The results revealed a significant effect of data privacy perceptions on SST reuse ($b = 0.265$, $SE = 0.10$, $t = 2.63$, $p = 0.010$) and positive WoM ($b = 0.537$, $SE = 0.12$, $t = 4.57$, $p = 0.000$) intentions, confirming H3a and H3c. Furthermore, the analysis revealed a significant indirect effect of firm-owned device to SST reuse intention through vulnerability and data privacy perceptions ($B = 0.109$, $SE = 0.06$, $CI_{95} = [0.0049, 0.2485]$) and of firm-owned device to positive WoM through vulnerability and data privacy perceptions ($B = 0.220$, $SE = 0.09$, $CI_{95} = [0.0694, 0.4324]$), in support of H4 (see [Web Appendix 4](#)).

¹ While we considered SST reuse and positive WoM intentions as the respective dependent variable (Y), the device type (1 = firm-owned, 0 = customer-owned device) represented the independent variable (X), and vulnerability feelings (M1) and data privacy perceptions (M2) represented the mediating variable in this model.

5.2. Study 2b

5.2.1. Methods

Study 2b was a between-subjects online experiment with two manipulated conditions (device ownership: firm-owned vs. customer-owned device). To manipulate the device type, we created two scenarios of an SST (i.e., mobile self-scanning technology) that differed only in the type of device used to interact with this SST (see [Web Appendix 5](#) for details). We chose the example of mobile self-scanning technology (i.e., customers use the SST for scanning articles selected in a retail store) because it reflects a current SST that retailers have implemented relying on either customer- or retailer-owned mobile devices ([Carrefour, 2020](#); [Sainsbury, 2020](#)). Furthermore, self-service “scanning” involves a more implicit form of personal data disclosure than self-service “registration” (Study 2a). The scenarios referred to a real retail company that had implemented the SST. To enhance participants’ immersion, we created a short video showing how self-scanning in general works. Then, we provided detailed information, including information about the device type, that was supported by pictures; the text was animated by enabling one word to appear only after the presentation of the previous word. We included attention checks to ensure that participants watched the video.

After the presentation of the experimental material, we asked participants to fill out a questionnaire measuring their intentions, data privacy and vulnerability (see [Web Appendix 3](#) for details). We also collected information about participants’ background (e.g., familiarity with the retailer) and treated this information as covariates in our data analysis. Before collecting key socio-demographic information, we asked participants to recall the device type required to use the SST.² To control for potential demand artifacts, we asked them to answer an open-ended question that asked about the aim of the study (suspicion probe). None of the participants guessed the study’s purpose. We used the responses from 196 adult participants (43.4% female, $M_{\text{age}} = 31.4$ years) recruited from Prolific. Through pre-screening, we ensured that panelists from the retailers’ target market and users of desktop or laptop computers could participate in this study.

5.2.2. Results

An ANCOVA on data privacy perceptions revealed a higher mean in the condition with firm-owned (vs. customer-owned) devices ($M_{\text{firm-owned}} = 4.04$, $SD = 1.18$; $M_{\text{customer-owned}} = 3.57$, $SD = 1.40$; $F(1, 190) = 4.711$, $p = 0.031$), while an ANCOVA on feelings of vulnerability suggested a lower mean in the condition with firm-owned (vs. customer-owned) devices ($M_{\text{firm-owned}} = 2.18$, $SD = 1.34$; $M_{\text{customer-owned}} = 2.73$, $SD = 1.54$; $F(1, 190) = 4.766$, $p = 0.030$), in support of H2a and H2b. Of note, one-way ANOVAs yielded the same results (data privacy perceptions: $F(1, 194) = 6.416$, $p = 0.012$; feelings of vulnerability: $F(1, 194) = 6.995$, $p = 0.009$). To test H2c, we conducted a mediation analysis (PROCESS [model 4] with 5,000 bootstrap samples including the covariates; [Hayes, 2018](#)). When we regressed data privacy perceptions on device ownership and vulnerability, the effect of device ownership was non-significant ($b = 0.206$, $SE = 0.16$, $t = 1.27$, $p = 0.205$) and the effect of vulnerability perceptions was significant ($b = -0.419$, $SE = 0.06$, $t = -7.38$, $p = 0.000$). The results further revealed a positive and significant indirect effect through vulnerability ($B = 0.187$, $SE = 0.10$, $CI_{95} = [0.0152, 0.3965]$). Thus, vulnerability perceptions mediated the effect of device ownership on data privacy perceptions, confirming H2c.

Furthermore, we tested H3 and H4 using PROCESS (model 6) with 5,000 bootstrap samples. The results revealed a significant effect of data privacy perceptions on SST reuse ($b = 0.515$, $SE = 0.09$, $t = 5.54$, $p = 0.000$), patronage ($b = 0.303$, $SE = 0.09$, $t = 3.46$, $p = 0.001$), and positive WoM ($b = 0.308$, $SE = 0.08$, $t = 3.89$, $p = 0.000$) intentions, in support of H3. In support of H4, the results revealed a significant indirect path from firm-owned devices to intentions through vulnerability and data privacy perceptions (SST reuse: $B = 0.096$, $SE = 0.06$, $CI_{95} = [0.0051, 0.2271]$; patronage: $B = 0.057$, $SE = 0.04$, $CI_{95} = [0.0019, 0.1502]$; WoM: $B = 0.058$, $SE = 0.04$, $CI_{95} = [0.0025, 0.1477]$) (see [Web Appendix 4](#) for details).

5.3. Discussion

The results of Study 2 show for two types of self-services (i.e., product scanning and registration for loyalty program) that device ownership determines the formation of data privacy perceptions. In particular, firm-owned devices lead to higher data privacy (H2a). The findings also illustrate that firm-owned devices make consumers feel less vulnerable (H2b) and that these vulnerability perceptions mediate the effect of device types on data privacy (H2c). Furthermore, consumers’ data privacy perceptions influence their decision-making about the SST and the SST-providing firm. That is, data privacy positively influences SST reuse, patronage, and positive WoM intentions (H3). Finally, the results reveal that firm-owned devices indirectly shape both consumers’ decision to reuse the SST in the future and their decision to spread positive WoM about and revisit the SST-providing firm through a serial mediation of vulnerability and data privacy perceptions. In other words, the device type indirectly influences consumers’ adoption of SSTs and preferences for SST-providing service firms (H4).

² The manipulation of the device type worked as intended. The question whether participants interacted with a firm-owned device was affirmed for participants in the condition in which a firm-owned device was used for the SST ($\chi^2(1, n = 189) = 148.142$, $p = 0.000$).

6. Study 3

6.1. Study 3a

6.1.1. Methods

In Study 3a, we tested H5 and H6 and conducted an online experiment in which we employed a 2 (device ownership: firm-owned vs. customer-owned) \times 2 (type of customer data used: lower vs. higher sensitivity) between-subjects design. For this study, we used the responses from 399 adult participants (35.6% female, $M_{\text{age}} = 36.8$ years) recruited from Prolific. Through pre-screening on Prolific, we ensured that participants had not been part of one of the previous studies and that they used a desktop computer.

First, we manipulated the device type using a text-based scenario that was similar to the one used in Study 2b (see [Web Appendix 6](#) for details). Second, we asked the participants to read one of the two randomly assigned articles about a fictitious SST-providing firm. We systematically varied the type of customer data (lower vs. higher sensitivity) the firm uses in the articles (see [Web Appendix 6](#) for details). Afterward, study participants rated the same measures as in the previous studies (see [Web Appendix 3](#) for details). Finally, we instructed participants to rate the type of customer data usage described in the study on a 7-point semantic differential scale (1 = uses data of lower sensitivity, 7 = uses data of higher sensitivity) and to recall the device used for the SST (1 = customer-owned, 7 = firm-owned).³ In addition, we captured information about consumers' background (i.e., SST familiarity, overall preference for using a personal device, and need for data privacy), which we used as control variables.

6.1.2. Results

An ANCOVA with device type, type of customer data used, and their interaction as the independent variables; perceived vulnerability or perceived data privacy as the dependent variable; and the covariates revealed a statistically significant interaction (vulnerability: $F(1, 392) = 5.318, p = 0.022$; data privacy: $F(1, 392) = 13.807, p < 0.001$), in support of H5a and H5b. Pairwise comparisons revealed that in the condition of higher data sensitivity, privacy perceptions were higher for firm-owned than customer-owned devices ($M_{\text{firm-owned}} = 4.97, SD = 1.44$; $M_{\text{customer-owned}} = 3.67, SD = 1.92$; $F(1, 190) = 5.262, p = 0.023$). Likewise, vulnerability perceptions were marginally lower for firm-owned than customer-owned devices ($M_{\text{firm-owned}} = 4.28, SD = 1.64$; $M_{\text{customer-owned}} = 4.88, SD = 1.53$; $F(1, 190) = 3.375, p = 0.068$). By contrast, in the condition of lower data sensitivity, vulnerability and privacy perceptions were indifferent between firm-owned and customer-owned devices (vulnerability: $M_{\text{firm-owned}} = 4.13, SD = 1.83$; $M_{\text{customer-owned}} = 3.92, SD = 1.75$; $F(1, 199) = 0.380, p = 0.846$; data privacy: $M_{\text{firm-owned}} = 4.87, SD = 1.57$; $M_{\text{customer-owned}} = 4.58, SD = 1.59$; $F(1, 199) = 0.183, p = 0.669$).

To test H6, we used PROCESS (model 84) with 5,000 bootstrap samples (see [Web Appendix 6](#) for details).⁴ Consistent with H6, we found a significant index of moderated mediation (SST reuse intentions: $B = 0.105, SE = 0.05, CI_{95} = [0.0175, 0.2064]$); patronage intentions: $B = 0.095, SE = 0.05, CI_{95} = [0.0136, 0.1933]$; positive WoM intentions: $B = 0.101, SE = 0.05, CI_{95} = [0.016, 0.2011]$). For the usage of data with higher sensitivity, firm-owned devices positively influenced SST reuse, patronage, and positive WoM intentions through data privacy and vulnerability perceptions (SST reuse intentions: $B = 0.089, SE = 0.04, CI_{95} = [0.0222, 0.1678]$; patronage intentions: $B = 0.080, SE = 0.03, CI_{95} = [0.0226, 0.1555]$; positive WoM intentions: $B = 0.085, SE = 0.03, CI_{95} = [0.0249, 0.1602]$). By contrast, for the usage of data with lower sensitivity, firm-owned devices did not influence SST reuse patronage, and positive WoM intentions (SST reuse intentions: $B = -0.016, SE = 0.03, CI_{95} = [-0.0819, 0.0494]$; patronage intentions: $B = -0.015, SE = 0.03, CI_{95} = [-0.0782, 0.0468]$; positive WoM intentions: $B = -0.016, SE = 0.03, CI_{95} = [-0.0796, 0.0463]$) (see [Web Appendix 6](#) for details).

6.2. Study 3b

6.2.1. Methods

In Study 3b, we tested H7 and H8 and conducted an online experiment in which we employed a 2 (device ownership: firm-owned vs. customer-owned) \times 2 (transparency in customer data usage: higher vs. lower) between-subjects design. For this study, we used the responses from 373 adult participants (38.3% female, $M_{\text{age}} = 37.4$ years) recruited from Prolific. We used the same pre-screening criteria as in the previous studies. First, we manipulated the device type in the same way as in Study 3a. Second, we asked the participants to read one of two randomly assigned articles about the SST-providing firm. In the article, we systematically varied the customer-oriented communication about the firm's usage of customer data (higher vs. lower transparency) (see [Web Appendix 6](#) for details). Afterward, participants rated the same measures as in the previous studies (see [Web Appendix 6](#) for details). Finally, we instructed participants to rate the firm's transparency in customer data usage described in the study on a 7-point semantic differential scale (1 = lower transparency, 7 = higher transparency) and to

³ Both the manipulation of the type of customer data usage ($M_{\text{lower}} = 3.72, SD = 2.26$; $M_{\text{higher}} = 5.74, SD = 1.36$; $F(1, 397) = 116.412, p < 0.001$) and the manipulation of the device type worked as intended. The question whether participants interacted with a firm-owned device was affirmed for participants in the condition in which a firm-owned device was used for the SST ($\chi^2(1, n = 399) = 282.377, p = 0.000$), indicating the success of the manipulation.

⁴ We used intentions as the dependent variable (Y), the device ownership type (1 = firm-owned device, 0 = customer-owned device) as the independent variable (X), vulnerability perceptions (M1) and data privacy perceptions (M2) as the mediating variables, and type of customer data used (1 = higher sensitivity, 0 = lower sensitivity) as the moderator (W) in this model.

recall the device used for the SST (1 = customer-owned, 7 = firm-owned).⁵ Finally, we captured information about consumers' background (i.e., SST familiarity, overall preference for using a personal device, and need for data privacy), which we used as control variables.

6.2.2. Results

To test H7, an ANCOVA with device type, transparency in customer data usage, and their interaction as the independent variables; perceived vulnerability or perceived data privacy as the dependent variable; and the covariates revealed a statistically significant interaction (vulnerability: $F(1, 366) = 4.778, p = 0.010$; data privacy: $F(1, 366) = 6.711, p = 0.010$). Pairwise comparisons revealed that in the condition of lower transparency, vulnerability perceptions were marginally lower for firm-owned than customer-owned devices ($M_{\text{firm-owned}} = 4.67, SD = 1.49$; $M_{\text{customer-owned}} = 5.10, SD = 1.24$; $F(1, 172) = 3.148, p = 0.078$). Likewise, data privacy perceptions were higher for firm-owned than customer-owned devices ($M_{\text{firm-owned}} = 4.66, SD = 1.68$; $M_{\text{customer-owned}} = 3.30, SD = 1.83$; $F(1, 172) = 4.291, p = 0.040$). By contrast, in the condition of higher transparency, both vulnerability and privacy perceptions were indifferent between firm-owned and customer-owned devices (vulnerability: $M_{\text{firm-owned}} = 4.07, SD = 1.81$; $M_{\text{customer-owned}} = 3.80, SD = 1.81$; $F(1, 191) = 0.777, p = 0.379$; data privacy: $M_{\text{firm-owned}} = 4.88, SD = 1.57$; $M_{\text{customer-owned}} = 4.68, SD = 1.44$; $F(1, 191) = 0.406, p = 0.525$), in support of H7.

To test H8, we used PROCESS (model 84) with 5,000 bootstrap samples (see [Web Appendix 6](#) for details).⁶ Consistent with H8, we found a significant index moderated mediation (SST reuse intentions: $B = -0.094, SE = 0.05, CI_{95} = [-0.1925, -0.009]$); patronage intentions: $B = -0.091, SE = 0.05, CI_{95} = [-0.1933, -0.0088]$; positive WoM intentions: $B = -0.090, SE = 0.04, CI_{95} = [-0.1840, -0.0138]$). For lower transparency in customer data usage, firm-owned devices positively influenced SST reuse, patronage, and positive WoM intentions through data privacy and vulnerability perceptions (SST reuse intentions: $B = 0.062, SE = 0.03, CI_{95} = [0.0063, 0.1326]$; patronage intentions: $B = 0.060, SE = 0.03, CI_{95} = [0.0063, 0.1292]$; positive WoM intentions: $B = 0.059, SE = 0.03, CI_{95} = [0.057, 0.1241]$). By contrast, for higher transparency in customer data usage, firm-owned devices did not influence SST reuse, patronage, and positive WoM intentions (SST reuse intentions: $B = -0.032, SE = 0.03, CI_{95} = [-0.098, 0.0325]$; patronage intentions: $B = -0.031, SE = 0.03, CI_{95} = [-0.0992, 0.0341]$; positive WoM intentions: $B = -0.031, SE = 0.03, CI_{95} = [-0.0961, 0.0319]$) (see [Web Appendix 6](#) for details).

6.3. Discussion

The results of Study 3 show that a firm's customer data usage dictates how consumers respond to firm-owned devices. Both the sensitivity of the customer data (lower vs. higher) a firm uses and the firm's transparency in customer data usage (lower vs. higher) determine how firm-owned devices affect vulnerability and data privacy perceptions and, ultimately, the decision to use the SST and to interact with the SST-providing firm in the future. The findings illustrate that both a decreasing data sensitivity level (H5) and an increasing level of transparency (H7) mitigate both the positive effect of firm-owned devices on data privacy in SSTs and the negative effect of firm-owned devices on vulnerability perceptions. Finally, the findings also reveal that the indirect effect of firm-owned devices on the different intentions is attenuated with decreasing data sensitivity (H6) and increasing transparency (H8).

7. General discussion

SSTs naturally involve the use of devices that are owned by either the customer or the service firm. To our knowledge, this research is the first to provide empirical insights into consumer responses to firm-owned (vs. personal) devices in SSTs. In doing so, this research developed and empirically tested a framework that integrates two perspectives on device ownership in SSTs. In Study 1, which encompassed two empirical studies, we examined consumer preference for firm-owned devices in SSTs to explain consumer decisions that usually precede an actual interaction with the SST. In Studies 2 and 3, we evaluated consumers' interaction with firm-owned (vs. personal) devices for self-service and developed an understanding of how and when consumers respond to the respective interaction. We used data privacy theory to shed light on consumer responses to firm-owned devices in SSTs.

The results of Study 1 show that consumers' general need for data privacy occupies a central role in fostering preferences for firm-owned devices in SSTs. Additional findings imply that other factors (e.g., the need for convenience) might shape a consumer's preferences for firm-owned devices indirectly. The results of Study 2 show for two types of self-services (i.e., scanning of products and registration for loyalty program) that an interaction with firm-owned (vs. personal) devices for self-service leads to higher data privacy perceptions because consumers feel less vulnerable. These data privacy perceptions positively influence SST reuse, patronage, and positive WoM intentions. Finally, the results reveal that firm-owned devices indirectly enhance these intentions through vulnerability feelings and data privacy perceptions. In Study 3, we show that the

⁵ Both the manipulation of the transparency level ($M_{\text{lower}} = 3.64, SD = 2.29$; $M_{\text{higher}} = 6.07, SD = 0.96$; $F(1, 374) = 183.565, p < 0.001$) and the manipulation of the device type worked as intended. The question whether participants interacted with a firm-owned device was affirmed for participants in the condition in which a firm-owned device was used for the SST ($\chi^2(1, n = 372) = 308.101, p = 0.000$), indicating the success of manipulation.

⁶ We used intentions as the dependent variable (Y), the device type (1 = firm-owned device, 0 = customer-owned device) as the independent variable (X), vulnerability perceptions (M1) and data privacy perceptions (M2) as the mediating variables, and transparency in customer data usage (1 = higher, 0 = lower) as the moderator (W) in this model.

service firm's customer data usage influences how consumers respond to firm-owned devices. When the SST-providing firm uses data of higher sensitivity or with lower transparency, firm-owned devices enhance data privacy perceptions through feelings of vulnerability.

7.1. Theoretical contributions

This research enriches the knowledge on SSTs from multiple perspectives. First, this study provides insights into the role of device types in consumer responses to SSTs by establishing the important role of device ownership. Although existing research refers to different types of device ownership (see Table 2), it has not provided a systematic understanding of consumer responses to firm-owned (vs. customer-owned) devices in SSTs. The findings of this research, however, reveal that this distinction is important for consumer decisions. For example, we show that consumers develop specific preferences for the devices used in SSTs, which advances the understanding of consumer preferences for SSTs (Simon & Usunier, 2007). Furthermore, we illustrate that the differences in devices in SSTs also guide the interaction with SSTs and subsequent perceptions and decisions.

Second, this research is the first to provide a multifaceted understanding of the interrelationships between SSTs and consumer data privacy. In contrast with research that is largely conceptual in nature (Quach et al., 2022) or has studied the relationship for shopper-facing technologies in retailing without specifying the technology's characteristics (Inman & Nikolova, 2017), we elucidate the role of consumer data privacy psychology at different stages of the decision process in relation to technologies (i.e., before and during interaction). Thus, our study expands understanding of customer data privacy by uncovering psychological mechanisms underlying the interrelationship between technologies and data privacy approaches. Moreover, this research illustrates the role of a firm's behavior in shaping the interrelationship between technologies and customer data privacy, which supports propositions in current conceptual works (Quach et al., 2022).

Finally, our findings show that in technology-mediated interactions, consumers relate the device to their data privacy, thereby broadening research on device effects. Previous research has provided first insights into the relevance of device categories for customer data privacy (Melumad & Meyer, 2020) or has shown that consumers associate device features with perceptions of ownership (Brasel & Gips, 2014). We add to this knowledge by showing that the type of device ownership (firm vs. customer) also informs consumer data privacy.

7.2. Managerial implications

This study's findings have important implications for firms offering customer services through SSTs. SSTs reflect an increasingly important touchpoint that is available for various self-services along the customer service process (e.g., check-in situations in hotels, orderings in restaurants, checkout at retailer cashpoints) (Grewal et al., 2020). In addition to this widespread penetration of SSTs in practice, our research reveals that these SSTs rely on different devices, either firm- or customer-owned devices.

Our findings suggest that SST-providing firms should consciously decide which device to promote, especially when they are aiming to manage customer psychology related to data privacy. Despite the recent shift toward reliance on customer-owned devices in SSTs (Amazon, 2021; Sainsbury, 2020), our findings suggest that firms should consider the supply of devices, as the interaction with firm-owned (vs. personal) devices enhances customer privacy perceptions and, ultimately, the intention to reuse the SST, the willingness to interact with the firm again in future, and the likelihood to spread positive WoM about the SST-providing firm. This favorability of firm-owned devices applies to services that require a more (e.g., registration) versus less (e.g., product scanning) explicit disclosure of data from customers.

Likewise, our findings have implications for firms that wish to establish SST accessibility on customer-owned devices. According to our findings, firms should manage customers' data privacy perceptions by establishing measures that support and enhance these perceptions. Potential measures, also discussed in this research, include the firm's use of customer data. Increasing the transparency in customer data use or lowering the sensitivity of collected customer data (e.g., by asking for information cues of lower sensitivity) might compensate for the privacy threats involved in customer-owned devices.

Furthermore, our findings have implications for (1) the identification of the fit between a firm's customer data use and the use of device types in SSTs, (2) the design of a firm's customer data use, and (3) the identification of contexts with specificities for customer data use. First, we advise SST-providing firms to fit the choice of SST devices into their way of using and communicating the use of customer data. For example, firms with higher transparency in customer data use should consider allowing customers to decide which device to use for self-service. Second, firms could even use our findings to stimulate the privacy-related indifference between firm-owned and customer-owned devices by designing customer data use accordingly. For example, lowering the overall sensitivity of data being collected from customers and communicating this approach to the SST-using customer could balance device-induced privacy perceptions. Likewise, firms could enhance their transparency in using customer data to induce an indifference between firm-owned and customer-owned devices. Informing customers about the purpose of customer data usage can make cues, such as the type of device in SSTs, appear less important in a customer's mind. Finally, the findings on the boundary conditions also provide first indications to SST-supplying firms to identify contexts in which supplying devices might be beneficial. For example, some service contexts involve higher data sensitivity than others, such as the medical service context. In this case, strategies involving the use of less sensitive customer data might not override the benefits of firm-owned devices, which requires further attention from future research.

Likewise, some contexts (e.g., less regulated countries in terms of data transparency) might have naturally lower transparency in terms of customer data usage and thus might require the supply of devices, even if the firm itself ensures higher transparency.

While the findings of this research provide recommendations on the use of firm-owned devices due to situational benefits to customer data privacy, it also informs firms about which consumer segments might be most likely to prefer firm-owned devices. Our findings suggest that consumers who have a higher general need for data privacy are most likely to prefer firm-owned devices in SSTs. Thus, SST-supplying firms should try to identify these segments in their customer base to provide SST devices that are aligned with their needs.

7.3. Limitations and future research

Although this study's findings offer important implications, they are not without limitations. First, this research examined the role of firm-owned devices in consumer responses from the perspective of data privacy theory. Future research might want to consider other theoretical angles to broaden knowledge on the favorability of customer-owned devices. The effectiveness advantage of provided devices might conflict with higher costs for implementing firm-owned devices compared with the use of consumer smartphones or other personal devices. Although we estimate these additional costs as marginal, an efficiency approach for evaluating our research question might also provide valuable managerial implications. Second, comparing the postulated effects for different service contexts (e.g., higher vs. lower sensitivity or intrusiveness) might be worthwhile. Third, we focused in this research on the role of device ownership. Future research might aim to provide insights into other device characteristics to broaden the findings on the effects of device ownership. One opportunity would be to rely on assessing the portability or spatial flexibility of devices. Current implementations of SSTs in retail settings, for example, suggest that customers are limited in where they are using SST devices, even when these are mobile devices. In addition, while this research analyzed the effects of firm-owned devices without specifying or varying the type of software or displayed information, future research could extend the findings by testing the effects of firm-owned devices on different types of information presented on the screen of the devices. For example, increasing visual complexity on the screen could dampen the effects of firm-owned devices on privacy perceptions. For customer-owned devices, future research might aim to provide insights into the software component (e.g., by analyzing web- vs. app-based SSTs). Access through an app could induce higher data privacy concerns, as the app typically remains on the device and could be perceived as collecting more data than a non-app solution. Finally, the findings of this research should be validated in a field study in which, for example, retailers implement SSTs based on the investigated device types. In this way, research could examine whether the observed effects of device types phase out after repeated usage.

Data availability

Data will be made available on request.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Web Appendix. Supplementary material

Supplementary material to this article can be found online at <https://doi.org/10.1016/j.ijresmar.2023.08.003>.

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