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### Subscriptions versus one-off purchases the impact of fee-charging models on consumer privacy concerns

Yan, Chenfeng; Yang, Zhilin; Dai, Xin

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***Subscriptions versus One-off purchases: The Impact of Fee-charging Models on  
Consumer Privacy Concerns***

**Abstract**

*Purpose* – With the popularity of paid apps and increasing concerns about privacy hazards, this paper aims to investigate the impact of mobile services’ fee-charging models on consumers’ privacy concerns, and generate insights for app developers’ fee-charging strategies.

*Design/methodology/approach* – Three experimental studies including 550 participants were conducted. All studies were between-subjects designs and based on the context of financial mobile services. The implementations of fee-charging models were manipulated by both visualized and test-based stimuli.

*Findings* – The results reveal that consumers are less concerned about potential privacy violations when using subscription-based (vs. purchase-based) financial mobile services (study 1). This effect is mediated by consumers’ perceptions that app developers that charge subscription fees (vs. one-off prices) are more likely to be consumer-serving motivated (study 2 and 3).

*Originality/Value* – This paper advances the current understanding of consumer response toward paid apps, by proposing and testing a novel attribution-based mechanism to explain why the implementation of a subscription-based versus purchase-based fee-charging model can result in more favorable consumer reactions. Furthermore, this paper identifies the implementation of contrasting fee-charging models as a market-related factor that affects the extent to which consumers are concerned about potential privacy violations, extending extant literature on consumer privacy concern.

*Keywords* – Paid Apps; Consumer Privacy Concern, Fee-charging Model, Financial Mobile Services, Consumer-serving Motive

*Paper type* – Research Paper

## 1. Introduction

Recent decades have witnessed the growing popularity of paid apps, due to their relative advantages in providing value-added services and reducing nonmonetary costs (Ghose and Han, 2014; Kubler *et al.*, 2018; Gokgoz *et al.*, 2021). According to *Statista*, global revenue of mobile services, including paid downloads and in-app purchases, hit \$318 billion in 2020; and is expected to reach around \$613 billion by 2025 (Statista Research Department, 2021). Despite the growing market presenting promising opportunities, app developers have to strategically choose between various fee-charging models to optimize revenues (Appel *et al.*, 2020; Schaefers *et al.*, 2022).

In practice, paid app developers mostly adopt two fee-charging models (Zhang and Seidmann, 2010; Appel *et al.*, 2020; Raghavan and Nargundkar, 2020). Under the first model, app developers charge a given one-off price for the app services. Once purchased, consumers will have perpetual access to app services. We refer to it as the one-off purchase model in this study. The second is the subscription model, by which app developers sell temporary access to its services and collect fees at an agreed interval. Users have a choice to either renew or terminate subscriptions before the end of each period. Normally, app developers face a tradeoff between these two models, because the implementation of one model may reduce usage and thus hurt the revenues of the other. Therefore, a practical question is which fee-charging model is better.

From a consumer behavior perspective, the extant literature on access-based consumption has initiated related discussions on the focal question (Moeller and Wittkowski, 2010; Bardhi and Eckhardt, 2012; Schaefers *et al.*, 2016). Scholars suggested that consumers may find paying for temporary access (i.e. subscription) associated with fewer opportunity costs compared with paying for ownership (i.e. one-off purchase) (Zhang and Seidmann, 2010; Raghavan *et al.*, 2020). One reason is that consumers can learn service quality by using

the services (Zhang and Seidmann, 2010; Arora *et al.*, 2017). As individual payments for subscriptions are much lower than one-off prices, consumers can address their uncertainty about service quality with less financial costs by subscribing to services rather than buying them off. Thus, consumers may respond more favorably toward subscription-based services compared with purchase-based ones.

Although this line of reasoning seems plausible, modern mobile services pose some issues that cannot be explained by extant knowledge. Some important dimensions of service quality can hardly be learned from usage, particularly the focus of this study, the treatment of user information. On one hand, app developers can collect, store and analyze user data undetectable during service interactions (Acquisti *et al.*, 2015). On the other hand, even though some app developers forwardly and passively reveal their privacy-related policies, consumers might still be suspicious of potential misconduct (Martin *et al.*, 2017; Kummer and Schulte, 2019). As consumer privacy concern is increasingly relevant in the mobile market (Gu *et al.*, 2017; Wottrich *et al.*, 2018; Kumar *et al.*, 2021), extant literature awaits a new theoretical framework to explain consumers' responses toward fee-charging models when they highly concern about information privacy.

To fill this gap, the present research provides an attribution-based mechanism to capture how mobile services' fee-charging models affect consumer response. We particularly focused on the degree to which consumers are concerned about privacy as the consumer-level outcome, and build our context on financial mobile services where privacy is highly relevant (Phelps *et al.*, 2001; Sreejesh *et al.*, 2016; Martin and Murphy, 2017; Kumar *et al.*, 2022). This helps us to isolate our proposed mechanism from the cost-based view of prior literature. At the same time, it advances the practical implications for app developers, as privacy-related issues are increasingly of concern to marketers.

Drawn on attribution theory (Heider, 1958; Kelley and Michela, 1980; Folkes, 1988), we propose that the implementation of a given fee-charging model (subscription vs. one-off purchase) could alter consumers' expectations of the app developers. This effect stems from consumers' lay belief that app developers are *profit maximizers* that incline to think and behave in line with the way they make profits (Kim and McGill, 2018). Compared with one-off purchases, app developers that charge subscription fees are perceived as more encouraged to direct their focus on customer satisfaction. It happens because customer satisfaction is directly related to future earnings of subscription-based services; whereas the most economic value of customer satisfaction is cashed out in one-off transactions when services are purchase-based. Therefore, consumers would perceive app developers that charge subscription fees (vs. one-off prices) to be more motivated to seek the best interests of consumers, as means to promote customer satisfaction and maximize profits. In turn, consumers would expect a lower likelihood of the occurrence of app developers' privacy-violating behaviors, and be less concerned about potential violation of their information privacy.

Three experimental studies were conducted to test our prediction. Study 1 demonstrated that consumers are less privacy-concerned when using financial mobile services that charge subscription fees (vs. one-off prices). Study 2 revealed that this effect is mediated by consumers' perception of the app developer's consumer-serving motive. Particularly, consumers tend to perceive app developers that charge subscription fees (vs. one-off prices) as more consumer-serving motivated, resulting in a lower level of privacy concerns. Study 3 further examined the proposed mediator by manipulating consumers' motive perception of the app developer. We found that with the existence of app developers' engagement with CSR activities (vs. control), consumers perceive a similar consumer-serving

motive of app developers with different fee-charging models, attenuating the impact of fee-charging models on consumers' privacy concerns.

The current study contributes to two bodies of literature. First, this paper advances the extant understanding of consumer response toward paid apps (Arora *et al.*, 2017; Kubler *et al.*, 2018; Bond *et al.*, 2019; Gokgoz *et al.*, 2021). This paper demonstrates that the implementation of different fee-charging models can lead to different consumers' evaluations of paid apps. Particularly, we build on attribution theory and propose a novel mechanism to capture these impacts. We show that the implementation of either a subscription or one-off purchase model will alter consumers' expectations of app developers, in turn affecting consumer response. The proposed mechanism serves as a novel theoretical framework to understand consumers' reactions toward subscription versus one-off purchase fee-charging models, filling the gap in prior literature (Zhang and Seidmann, 2010; Schaefers *et al.*, 2016).

Second, built on extant literature on consumer privacy concern (Phelps *et al.*, 2001; Acquisti *et al.*, 2015; Martin and Murphy, 2017; van Doorn *et al.*, 2017), our paper identifies the implementation of fee-charging models as an impactful market-related factor that has been overlooked by prior literature. Specifically, we show that consumers would perceive app developers that charge subscription fees as more consumer-serving motivated than those charging one-off prices, leading to a lower level of privacy concerns when using the services. Our findings provide empirical evidence that consumer privacy concern could be altered by marketing practices that are not directly related to the treatment of user data (Acquisti *et al.*, 2015; Martin and Murphy, 2017). Moreover, our work identifies the important role of consumer-serving motive in the process of consumers making privacy-related judgments.

In the following sections, we first review related literature streams and develop our hypotheses. Secondly, we present an overview of our empirical studies, followed by a



detailed introduction of each experiment. Finally, the implications and limitations of the present research are discussed.

## **2. Theoretical Background**

### ***2.1 Fee-charging models***

Mobile apps can be monetized by directly charging the user fees for app installation or feature access (Gokgoz *et al.*, 2021). To do so, app developers can implement multiple fee-charging models (Schlereth *et al.*, 2011; Ghose and Han, 2014; Bond *et al.*, 2019). The current research focuses on two mostly adopted models in the mobile market. One is the one-off purchase model that allows app developers to sell permanent app access at a certain price, while the other is the subscription model by which app developers sell the temporary access and collect fees at an agreed interval. Particularly, the current research intends to investigate whether and how the implementation of contrasting fee-charging models (subscription vs. one-off purchase) would affect consumers' evaluations of given mobile services.

The extant understanding of our focal research question is limited. To the best of our knowledge, our paper is the first empirical investigation directly examining the differential impacts of mobile services' subscription versus the one-off purchase model on consumer response. One most related literature stream is the discussion over access-based consumption (Moeller and Wittkowski, 2010; Bardhi and Eckhardt, 2012; Schaefers *et al.*, 2016), which refers to market transactions that provide customers with temporal access to the services in exchange for access fee (Moeller and Wittkowski, 2010). Scholars have revealed that access-based services allow consumers to avoid the opportunity costs that accompany ownership (Schaefers *et al.*, 2016), because consumers can learn the quality of the given services by directly using the services (Zhang and Seidmann, 2010; Arora *et al.*, 2017).

Our focal pair of fee-charging models share the same characteristic as access-based versus ownership consumption. As individual payments for subscriptions are normally much lower than the one-off price, consumers could address the uncertainty of service quality with fewer costs by subscribing rather than purchasing (Zhang and Seidmann, 2010). Following this line of reasoning, subscription-based services would have a cost-based advantage relative to purchase-based ones. However, the core assumption of the cost-based view is challenged when important dimensions of service quality cannot be learned from usage. For instance, consumers can learn the extent to which an app's features meet their needs by using the app; but they are hardly able to know how app developers are handling their data in service interactions (Acquisti *et al.*, 2015). Taken together, extant literature awaits a new theoretical framework to explain the impact of the subscription versus one-off purchase model on consumer response.

Contrasting to prior literature, the present research proposes an attribution-based mechanism to uncover the potential impacts of fee-charging models (subscription vs. one-off purchase) on consumers' evaluations of the given mobile services. We particularly focus on consumers' concerns for potential violation of information privacy as the consumer-level outcome, which cannot be explained by extant knowledge.

## ***2.2 Consumer privacy concern***

Privacy refers to an individual's control of access to the self (Altman, 1975). The discussion of privacy started from the judicial perspective that humans should have "the right to be let alone" (Warren and Brandeis, 1890; p205). Since it is impossible to measure privacy itself, social science scholars propose the concept of privacy concern as one of the measurable proxies to capture an individual's psychological states related to privacy (Smith *et al.*, 2011). Generally, privacy concern refers to an individual's feelings about their information privacy (Martin and Murphy, 2017). The basic idea of privacy concern suggests

that individuals consider the release of their personal information risky, because it makes them vulnerable to others (Laufer and Wolfe, 1977).

Privacy concern is an important dimension of consumers' evaluation of mobile services (Keith *et al.*, 2013; Pentina *et al.*, 2016; Gu *et al.*, 2017; Wottrich *et al.*, 2018; Koohikamali *et al.*, 2019). Because not only are consumers increasingly concerned about information privacy, but also mobile services are perceived as quite capable of collecting personal information (Tong *et al.*, 2020). Extant literature reveals the associations between consumers' privacy concerns and behavioral inhibition in the context of mobile services, such as download behaviors (Wottrich *et al.*, 2018), intention to use mobile services (Vlachos and Vrechopoulos, 2008), or information disclosure intention (Keith *et al.*, 2013). The impact of privacy concern is more powerful in the context of mobile financial services, since financial information is highly sensitive (Phelps *et al.*, 2001; Sreejesh *et al.*, 2016; Martin and Murphy, 2017).

One typical characteristic of privacy-related judgment is that consumers' concerns about privacy are difficult to be addressed by usage. One reason is that app developers can collect, store and analyze user data undetectable during service interactions (Acquisti *et al.*, 2015). Therefore, consumers cannot observe the misuse of user information and make related judgments. Even when some app developers forwardly and passively reveal their privacy-related policies, consumers might still be suspicious about potential misconduct (Martin *et al.*, 2017; Kummer and Schulte, 2019).

Previous literature suggested that service providers' market-related activities can assist consumers to make privacy-related judgments (Smith *et al.*, 2011; Acquisti *et al.*, 2015; Martin and Murphy, 2017; Brough and Martin, 2020; Quach *et al.*, 2022). Without doubts, activities that are directly related to service providers' information handling (i.e. data collecting, processing, or storing) are impactful to privacy concerns (Milne, 1997; Phelps *et*

*al.*, 2000; Xu *et al.*, 2009). For example, Kim *et al.* (2018) showed that consumers find targeted advertising less acceptable when their personal information is obtained from outside of (vs. within) the website. Martin *et al.* (2017) found that enhancing transparency in companies' data management practices can reduce consumers' concerns about privacy violations.

Activities that are seemingly unrelated to information handling can also play a role. The rationale is that engaging with certain activities reflects the intrinsic characteristics of the service provider, making them more reliable and trustworthy (Gu *et al.*, 2017; Su and Jin, 2021). As such, consumers expect a low likelihood of such service providers misusing user data. Following the same line of reasoning, the current research proposes that the implementation of a given fee-charging model would be attributed to the characteristic of the service provider, which in turn affects consumers' concerns for privacy.

### ***2.3 Attribution theory***

The present research builds on and related to the literature on attribution theory, which assumes that people are social perceivers who make causal inferences about events they observe and experience (Heider, 1958; Kelley and Michela, 1980). The basic idea is that people do not simply observe a particular event passively, but rather actively try to make sense of available information (Harvey and Weary, 1984). The attributional process normally involves consumers' implementation of preexisting beliefs about causes and effects (Folkes, 1988). Based on these beliefs, people can suppose causes for a certain effect, or expect effects for a given cause (Kelley and Michela, 1980). Note that preexisting beliefs are not necessarily tested scientifically, but more like some plausible theories based on consumers' feelings, intuitions and knowledge learned from prior experiences (Abelson *et al.*, 1987).

Previous literature has identified a consumer's lay belief that business entities (e.g., companies, and service providers) incline to think and behave in line with the way they make profits (Kim and McGill, 2018). The belief is rather intuitive in the first place because business entities are perceived as rational agencies and profit maximizers. Also, this belief can be constantly reinforced in a service encounter where consumers develop expectations of business behaviors. For example, consumers tend to expect companies to direct their focus on consumers with high (potential) customer value (Lacey *et al.*, 2007).

In line with these views, Su and Jin (2021) document the process of how consumers implement the lay belief to infer a platform's ethicality based on its revenue models (fee-based vs. ad-based). Specifically, their work reveals that consumers believe that the online platforms with the service fee-based (vs. advertising-based) revenue models are more likely to serve the best interests of the user (vs. advertiser), because the extent to which they profit is perceived as more dependent on the user (vs. advertiser). Following the same line of reasoning, consumers might develop different expectations of service providers contingent upon the way they charge fees from their customers.

### ***3. Hypothesis Development***

The present research poses that consumers would perceive app developers with either the subscription model or the one-off purchase model different in terms of their focus on customer satisfaction. Relatively, subscription-based services would be perceived as more encouraged to direct their focus on customer satisfaction compared with purchase-based ones. Because compared with purchase-based services, customer satisfaction has a more direct impact on the revenues of the services that charge subscription fees. On one hand,

satisfied customers contribute to subscription-based services economically by keeping subscribing to the services. Although purchase-based services could benefit from customer satisfaction through word-of-mouth, the economic value has already cashed out in the one-off transactions. On the other hand, subscription-based services face more severe penalties for customer dissatisfaction than purchase-based services. In subscription-based services, dissatisfied customers could stop subscribing to the services, which immediately results in revenue losses; whereas customers who have purchased the services are less capable to rub off the revenue of the service provider, since the monetary transactions have already been done.

Note that the present study does not suggest that customer satisfaction has no impact on purchase-based services. Instead, we focus on the comparison of the relative differences between the two fee-charging models. We neither do not pose that subscription-based services are necessarily more customer-satisfaction-focused than purchase-based services in real-life practices; they are rather consumers' lay perceptions of the service providers attributed from their fee-charging models.

Taken together, the present research proposes that service providers that charge subscription fees (vs. one-off prices) are perceived more focused on customer satisfaction. Specifically, consumers would expect these service providers more likely to engage with actions that aim at increasing (long-term) customer satisfaction, as well as avoid actions that might result in customer dissatisfaction. Since the treatment of customers' data is of interest in the financial mobile service context (White, 2004; Schumann *et al.*, 2014; Acquisti *et al.*, 2015; Pentina *et al.*, 2016), service providers that charge subscription fees (vs. one-off price) are expected more incentivized to handle user information appropriately, and in turn assuring consumers' privacy concerns of the financial mobile services.

Therefore, we hypothesize that:

***H<sub>1</sub>: Compared with one-off prices, consumers are less concerned about potential violation of their information privacy when using financial mobile services that charge subscription fees.***

We use the term consumer-serving motive to capture the mechanism, which refers to the marketer's altruistic motive to look out for the best interests of consumers (DeCarlo, 2005; Jeong and Lee, 2013). As suggested by prior literature, highly consumer-serving motivated service providers tend to engage in actions aimed at increasing (long-term) customer satisfaction, as well as avoiding actions that might result in customer dissatisfaction (Saxe *et al.*, 1982). Since app developers that charge subscription fees (vs. one-off prices) are perceived as more incentivized to direct their focus on (long-term) customer satisfaction, consumers tend to believe they are more likely to engage in actions that serve the interests of customers (and less likely to engage in actions that harm the interests of customers), which is exactly the idea of being consumer-serving motivated (DeCarlo, 2005). As a result, consumers would expect a lower likelihood of the occurrence of app developers' privacy-violating behaviors, and thus less concern about potential violation of their information privacy.

Therefore, we hypothesize that:

***H<sub>2</sub>: The impact of mobile financial services' fee-charging models on consumers' privacy concerns is mediated by consumers' perceptions of the app developer's consumer-serving motive.***

#### **4. Studies Overview**

Three experiments were conducted to test the hypotheses. Study 1 tested H<sub>1</sub> which suggests that consumer privacy concerns are lower when using financial mobile services that charge subscription fees (vs. one-off purchase prices). Study 2 and 3 examined H<sub>2</sub> and demonstrated that the effect of fee-charging models on consumer privacy concerns is mediated by consumers' inferences of the service provider's consumer-serving motive. Specifically, the proposed mediator was tested by both measuring (study 2) and manipulating (study 3).

The primary dependent measure was the degree to which consumers concern about their information privacy when using financial mobile services. In study 1 and 2, privacy concern were measured by a four-item 7-point Likert scale adapted from prior literature (Smith *et al.*, 1996; Malhotra *et al.*, 2004; Miltgen *et al.*, 2016). The items reflect four dimensions of financial mobile services' data-related practices (i.e. monitoring, collecting, misuse, sharing) and were averaged to conceptualize consumer privacy concerns about using financial mobile services. In Study 3, privacy concern was captured by the intention to participate in a customized program that required sensitive information disclosure (White, 2004). The focal independent variable was the finance app's implementation of either a subscription-based or a one-off purchase-based fee-charging model. Both visualized (study 1) and script-based (study 2 and 3) stimuli were adopted.

**Table 1: An overview of study results by condition**

Study	Participants	Contexts	Conditions and results		Conclusion
Study 1	N = 139, general population	Searching for a personal finance app - DV: privacy concern	<u>Subscription (N = 70)</u> 3.782 (1.797)	<u>Purchase (N = 69)</u> 4.533 (1.768)	t = 2.482, p = .014, d = .42 Supporting H <sub>1</sub>
Study 2	N = 128, finance app users	Determining purchases for a family finance app - DV: privacy concern	<u>Subscription (N = 63)</u> 4.579 (1.621)	<u>Purchase (N = 65)</u> 5.138 (1.259)	t = 2.174, p = .031, d = .55



		5.246 (.836)		5.667 (.697)		Supporting H <sub>2</sub>	
Study 3	N = 270, general population	- MED: perceived motive					
		Determining participation of a project required the disclosure of sensitive information		CSR (N = 136)		Non-CSR (N = 134)	F (3, 266) = 5.09,
			<u>Subscription</u> (N = 67)	<u>Purchase</u> (N = 69)	<u>Subscription</u> (N = 67)	<u>Purchase</u> (N = 67)	p = .002,
		- DV: willingness to participate	7.044 (1.996)	7.101 (5.348)	6.881 (1.153)	5.851 (2.224)	f <sub>inter</sub> = .012
	- MED: perceived motive	5.343 (1.200)	5.348 (1.174)	5.299 (1.219)	4.657 (1.503)	Supporting H <sub>2</sub>	

## 5. Study 1

Study 1 aimed to test H<sub>1</sub> and examined whether consumers would be less concerned about potential violation of their information privacy when using financial mobile services that charge subscription fees rather than one-off purchase prices. A one-way between-subjects design (the fee-charging model: subscription vs. one-off purchase) was conducted where participants were randomly assigned to one of two conditions.

### 5.1 Methods

The targeted sample of this study was the general population. We recruited participants from *Credamo*, a large online labor market for experimental research in China. A total of 140 participants were recruited in exchange for 0.3 dollars as financial compensation. One participant who dropped out in the middle of the experiment was excluded, leaving the final sample size as 139 participants (N<sub>female</sub> = 83; M<sub>age</sub> = 30.388, SD<sub>age</sub> = 8.550).

*Manipulation.* All participants were firstly informed of a cover story that the researcher intend to learn about people's attitudes toward financial mobile services. After that, all participants were presented with a series of warm-up questions, where their attitude toward financial mobile services, familiarity with financial mobile services, and familiarity

with paid apps were measured. These measures also served as the baseline of consumers' evaluation of given mobile services which were included in our randomization check.

Afterward, participants were asked to imagine a scenario in which they were looking for a finance app to track budget spending. After that, participants were told that they accidentally found a well-rated app that met their needs, and randomly presented with one of two posters introducing this app. The app in the two posters had identical features and only differ in terms of either a subscription or a one-off purchase fee-charging model (see Appendix for details). Specifically, the subscription condition stated that "*It only cost 6 RMB each month. Subscribe right now and enjoy your financial services immediately,*" while the ad in the one-off purchase condition stated that "*the perpetual access only costs 6 RMB. Pay right now and enjoy the financial services for a lifetime.*"

Note that we deliberately controlled the price for a one-period subscription equivalent to a one-off purchase to rule out the potential number effect (Pocheptsova, 2008). Also, the price of 6 RMB was adopted from real-life examples (e.g., *DCA Income Calculator*, *Family Cashflow*), which was a commonly acceptable price in both subscription and one-off purchase situations.

*Measurements.* After seeing the ad, participants were asked to indicate their privacy concerns when thinking about using the services. Specifically, participants' privacy concerns were measured by a 7-point Likert scale with four items adapted from prior literature (Smith *et al.*, 1996; Malhotra *et al.*, 2004; Miltgen *et al.*, 2016) (1 = "*Strongly disagree*", 7 = "*Strongly agree*"; "*I am concerned that my financial information can be monitored/tracked without my permission,*" "*I am concerned that the app developer is collecting my financial information without my permission,*" "*I am concerned that the app developer could use my financial information for other purposes without my authorization,*" "*I am concerned that the app developer shares my financial information with different parties without my agreement*";

Cronbach's  $\alpha = .943$ ). After that, participants were instructed to evaluate the price of the app on a single-item scale (1 = "Not at all", 7 = "Very much so", "To what extent do you find the app expensive?"). Finally, participants were asked to recall the fee-charging model in the scenario as the manipulation check (1 = "The subscription model", 2 = "The one-off purchase model"; randomly ordered; "What is the fee-charging model of the app?").

## 5.2 Results

*Manipulation check.* The results of the Chi-square test indicated the effectiveness of the fee-charging model manipulation ( $\chi^2(1) = 112.429, p < .001$ ). 67 out of 70 participants (95.7%) in the subscription condition recalled the fee-charging model as a subscription, while 65 out of 69 participants (94.2%) in the one-off purchase condition recalled the fee-charging model as a one-off purchase.

*Randomization check.* A series of ANOVA analyses showed no significant differences between the two conditions in terms of participant's general attitude toward financial mobile services (1 = "Extremely negative", 7 = "Extremely positive"; "In general, what is your attitude toward financial mobile services?";  $p = .526$ ), the familiarity with the financial mobile services (1 = "Not familiar at all", 7 = "Very familiar"; "To what extent are you familiar with financial mobile services in general?";  $p = .960$ ), the familiarity with paid mobile services (1 = "Not familiar at all", 7 = "Very familiar"; "To what extent are you familiar with paid mobile services in general?";  $p = .986$ ) and demographic traits (e.g., gender, age, and income; all  $p$ 's  $> .1$ ). The results indicated that participants in two conditions were sampled from the same population in terms of mobile service usage. Thus, we did not include these variables in the main analysis.

*The main effect.* Consistent with our prediction, results of a t test revealed that participants in the subscription condition reported a lower level of privacy concern compared

with participants in the one-off purchase condition ( $M_{\text{subscription}} = 3.782$ ,  $SD_{\text{subscription}} = 1.797$  vs.  $M_{\text{purchase}} = 4.533$ ,  $SD_{\text{purchase}} = 1.768$ ;  $t = 2.482$ ,  $p = .0140$ , Cohen's  $d = .42$ ). To rule out potential interferences of price evaluation, an additional analysis was conducted in which participants' price evaluation was considered as a covariate. The results were consistent with our prediction. After ruling out the impact of price evaluation, the differences in reported privacy concerns between the two conditions were still significant ( $F(1, 136) = 9.47$ ,  $p = .003$ ).

### **4.3 Discussions**

Results of Study 1 supported  $H_1$  that compared with the one-off prices, consumers are less concerned about their information privacy when using financial mobile services that charge subscription fees. And this effect is still observable after controlling the interferences of consumers' price evaluation. Yet study 1 has two limitations. First, this study set both individual subscription fee and one-off price to 6 RMB, which is relatively low in the current market. It is reasonable to question whether the proposed effect is still observable as the price increases. Thus, study 2 manipulated the price level to 12 RMB in both conditions. Second, this study did not reveal the underlying mechanism of the proposed effect. To address that, we further conducted Study 2 and examined the mediating role of the consumer-serving motive.

## **6. Study 2**

The primary goal of study 2 was to test  $H_2$  and to examine whether the consumer-serving motive serves as a valid mediator. We proposed that consumers would expect app developers that charge subscription fees (compared with one-off prices) to be more

consumer-serving motivated, which in turn alleviates their concerns about potential violation of their information privacy.

Study 2 also examined two alternative accounts that might underlie the fee-charging model's impact on consumer privacy concerns. The first account is the consumer's price evaluation. Consumers might believe app developers that charge less as more likely to profit from other aspects (e.g., selling consumer information). Thus, consumers might be more privacy-concerned when they perceived the price of app services as relatively low. The second potential account is the consumer's perceived power of the app developer. Consumers might feel more capable to punish (i.e. canceling the subscription) or to reward (i.e. renewing the subscription) the app developer when using subscription-based rather than purchase-based services. This feeling might generate a sense of power over the services, which in turn decreases consumers' perceived vulnerability to any privacy violation (Lwin *et al.*, 2007).

Taken together, a one-way between-subjects design (the fee-charging model: subscription vs. one-off purchase) was conducted where participants' privacy concerns, motive inferences, and two alternative accounts were measured. Also, to increase the external validity of our proposed effect, we recruited participants who had engaged with financial mobile services in this experiment.

### **6.1 Methods**

A total of 140 participants were recruited from *Credamo* in exchange for 0.3 dollars as financial compensation. To enhance external validity, we particularly targeted the sample of finance app users. At the beginning of the survey, we asked participants to report their prior experiences of using financial mobile services (1 = “*Not at all*”, 2 = “*At least once*”; “*Have you ever used mobile finance apps before?*”). Participants without any experiences

were thanked and their survey pages were terminated ( $N = 12$ ). The final sample size was 128 participants ( $N_{\text{female}} = 84$ ;  $M_{\text{age}} = 29.344$ ,  $SD_{\text{age}} = 9.234$ ).

*Manipulation.* Participants were informed of a cover story same to Study 1's. Afterward, participants were randomly assigned to two conditions and asked to imagine that he/she was engaging with an app for family finance. All participants were first told the same context that "*the app developer offered you a one-week free trial during which you had found this app easy-to-use*". We framed the app as being easy to use intentionally to control potential inferences of app usage perception. Thereafter, the scenarios diverged in two conditions.

In the subscription condition, participants learned that "*after the free trial, this app would charge RMB each month. Once subscribed, you would have monthly access to the app services. You could determine the renewal any time before the end of the current period.*"

In the one-off purchase condition, participants were told that "*after the free trial, this app would charge 12 RMB in total. Once purchasing, you would have perpetual access to the app services without any future charges.*" After reading the material, participants in both conditions were instructed to imagine and describe how they would engage with the app to enhance internal validity.

*Measurements.* Then, participants were asked to indicate their privacy concerns when they were picturing the way they engage with the app on a scale similar to study 1's (Cronbach's  $\alpha = .918$ ). After that, participants were asked to report their expectations of the app developer in terms of consumer-serving motive on a five-item scale adapted from Su and Jin (2021) (1 = "Not at all", 7 = "Very much so", "The app developer will try to understand the needs of its consumers", "The app developer will try to maximize the interests of its consumers", "The app developer will try to provide services with consumer-satisfaction-

oriented goals”, “The app developer will try its best to satisfy its consumers with its services”, and “The app developer will try its best to provide services that serve its consumers’ goal”; Cronbach’s  $\alpha = .820$ ). The five items were averaged to conceptualize the perception of the consumer-serving motive.

Afterward, participants were asked to report their price perception of the app (1 = “Extremely cheap”, 7 = “Extremely expensive”; “How do you feel about the price of the app?”). Also, the participant’s perceived power over the app developer was measured by a 7-point Likert scale adapted from Shnabel and Nadler (2008) (1 = “Not at all”, 7 = “Very much so”, “When thinking about my relationship with the service provider, I feel relatively powerful”, “I have a lot of influence on the service provider”, and “I have a lot of control over the services”; Cronbach’s  $\alpha = .820$ ). Finally, participants were asked to respond to a manipulation check same as Study 1’s.

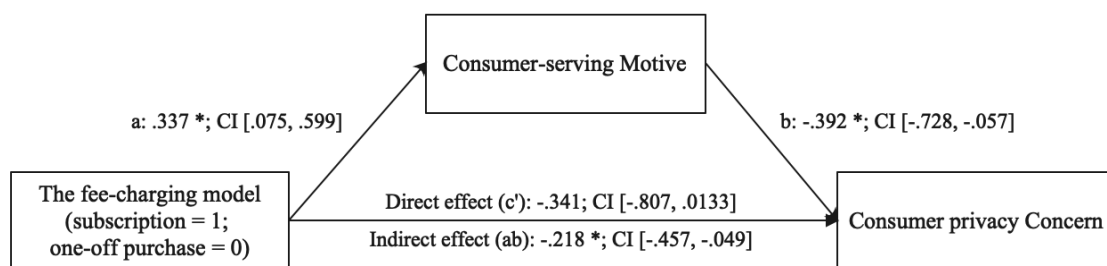
## **6.2 Results**

*Manipulation check.* The results of the Chi-square test indicated the effectiveness of the fee-charging model manipulation ( $\chi^2(1) = 78.463, p < .001$ ). 58 out of 63 participants (92.1%) in the subscription condition recalled the fee-charging model as a subscription, while 56 out of 65 participants (86.2%) in the one-off purchase condition recalled the fee-charging model as a one-off purchase.

*The main effects.* As predicted, results of a series of t tests revealed that participants in the subscription condition reported a lower level of privacy concerns compared with participants in the one-off purchase condition ( $M_{\text{subscription}} = 4.579, SD_{\text{subscription}} = 1.621$  vs.  $M_{\text{purchase}} = 5.138, SD_{\text{purchase}} = 1.259$ ;  $t = 2.183, p = .031$ , cohen’s  $d = .39$ ), replicating the findings of study 1. At the same time, participants in the subscription condition considered

the app developer more consumer-serving motivated compared with participants in the one-off purchase condition ( $M_{\text{subscription}} = 5.667$ ,  $SD_{\text{subscription}} = .836$  vs.  $M_{\text{purchase}} = 5.246$ ,  $SD_{\text{purchase}} = .697$ ;  $t = -3.087$ ,  $p = .003$ , cohen's  $d = .55$ ), consistent with our prediction.

*The process analysis.* A mediation analysis (Hayes, 2013; Model 4 bootstrapped with 5000 draws) was conducted, which included participants' privacy concerns as the dependent variable, the fee-charging model as the independent variable, and the perceived consumer-serving motive of the app developer as the mediating variable. The result showed a significant indirect effect of fee-charging models on reported privacy concern through perceived consumer-serving motive (ab: effect =  $-.218$ ,  $SE = .105$ ,  $p = .039$ , CI 95% [ $-.457$ ,  $-0.049$ ]); whereas the direct effect of the fee-charging model on privacy concerns was not significant (c': effect =  $-.341$ ,  $SE = .240$ ,  $p = .156$ , CI 95% [ $-.807$ ,  $.133$ ]). Particularly, the implementation of the subscription model (vs. the one-off purchase model) was associated with a higher level of perceived consumer-serving motive (a:  $\beta = .421$ ,  $SE = .136$ ,  $t = 3.09$ ,  $p = 0.002$ ), which in turn contributed to consumers' lower privacy concerns (b:  $\beta = -.518$ ,  $SE = .162$ ,  $t = -3.20$ ,  $p = 0.002$ ). These results suggested that consumer-serving motive perception was a valid mediator (see Figure 1).



Notes: \*\*\*  $p < .001$ ; \*\*  $p < .01$ , \*  $p < .05$

**Figure 1: Coefficients of variables in the model for study 2**



*Alternative accounts.* A series of ANOVA analyses suggested that there were no significant differences in terms of participants' perceived power and price perception of the app among the two conditions (all  $p$ 's > .1). Thus, we excluded two accounts in the following analysis.

### **6.3 Discussions**

Study 2 has two implications. First, this study replicated the findings of study 1 that consumers hold a lower level of privacy concerns when using finance app that charges subscription fees (vs. one-purchase prices). Second, the results of study 2 supported H<sub>2</sub> that the effect of the fee-charging model on consumer privacy concerns is mediated by consumers' expectations of the app developer's consumer-serving motive. As the perception of consumer-serving motive was merely measured in this study, some might argue the existence of other potential explanations that disrupt our proposed mechanism. To address that, study 3 applied a moderated mediation analysis approach to examine the mediator.

### **7. Study 3**

Study 3 aimed to provide further evidence of our proposed mechanism. Contrary to Study 2, this study manipulated consumers' expectations of the app developer's consumer-serving motive by the existence of the service provider's socially responsible activities. We proposed that the impact of fee-charging models on consumer privacy concerns would be attenuated when consumers acknowledge that the app developer is engaging in socially responsible activities. The rationale is that the engagement with CSR activities would externally elevate the perception that the app developer is consumer-serving motivated, neutralizing the differences in consumers' expectations of the app developer attributed from different fee-charging models. In turn, the enhanced perception of the service providers'

consumer-serving motive would result in the same level of consumers' privacy concerns, regardless of the implementation of either a subscription or one-off purchase model.

A 2 (the fee-charging model: subscription vs. one-off purchase) \* 2 (activities: CSR vs. control) was conducted in this study. To manipulate the existence of CSR activities, we introduced participants to one of two functions of financial mobile services adapted from real-life practices (see *MyMoney* as an example). The focal function is *the accessible book*, which is designed to assist visually impaired people to keep financial accounts. According to the extant literature, providing services empowering socially-vulnerable groups (i.e. visually-impaired individuals) should be considered socially responsible (Fatma and Rahman, 2015). As a control group, a commonly witnessed function as *the daily book* (i.e. allowing users to track their daily spending) was adopted.

Another goal of study 3 was to rule out the alternative account as familiarity with the given fee-charging model. According to prior literature, consumers tend to be more privacy-concerned when engaging with unfamiliar (vs. familiar) services (Sheehan and Hoy, 2000). Since subscription models (compared with the one-off purchase models) are more frequently adopted by real-life service providers (Benbunan-Fich and Benbunan, 2007), it is reasonable to question whether consumers would perceive the app that employs the one-off purchase (vs. subscription) model unfamiliar, in turn resulting in a higher level of privacy concern. Thus, we additionally measured and tested this account in this study.

## **7.1 Methods**

A total of 270 participants were recruited from *Credamo* in exchange for 0.4 dollars as financial compensation ( $N_{\text{female}} = 192$ ;  $N_{\text{age (16-20)}} = 31$ ,  $N_{\text{age (21<30)}} = 159$ ,  $N_{\text{age (31-40)}} = 55$ ,  $N_{\text{age (41-50)}} = 19$ ,  $N_{\text{age (51-60)}} = 6$ ).

*Manipulation.* Participants were asked to imagine a scenario in which he/she “installed a finance app to manage personal finance.” Particularly, participants were randomly assigned to two conditions where the app charged either subscription fees or a one-off purchase price. The introductions of fee-charging models were similar to stimuli of study 2’s with one exception. Contrasting to prior studies, purchasing the app would cost 30 RMB (vs. 6 RMB in Study 1 and 12 RMB in Study 2) while subscribing to the app would cost 6 RMB per month (same as Study 1). This design aimed to counterbalance the potential differences in price perception of the app, since purchase prices are relatively higher than the subscription fees (at one time) in the real life.

Afterward, participants were randomly presented with one of two scenarios that described their experiences of noticing a particular feature of the app. In the CSR condition, participants were told that the app has a function called *the accessible book* that “aimed to assist visually impaired users to manage their finances.” In the control condition, the function is featured as *the daily book* that “aimed to assist users to track daily spending.”

*Measurements.* After that, all participants were asked to indicate their willingness to participate in a newly launched program of the app (1 = “Not at all”, 10 = “Very much so”, “To what extent are you willing to participate in this program?”). The program was framed as a service-enhancing project by which participation would grant the app access to collect and analyze his/her financial data (see Appendix for details). We used this measure as a reflection of the extent to which participants were concerned about potential violations of their information privacy (White, 2004).

Further, participants were asked to indicate the extent to which they considered the app developer’s intention to launch the program as altruistic (1 = “Strongly disagree”, 7 = “Strongly agree”, “The real intention for the service provider’s collecting user’s data is to improve the service quality and enhance user experience.”). This measure served as the

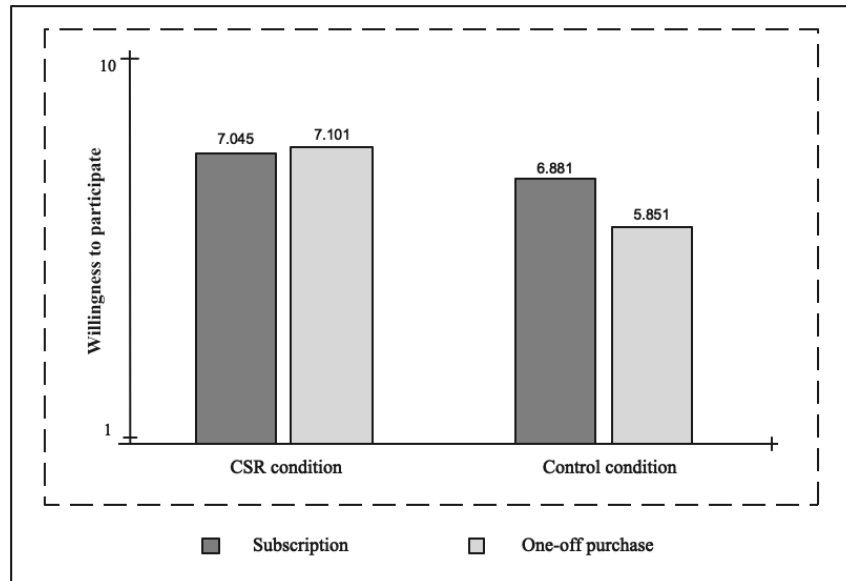
reflection of the degree to which participants expected the app developer to be consumer-serving motivated. Further, participants reported the extent to which they found the given fee-charging model familiar based on their daily experiences (1 = “*Extremely unfamiliar*”, 7 = “*Extremely familiar*”). Finally, participants are asked to evaluate the price of given mobile services (similar to study 2’s) and respond to a manipulation check.

## 7.2 Results

*Manipulation check.* The manipulation of the fee-charging model was successful. The results of an ANOVA analysis revealed that the type of model recalled by participants was significantly related to the fee-charging model manipulation ( $F(3, 266) = 569.66, p < .001$ ), but not with either the activity manipulation or their interaction term (all  $p$ ’s  $> .36$ ). At the same time, an ANOVA analysis revealed no significant differences of price evaluation among four conditions ( $M_{\text{subscription*CSR}} = 3.269, SD_{\text{subscription*CSR}} = 1.399$  vs.  $M_{\text{purchase*CSR}} = 3.391, SD_{\text{purchase*CSR}} = 1.342$  vs.  $M_{\text{subscription*control}} = 3.060, SD_{\text{subscription*control}} = 1.192$  vs.  $M_{\text{purchase*control}} = 3.388, SD_{\text{purchase*control}} = 1.585$ ;  $F(3, 266) = .85, p = .468$ ), consistent with our prediction. Therefore, we did not include price evaluation in further analysis.

*The interactive effects.* As predicted, the results of an ANOVA analysis indicated a significant interactive effect of the fee-charging model and CSR engagement on the willingness to participate in the program ( $M_{\text{subscription*CSR}} = 7.045, SD_{\text{subscription*CSR}} = 1.996$  vs.  $M_{\text{purchase*CSR}} = 7.101, SD_{\text{purchase*CSR}} = 2.052$  vs.  $M_{\text{subscription*control}} = 6.881, SD_{\text{subscription*control}} = 2.253$  vs.  $M_{\text{purchase*control}} = 5.851, SD_{\text{purchase*control}} = 2.224$ ;  $F(3, 266) = 4.38, p = .037$ , interaction term’s effect size:  $\text{cohen’s } f = .016$ ). Additional analysis revealed that with the presence of the app developer’s CSR engagement, participants’ willingness to participate

showed no significant differences among two fee-charging model conditions ( $F(3, 266) = .024, p = .877$ ); however, without the presence of CSR engagement, participants in the subscription condition reported a higher level of willingness to participate the program compared with participants in the purchase condition ( $F(3, 266) = 7.806, p = .006$ ).



**Figure 2: The results of ANOVA analysis for study 3**

*Moderated mediation analysis.* A series of regression analyses once again revealed that the interaction between the fee-charging model and CSR engagement had a significant effect on willingness to participate ( $\beta = -1.087, SE = .519, t = -2.09, p = .037$ ). After controlling for the mediating influence of motive perception, the effect of the interaction between the fee-charging model and CSR engagement on willingness to participate became non-significant ( $\beta = -.285, SE = .350, t = -.82, p = .417$ ). Consistent with our prediction, the interaction between the fee-charging model and CSR engagement predicted consumer-serving motive perception ( $\beta = -.646, SE = .312, t = -2.07, p = .039$ ), and motive perception

in turn significantly predicted willingness to participate ( $\beta = -1.240$ ,  $SE = .068$ ,  $t = -18.13$ ,  $p < .001$ ).

We further conducted a moderated mediation analysis (Hayes, 2013; Model 8 bootstrapped with 5000 draws) which included the fee-charging model as the independent variable; participants' willingness to participate in the program as the dependent variable; participants' perceived motive for the service provider as the mediating variable; and the existence of app developer's CSR activities was the moderating variable. As predicted, the conditional indirect effect of the fee-charging model on willingness to participate through consumer-serving motive perception was significant among participants in the control condition (effect = .796,  $SE = .283$ ,  $p = .005$ , CI 95% [.244, 1.338]), but not among participant in the CSR condition (effect = -.006,  $SE = .252$ ,  $p = .982$ , CI [-.491, .489]). However, the conditional direct effect of the fee-charging model on willingness to participate was non-significant in both the control condition (effect = .796,  $SE = .283$ ,  $p = .005$ , CI 95% [.244, 1.338]), and the CSR condition (effect = .796,  $SE = .283$ ,  $p = .005$ , CI 95% [.244, 1.338]). Taken together, the results suggested that the consumer-serving motive perception mediated the interacting effect of the fee-charging model and CSR engagement on willingness to participate.

*The role of model familiarity.* A series of regression analyses revealed that participants in the subscription condition perceived the fee-charging model as more familiar than the purchase condition ( $\beta = .690$ ,  $SE = .172$ ,  $t = 4.01$ ,  $p < 0.001$ ), and the higher level of model familiarity predicted the increase of willingness to participate in the program ( $\beta = .185$ ,  $SE = .091$ ,  $t = 2.04$ ,  $p = 0.043$ ), consistent with findings of prior research on familiarity-induced privacy concern (Sheehan and Hoy, 2000).

We further conducted a moderated mediation analysis (Hayes, 2013; Model 8 bootstrapped with 5000 draws) to examine the influence of model familiarity on our proposed mechanism. The analysis considered model familiarity and motive perception as two paralleled mediators. The results suggested that the consumer-serving motive perception still mediated the interacting effect (The control condition: effect =  $-.793$ ,  $SE = .285$ ,  $p = .005$ , CI 95% [ $.245$ ,  $1.356$ ]; The CSR condition:  $-.006$ ,  $SE = .250$ ,  $p = .982$ , CI 95% [ $-.491$ ,  $.485$ ]). However, model familiarity could not account for the interacting effect of fee-charging models and CSR engagement on willingness to participate (The control condition: effect =  $.045$ ,  $SE = .043$ ,  $p = .295$ , CI 95% [ $-.038$ ,  $.132$ ]; The CSR condition:  $.056$ ,  $SE = .055$ ,  $p = .309$ , CI 95% [ $-.037$ ,  $.184$ ]). These results further indicated the validity of our proposed mediator.

### **7.3 Discussions**

The results of study 3 once again supported H<sub>2</sub> that consumers' perceptions of the service provider's consumer-serving motive mediate the impact of the fee-charging model on consumer privacy concerns. Specifically, study 3 used the existence of the service provider's CSR activities to manipulate the motive perception, showing that the fee-charging model will not affect consumer privacy concerns when the perceived consumer-serving motive was already elevated. Additionally, study 3 examined the potential underlying effect of model familiarity. Consistent with prior research (Sheehan and Hoy, 2000), this study found that model familiarity is associated with lower privacy concerns. However, the account of the model familiarity effect did not overthrow the mediating role of the consumer-serving motive.

## **8. General Discussion**

Although paid mobile services have been increasingly accepted by individual consumers, app developers need to choose among various fee-charging models to optimize revenue. Particularly, there are two fee-charging models widely adopted in mobile services. One is the purchase model that sells service access at one-off prices; whereas the other is the subscription model that collects fees for temporary service access at the agreed interval. Prior literature suggested that consumers may relatively favor subscription-based mobile services; because consumers can address the uncertainty of service quality by using the services for a shorter and cheaper period (Zhang and Seidmann, 2010; Schaefers *et al.*, 2016). However, this line of reasoning does not consider the situation when an important dimension of service quality cannot be learned from usage, particularly the focus of this paper, the treatment of user data. It happens because the way that app developers handle user data could be undetectable and doubtful (Acquisti *et al.*, 2015).

To fill this gap, the present research investigated the impact of fee-charging models on the extent to which consumers are concerned about information privacy when using the given mobile services. We particularly focus on the context of financial mobile services where privacy-related issues are highly of interest. Through three experimental studies, we found that consumers are less concerned about their information privacy when using subscription-based (vs. one-off purchase-based) mobile services (study 1). This effect is mediated by consumers' expectations that app developers that charge subscription fees (vs. one-off prices) are more likely to be consumer-serving motivated (study 2). However, when acknowledging the app developer's engagement with CSR activities, consumers tend to perceive it as consumer-serving motivated regardless of which fee-charging model it adopted, attenuating the impact on consumers' privacy concerns (study 3). Additionally, we found that the proposed effect cannot be explained by consumers' price evaluation of the services (study



1 and 2), power perception when using the services (study 2), and familiarity with two fee-charging models (study 3), supporting the validity of our mechanism.

### ***8.1 Theoretical Implications***

The present research contributes to the extant literature in two primary ways.

First, this paper contributes to the extant literature on consumers' response toward paid apps, by proposing and testing an attribution-based mechanism to explain why consumers respond differently toward subscription versus one-off purchase fee-charging model. Although access-based consumption literature has suggested the advantages of subscription-based services relative to purchase-based ones in addressing consumers' uncertainty of service quality (Bardhi and Eckhardt, 2012; Schaefers *et al.*, 2016; Harding *et al.*, 2019; Schaefers *et al.*, 2022), it did not consider the situation when consumers value certain dimension of service quality that cannot be learned by usage, for instance, treatment of user data.

This paper filled this gap by proposing a novel mechanism to capture consumer response toward fee-charging models in these situations. Contrasting to prior literature, we proposed that the adoption of a given fee-charging model could be attributed to the characteristics of an app developer, shaping consumers' expectations of its behaviors. Specifically, we found that consumers tend to perceive app developers with subscription-based (vs. purchase-based) fee-charging models as more likely to be consumer-serving motivated, in turn less concerned about potential violation of their information privacy when using financial mobile services that charge subscription fees (vs. one-off prices).

Second, the present study advances the extant understanding of consumer privacy concern, by identifying an impactful market-related factor that has been overlooked by prior

literature. Scholars have suggested multiple market-related practices affecting consumers' concerns about privacy violations in service interactions, even when these practices are not directly related to information handling (Phelps *et al.*, 2000; Smith *et al.*, 2011; Martin and Murphy, 2017). Because service providers' behaviors reflect their characteristics, in turn affecting consumers' perceived likelihood of their engagement with privacy violation activities (Smith *et al.*, 1996; Shariff *et al.*, 2021). The findings of this paper indicate that the choice of a particular fee-charging model serves a similar role. Specifically, we found that consumers tend to be less concerned about potential violations of their information privacy when using financial mobile services that charge subscription fees rather than one-off prices; because consumers expect subscription-based app developers more likely to be consumer-serving motivated.

## ***8.2 Practical Implications***

The present research provides insights for developers of paid apps to choose between subscription versus one-off purchase fee-charging model. Consumers increasingly care about information privacy, especially in service encounters that involve their sensitive information (e.g., financial mobile services in our context). For service providers, addressing consumers' concerns about privacy can lead to better market performance. This paper identified the relative benefits of the subscription model compared with the one-off purchase model. Specifically, the results of three studies indicated that consumers are less concerned about potential privacy violations when using financial mobile services that charge subscription fees rather than one-off prices. These findings implicate the competitive advantages of subscription-based services, providing a privacy-related perspective for app developers to determine fee-charging models.

Furthermore, the current study highlights the important role of CSR engagement in the mobile market. Specifically, the results of study 3 revealed that an app developer's engagement with CSR activities will elevate consumers' perceived consumer-serving motive of the given app developer, attenuating the impact of contrasting fee-charging models on consumer privacy concern. These findings suggest that for purchase-based app developers, CSR engagement can be beneficial in resolving their competitive disadvantages in consumers' privacy-related considerations. More importantly, we reveal that engaging with CSR activities can be a promising strategy to address consumers' concerns about privacy violations and win the battle of "*the privacy-driven market*".

### ***8.3 Limitations and Future Research***

The present research has several limitations that await future investigation. First, this paper used between-subjects designs to test the hypotheses. We did not conduct any within-subject design since it might be problematic to present a participant with manipulations of both fee-charging models in our context. On one hand, participants are very likely to learn the experimental purpose after seeing two manipulations at the same time, challenging the validity of our experiments. On the other hand, two conditions might have carryover effects on each other due to our price-related manipulation. However, the between-subject design has setbacks that should be aware of. For instance, as our focal outcome is the extent to which participants are concerned about privacy violation, the comparison between participants' before-treatment (i.e. baseline) and after-treatment privacy concerns could provide more insights to evaluate the impact of fee-charging models. Future research could engage in more rigorous experimental design, such as Solomon experimental design (Lim *et al.*, 2022).

Second, since the primary focus of this paper is consumer privacy concern, we do not explore potential downstream consequences of our proposed effect, such as adoption intention or WOM. Although behavioral inhibitions due to privacy-related concerns have been heavily investigated, extant literature also documents the existence of the privacy paradox (Pentina *et al.*, 2016), suggesting that consumers tend to trade off their information for actual benefits. It could be possible that assuring consumers' privacy concerns would not bring monetary gains (e.g., more downloads) to app developers. Future research could use secondary data from real-life apps to evaluate the extent to which the implementation of two contrasting fee-charging models would result in different app performances. Methods such as data partitioning are promising (Lim *et al.*, 2019). We expect that performance differences between two fee-charging models would be larger in app categories that involve sensitive (vs. not) user information.

Third, our studies were based on a Chinese sample; caveats about potential cultural differences should be considered. For the sake of generalizability, our studies particularly recruited a Chinese sample who are reputed to be more open about financial matters (Acquisti *et al.*, 2015), and less privacy-concerned in financial mobile services (compared with other cultures). If our proposed effect works upon Chinese consumers (as we have shown in this paper), our findings are very likely to be generalized to consumers from other cultures who are more concerned about financial privacy. However, our proposed mechanism, consumer-serving motive perception, could be cultural or norm-specific. Central to the process of forming attributes of app developers based on their fee-charging models is consumers' implementation of lay belief acquired from service interactions. At the same time, the effect of consumer-serving motive on privacy concern follows an intrinsic path (i.e. "the company does good because it is good"), contrasting to the extrinsic path (i.e. "the company does good because it is required to do so"). For people who highly believe in

extrinsic forces, our proposed effects might be less salient. Future research could examine our proposed mechanism in cultural contexts. Potential cultural-related boundary conditions could be power distance (Xu *et al.*, 2021), and locus of control (Weiner, 2001).

*Declarations of interest: none*

*The project received IRB at Huazhong University of Science and Technology (IRB #: 2022.03.01, Study title: Fee-chargingModel).*

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