



## Barriers and paradoxical recommendation behaviour in online to offline (O2O) services. A convergent mixed-method study

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### ABSTRACT

Mobile apps offering online to offline (O2O) services act as aggregators providing interface for delivery of required products and services at a preferred location. Despite offering multiple affordances, many O2O services have not diffused as anticipated, indicating the existence of consumer resistance towards them. One such example is that of food delivery apps (FDAs), which are experiencing resistance at both the pre-adoption and post-adoption stage. However, there are scarce empirical findings explicating the pre-and post-adoption barriers perceived to be associated with FDAs. The present study addresses this gap by utilising the Innovation Resistance Theory (IRT) and a convergent mixed-method study design to examine the barriers that existing FDA users face and how these impinge on their trust and valence of recommendation behaviour (positive and negative word of mouth). The study not only extends the classic IRT barriers to the FDA-context by identifying three key barriers (economic, efficiency, and experience) but also offers empirical evidence to support the negative association of barriers with trust and paradoxical recommendation behaviour by analysing data collected from 303 FDA users through *Prolific*. The findings also support the mediation effect of trust and the moderation effect of advertisement overload on the identified associations, making interesting theoretical and practical contributions.

### 1. Introduction

The wave of digitalisation unleashed in the first two decades of this millennium has supported the growth of mobile commerce (m-commerce) and related online to offline (O2O) services. O2O refers to the products/services that are booked or purchased online through mobile apps to be used or experienced in offline locations (Talwar et al., 2020b). One of the most visible and widely discussed segments of O2O services is apps offering delivery of ready-to-consume food through online food delivery platforms. These include the aggregator platforms and food delivery applications (FDAs), which offer a convenient and innovative alternative to order food for consumption (Alalwan, 2020; Cho et al., 2019). According to recent estimates, the revenues in the aggregator food delivery segment are anticipated to grow annually at 6.8% between 2021 and 2024, with user penetration during the period increasing from

10.5% to 12.5% globally (Statista, 2021). While these estimates are encouraging, a single-digit revenue growth rate and an only two per cent expected increase in user penetration indicate that the adoption and continued usage rate of the FDAs/aggregator platforms are not keeping pace with the high growth rate of other digitally vended products/services. This is corroborated by academic research, where scholars have noted that despite various facilitating factors, the adoption and usage of FDAs are still lagging. For instance, Yeo et al. (2017) noted that ordering food through FDAs was not as popular as ordering it through other means, such as by telephone, with food ordered through websites accounting for only 22.9% of total orders served by restaurants. These concerns notwithstanding, the research has continued to focus on the factors facilitating the adoption of FDAs (e.g., Cho et al., 2019; Ray et al., 2019; Xu & Huang, 2019). In comparison, the reasons behind such a modest increase in FDA use have remained largely under-investigated.

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A review of the literature reveals that the low usage or non-adoption of any product or service, in both digital as well as offline contexts, is driven by reasons that are distinct from those that motivate adoption (e.g., Claudy, Garcia & O'Driscoll, 2015). In fact, the tepid response of consumers to any product or service is referred to as 'consumer resistance' in the consumer behaviour literature (Talwar et al., 2020d). Scholars have acknowledged that understanding resistant responses are just as important as examining the drivers of adoption (Seth et al., 2020; Talwar et al., 2020d) because consumer resistance can lead to the failure of any innovation (Heidenreich & Handrich, 2015). In this context, consumer resistance is conceptualised through the existence of various barriers that hinder a positive response from consumers. Underscoring the importance of this resistance perspective, Innovation Resistance Theory (IRT; Ram & Sheth, 1989) has proposed a novel theoretical framework based on various functional and psychological barriers that may constitute consumer resistance. Accordingly, scholars have examined barriers constituting consumer resistance in different contexts, such as mobile payments (Kaur et al., 2020c), online shopping (Nel & Boshoff, 2019), and organic food (Kushwah, Dhir, & Sagar, 2019), among others. Despite the existing evidence in various digital contexts, of which FDAs are a part, the related literature has made limited attempts to understand the resistance of consumers and its consequences in the context of FDAs. Only one recent study (Kaur et al., 2020b) has examined the association of IRT barriers toward FDAs with intentions to use and word of mouth behaviour. A gap thus exists in the literature on FDAs regarding the examination of various outcomes of consumer resistance and the barriers causing friction in consumers' unhindered usage of FDAs.

In addition, a review of the literature reveals that research on consumer resistance to various services/products offered through digital platforms has focussed on examining the generic IRT barriers and their association with purchase/continuance intentions and consumer resistance (e.g., Leong et al., 2020; Kaur et al., 2020c). In comparison, few studies have attempted to extend IRT by identifying context-specific barriers or examining their association with consumer attitude or post-adoption manifestations, such as recommendation behaviour. Since scholars have revealed that users' attitudes towards using any digital product or service can affect their actual usage (Hassanein & Head, 2007), this limited understanding about how different barriers towards digital products/services, in general, and FDAs, in particular, affect consumers' attitude is a crucial gap, which, if addressed, can make the accumulated learning more theoretically insightful and practically useful. Similarly, with the digital space being largely driven by user-generated content (Simon et al., 2015), the importance of recommendation behaviour in online environments (Manes & Tchetchik, 2018) is becoming more important than ever. We argue that a better understanding of consumers' recommendation behaviour can support service providers in formulating more effective strategies to not only leverage these recommendations to acquire new users but also to increase their existing users' engagement.

Based on the preceding discussion, we contend that theory and practice can benefit from a deepening of the literature related to O2O services, particularly FDAs, in terms of an improved understanding of the barriers that constitute consumer resistance and how the post-adoption barriers interact with the attitude of consumers and their recommendation behaviour. Consequently, the present study develops a conceptual model that theorises the association of FDA-specific IRT barriers with the attitude and recommendation behaviour of consumers. First, we identified the FDA-specific barriers through a qualitative study. In this context, we refer to the study by Kaur et al. (2020b) as a discussant to help us conceptualise the FDA-specific barriers and contextualise our results. Next, we reviewed the underlying literature to understand the conceptualisation of consumer attitude in the digital space. Accordingly, we found that in the online setting (e.g., Beldad, Jong, & Steehouder, 2010; Oliveira et al., 2017), trust is considered a key expression of consumer attitude. Moreover, scholars contend that trust is a key factor in e-commerce (e.g., Lee & Rha, 2016). Therefore, we

propose trust as a measure of attitude in our conceptual model, in consonance with the prior studies indicating that trust (e.g., Kang & Namkung, 2019) is an important consideration in consumer decision-making. By proposing trust as an outcome of FDA-specific barriers and examining recommendation behaviour as its consequent, we acknowledge the importance of examining the antecedents and consequences of trust in digital recommendation behaviour (e.g., Ayeh et al., 2013; Filieri et al., 2015), which has been absent in the specific context of FDAs.

To formulate our understanding of recommendation behaviour in the FDA context, we examined the literature related to recommendation behaviour in the digital milieu and found that this behaviour is not just high or low but, rather, has two distinct valence-like manifestations in the form of positive word of mouth (PWOM) and negative word of mouth (NWOM). Scholars have argued that PWOM and NWOM are not necessarily on the same continuum, i.e., they are not opposite of each other but are driven by a different set of factors instead (e.g., Talwar et al., 2020e). However, the existing findings are in the context of mobile payments, making it of interest to examine whether and how the same distinction exists in the valence of word of mouth in the context of FDAs. Thus, we propose to refer to Talwar et al. (2020e) as our second discussant to better explicate and contextualise our findings.

An extensive review of the above literature further provided us with a more granular understanding of the key behavioural manifestations of FDA users that need to be better understood. Accordingly, we propose to address four research questions (RQs): **RQ1.** What are the barriers that existing consumers have towards the use of FDAs? **RQ2.** Are the FDA-specific barriers, consumers' trust, and recommendation behaviour (both positive and negative word of mouth) associated with each other? **RQ3.** Does trust mediate the association of the FDA-specific barriers with negative word of mouth? **RQ4.** Does the advertisement overload created by the promotional efforts of FDAs moderate the association between the FDA-specific barriers with trust?

Accordingly, we conceptualised a model comprising FDA-specific barriers, trust, PWOM, and NWOM. Since barriers toward FDAs have remained under-explored so far, particularly in the context of the pandemic, we adopted a mixed-method approach with both qualitative and quantitative studies to help us identify FDA-specific barriers and test the hypothesised associations. Our study design was a convergent mixed method (Harrison & Reilly, 2011) since we used a qualitative study in the form of open-ended essays to address RQ1. and quantitative data collected through a cross-sectional survey to respond to RQ2-4. In addition, we also formed an expert panel of three professors from the area of consumer behaviour and digital artefacts and one practitioner with relevant experience to solicit their inputs for further conceptual clarity. We reached theoretical saturation with 28 responses to the open-ended essays conducted on Prolific but solicited a few more responses to ensure that no new information was missed. Subsequently, we took forward 32 responses for content analysis. Our analysis of the qualitative data led to the identification of three barriers related to price/value for money, functionality/usage barrier, and customer service. The inputs from the expert panel further helped us develop the questionnaire and identify advertisement overload as an additional consideration when examining consumer behaviour towards FDAs. Thereafter, we collected cross-sectional data through Prolific from 303 users of FDAs during the COVID-19 pandemic.

## 2. Theoretical background

### 2.1. Innovation resistance theory

Innovation Resistance Theory (IRT) was first proposed by Ram (1987) and used the innovation characteristics, characteristics of users, and marketing strategies to explore the factors causing consumers to resist an innovation. The theory was later extended by Ram and Sheth (1989), who indicated that the changes produced by an innovation could conflict with tradition, thereby increasing the barriers to adoption

and, thus, the consumers' resistance. IRT argues that resistance is a response to change that poses a potential threat to the status quo and belief structure. Generic IRT comprises of five barriers grouped under two broad types: (a) functional barriers (usage, risk, value), and (b) psychological barriers (tradition and image) (Ram & Sheth, 1989). Usage barriers arise when the use of an innovation is not in sync with the values, acceptance conditions, or previous experiences of the users. Moreover, if innovation conflicts with existing work and habits, consumers need a longer time to accept the innovation (Lian & Yen, 2014). Value barriers arise when consumers attempt to assess the value difference between the innovation and existing products. The innovation will not get accepted unless it offers greater value than the current offerings (Laukkanen, 2016). Risk barriers arise when consumers can not estimate the associated risks and uncertainties of the innovation, leading them to refuse to accept it (Lian & Yen, 2014). Image barriers come into play when users have a negative attitude towards the innovation's country of origin, industry, brand, or side effects of the innovation (Laukkanen, 2016). Lastly, tradition barriers are produced when innovation alters the existing culture of consumers (Lian & Yen, 2014).

IRT is suitable for our study for three reasons. First, it helps us map the problems/issues faced by existing FDA users that may act as barriers and increase the resistance of consumers towards FDAs with time. Second, IRT has been useful in explaining resistance in e-commerce and mobile application contexts (Laukkanen, 2016; Lian & Yen, 2014). Third, the extant hospitality literature has recognised the existence of barriers related to pricing and customer service (Lee & Jang, 2013; Ratten et al., 2019).

## 2.2. Identification of FDA-specific barriers: Qualitative study

We conducted a qualitative study on Prolific using open-ended essays. The key to the study was prepared through an extensive review of the literature on IRT and FDAs. In general, the questions covered in the essay centred on the issues and problems faced by consumers while using FDAs to order food for delivery during the COVID-19 pandemic. Respondents were also invited to share their experiences related to the use of FDAs. To ensure congruent respondent recruitment, we added a screening question stating that only individuals who had used FDAs to order food for delivery at least four times during the past three months and faced some issues should respond. The questions were related to various IRT barriers, such as usage, value, risk, and technology-related aspects.

We analysed the qualitative data using the seven-step phenomenological process given by Colaizzi (1978). First, each researcher independently read the responses to develop our understanding of the key issues and problems faced by users while using FDAs. This step provided us with a complete picture of the relevant issues. Second, we identified words, phrases, and sentences that were of significance to the topic at hand. In other words, we performed open coding. As a third step, each researcher independently articulated the meaning of the words, phrases, and sentences identified through the preceding step. Next, each researcher repeated the process for all responses to delineate common themes. In the fifth step, each researcher integrated the themes to develop a more cohesive description of the topic at hand. Thereafter, in step six, the researchers compared their notes and jointly developed a lucid narrative of the phenomenon being examined. Finally, the researchers had the option of contacting the respondents through email for clarification, if required.

This process of content analysis through manual coding led to the synthesis of three barriers. One was related to price/value for money, the second was related to functionality, and the third was related to customer service. To make the barriers more relatable to the digital context, as well as more representative of the significant words and phrases used by the respondents, the researchers named the price/value for money issues as the 'economic barrier', functionality issue as the 'efficiency barrier', and customer service issues as the 'experience

barrier'. We also solicited the feedback of our expert panel for these barriers. The subsequent discussions helped us formulate specific items to measure these barriers as well as consider the potential effect of the promotional messages and notifications sent by FDAs in aggravating the users further by creating information overload, a variable quite commonly discussed and cited as a source of fatigue in social media studies (e.g., Malik et al., 2020). We named this variable 'advertisement overload' and developed a measurement scale based on the review of the relevant literature in the Information Systems (IS) domain.

## 3. Research model and hypotheses

The conceptual model, formulated based on the research objectives of the present study, comprises the three barriers, namely, economic, efficiency, and experience, as the antecedents of the three outcome variables of trust, PWOM, and NWOM. Furthermore, trust is hypothesised as an antecedent of PWOM and NWOM (Fig. 1). As mentioned in the preceding section, our choice of barriers is grounded in the qualitative study and guided by our first discussant (Kaur et al., 2020b). Similarly, our choice of trust and recommendation behaviour is grounded in the hospitality literature (e.g., Kang & Namkung, 2019; Correia Leal, & Ferreira, 2019). Furthermore, to present more refined and unambiguous findings, we have drawn upon our second discussant (Talwar et al., 2020e) to capture recommendation behaviour through not only PWOM but also NWOM.

Apart from examining the proposed direct associations, we have also attempted to uncover the complex interplay between the examined variables by testing the mediation effect of trust between the three barriers and the two recommendation behaviours, as well as the moderation effect of advertisement overload on the association between the three barriers and trust. In recognition of the fact that socio-demographic factors may have a confounding effect on the three outcome variables, we further control the proposed model for age, gender, educational background, and household size. The conceptual model is presented in Fig. 1, and the operational description of the study variables is presented in Table 1.

### 3.1. Barriers and trust

The price barrier is an obstacle that can impede purchase intentions (Aschemann-Witzel & Zielke, 2017). It becomes activated when consumers realise that the offered prices are not reasonable (Riquelme et al., 2019). This could happen if consumers perceive that the value they have received is lower than what they have paid for (Aschemann-Witzel & Zielke, 2017). In comparison, reasonable prices support purchase intentions (Yeo et al., 2017). The prior hospitality literature has confirmed similar findings. Lien et al. (2015) revealed that online hotel booking intentions are high if the price barrier is low in terms of the price being perceived as affordable. Notably, consumers ordering products or services online expect a fair price and believe it should be lower than offline retail prices (Fassnacht & Unterhuber, 2016). Furthermore, the experience of not getting a reasonable price may lead to the weakening of trust and may be exacerbated if the consumers have been loyal to the brand (So et al., 2016). In other words, the price barrier has an association with trust (Choi, Wang, & Sparks, 2019). In consonance, we believe that while ordering food through FDAs, users may experience a price/value for money barrier (represented in the present study by an economic barrier), such that they might feel that they have paid a higher price than the value received, thereby lowering their trust in the given FDA service provider. Thus, we propose:

**H1a.** The economic barrier is negatively associated with trust in FDAs.

Usage barrier refers to a situation where innovation is not in sync with the existing habits, patterns, or workflows of consumers (Ray et al.,

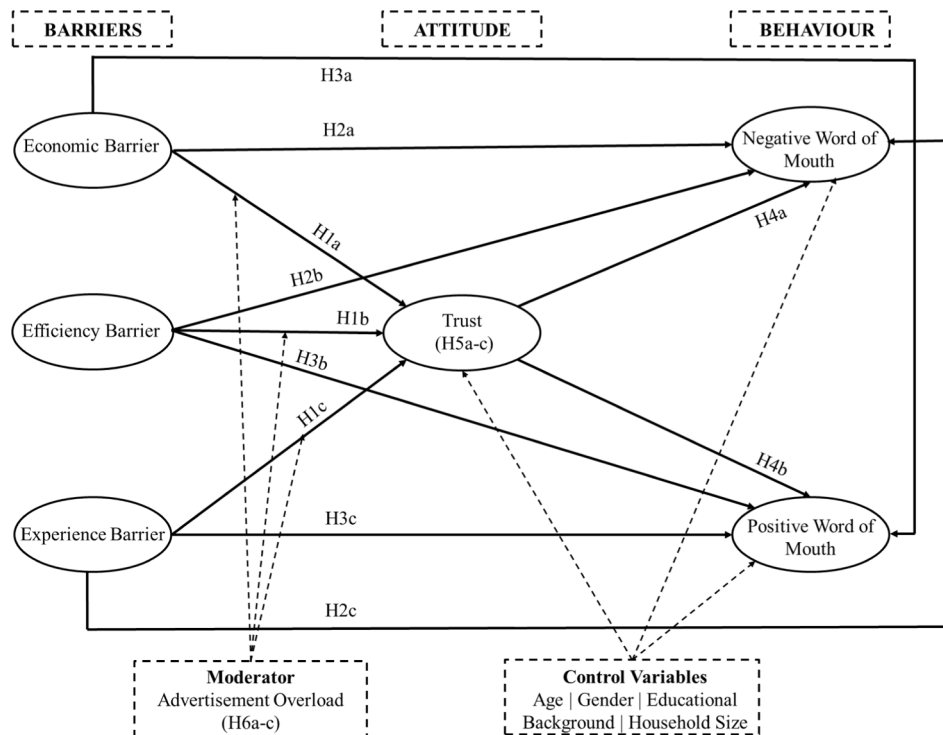


Fig. 1. Conceptual model.

2019; Ram & Sheth, 1989), which reduces their adoption and usage intentions. The prior extended literature on travel and hospitality has also examined the association of usage barriers with intentions and trust. For instance, Kim and Qu (2014) found that a low usage barrier is positively associated with travelers' intentions to use self-serving kiosks. Similarly, a low usage barrier was found to be associated with trust in the case of unfamiliar online vendors (Pengnate & Sarathy, 2017) and m-wallet users (Leong et al., 2020). Since FDAs are a relatively new form of ordering food, we anticipate that using them may demand a change in consumers' behaviour and disturb their equilibrium, thus resulting in a high usage barrier. Following the preceding discussion, we assume that the existence of such barriers related to the usability and functionality of the FDA apps (represented in the present study by efficiency barrier) may cause consumers to doubt the efficacy of these apps, which, in turn, may reduce their trust in them. Thus, we propose:

**H1b.** Efficiency barrier is negatively associated with trust in FDAs.

Customer service is an important factor in the marketing, tourism, and hospitality domain (Ratten et al., 2019) since it is associated with trust (Cheshin et al., 2018; Song, Ruan & Park, 2019). Prior research has confirmed this association in varied contexts. For example, Klaus (2013) indicated that for online businesses, such as Amazon, superior customer service enhances trust, whereas negligent customer service reduces it. Thus, frequent service failures can weaken consumers' trust (Boonlertvanich, 2019), and the proper resolution of such issues can strengthen it (Rahman et al., 2020). In the context of FDAs, the delivery of items other than those ordered, poor quality of food, and a deviation from the expected delivery time can aggravate the customer service barrier (Ray et al., 2019). Kaur et al. (2020b) also identified poor customer service as a key barrier in the FDA context. We represent this issue as the experience barrier in the current study. If such issues crop up frequently, they are likely to erode trust in FDAs, with the ineffective handling of these issues causing a further reduction. Hence, we hypothesise:

**H1c.** Experience barrier is negatively associated with trust in FDAs.

### 3.2. Barriers, NWOM, and PWOM

NWOM refers to criticising a product, brand, or service and sharing negative information about it (Talwar et al., 2020e). One of the earliest mentions of NWOM can be traced back to a study by Arndt (1968), who revealed that consumers with high-risk perceptions were more susceptible to NWOM. Seminal studies (e.g., Richins, 1983) have contended that the failure to address customer complaints or issues can cause them to share their bad experience with others, i.e., spread NWOM. Similar findings have been reported by relatively recent studies as well. For instance, Um and Lau (2018) argued that the dissatisfaction experienced by consumers is directly associated with NWOM in the healthcare sector, while Kumar and Purbey (2018) posited that consumers might express their displeasure by not recommending the product or service to others and indulging in NWOM. The tendency of dissatisfied consumers to engage in NWOM has also been observed in hospitality settings (e.g., Kandampully, Zhang, & Bilgihan, 2015), wherein scholars have contended that customers who feel mistreated by restaurants spread NWOM (Garcia et al., 2019). In digital settings, scholars have similarly provided evidence of an association between negative factors or barriers and NWOM. For example, perceived risks of e-commerce business lead to NWOM (Hsu, Huang, & Chuang, 2017), while the usage barrier may cause banking customers to indulge in NWOM (Mahadin & Akroush, 2019), and barriers related to perceived cost, risk, and uncertainty lead to NWOM for mobile wallets (Talwar et al., 2020e).

Although there is no a priori finding in the FDA context to indicate that barriers lead to NWOM, the existing evidence in both the hospitality and digital contexts provides us with a sufficient basis to speculate that the economic, efficiency, and experience barriers experienced by FDA users will aggravate their NWOM behaviour. This supposition is also plausible in the light of prior findings arguing that negative factors are perceived more keenly by consumers than positive ones, which causes them to respond accordingly (Cenfetelli & Schwarz, 2011), particularly through spreading NWOM. Thus, NWOM may serve as a venting mechanism to help consumers cope with the dissonance they experience (Velázquez et al., 2015). Hence, we propose:

**Table 1**  
Operational description of study measures.

Measures	Description	Reference
<b>Economic barrier</b>	It is a barrier based on the perception of users that the FDA charges an unreasonable price for the food they deliver, are expensive, and do not offer value for the amount charged.	Choi, Wang, & Sparks (2019); Talwar et al. (2020a); Mani & Chouk (2018)
<b>Efficiency barrier</b>	It is a barrier based on the perception of users that the interface of the app is not smooth, and several glitches occur while ordering food.	Leong et al. (2020); Kaur et al. (2020b)
<b>Experience barrier</b>	It is a barrier based on the perception of users that the customer service provided by the FDAs is slack and ineffective in the event of service failures, such as delayed delivery, mistakes in order processing, and so on.	Boonlertvanich (2019); Song, Ruan, & Park (2019); Kaur et al. (2020b)
<b>Trust</b>	It is an attitude of confident expectation of safety, wherein consumers' vulnerability would not be exploited in any way. It represents the belief of consumers that the FDA is reliable, trustworthy, capable, caring, and responsible.	Chang, Diaz, and Hung (2015); Beldad, Jong, and Steehouder (2010); Oliveira et al. (2017); Kim & Gupta (2012)
<b>Recommendation behaviour</b>	It represents the valence of recommendation intent, including both PWOM and NWOM.	Talwar et al. (2020e); Alexandrov et al. (2013)
<b>Advertisement overload</b>	It captures the overload, interruption, and irritation that consumers experience upon being subject to frequent notifications, promotional messages, and advertisements by FDAs.	Schmitt et al. (2018); Pantoja, Rossi, & Borges (2016)

**H2a)** Economic barrier, **b)** efficiency barrier, and **c)** experience barrier are positively associated with NWOM for FDAs.

As discussed above, scholars have contended that WOM is valenced, as represented by PWOM and NWOM (Naylor & Kleiser, 2000), wherein each is distinct from the other and driven by different sets of motives (Alexandrov et al., 2013), causing consumers to behave in a distinctive manner (Talwar et al., 2020e). This distinction has been observed in the case of other dichotomous variables, such as enablers and inhibitors of intentions/behaviour (Cenfetelli, 2004; Cenfetelli & Schwarz, 2011) and satisfaction and dissatisfaction with a product/service (Talwar et al., 2020c). In the specific context of recommendation behaviour, recent studies in the digital context have noted that the antecedents of PWOM are different from those of NWOM (Nam et al., 2020; Talwar et al., 2020e). Although no prior study has examined and confirmed that the antecedents of PWOM are distinct from those of NWOM in the context of FDAs, the existing findings in both the offline and online settings give us a reasonable base to expect that the same distinction will prevail in the present context. Therefore, we posit that the antecedents of PWOM will be distinct from the antecedents of the NWOM behaviour of existing FDA users.

Regarding the potential antecedents of PWOM and NWOM, prior findings have suggested that PWOM is driven by positive factors, whereas NWOM is driven by negative factors (Talwar et al., 2020e). For instance, Kaur et al. (2020a) found that relative advantage, compatibility, low complexity, and observability increased mobile wallet users'

recommendation behaviour. The service delivery literature has also suggested that good service delivery will result in PWOM (Jan, Anuar, & Sultan, 2018). However, some prior studies have also revealed the existence of a negative association between poor customer experiences and PWOM. For instance, Li & Liu (2014) revealed that poor service experience reduces consumers' tendency to recommend a product or service to others.

Similarly, scholars argue that if any service provider or brand is perceived as offering services or products unfairly, then consumers will likely develop an unsatisfactory response towards them (Ali, Kan, & Sarstedt, 2016) and may express their displeasure by not recommending the product or service to others (Kumar & Purbey, 2018). In a similar vein, scholars have argued that unsatisfactory operational experiences inhibit consumers from spreading PWOM (Kumar & Purbey, 2018). In the specific context of FDAs, Kaur et al. (2020b) posited a negative association of IRT barriers with WOM (positive recommendation). They found statistical support for the same only in the image barrier, representing issues associated with customer service. Thus, there is confusion in the prior literature, wherein some studies argue that PWOM is associated with positive factors only with no association with negative factors.

In contrast, others argue that PWOM is also negatively associated with negative factors. This implies that PWOM may be negatively associated with barriers. We seek to clarify this confusion in the prior findings by positing and examining the hypotheses that the three barriers, representing negative aspects of FDA usage, have no association with PWOM. Our position is based on the findings of our second discussant, Talwar et al. (2020e). Hence, we propose:

**H3a)** Economic barrier, **b)** efficiency barrier, and **c)** experience barrier are not associated with PWOM for FDAs.

### 3.3. Trust, NWOM and PWOM

Trust is perhaps one of the most complex variables that has been examined in consumer behaviour studies. Indeed, it has been explored in various contexts and conceptualised from multiple perspectives (Furner et al., 2021). For instance, Chen and Dhillon (2003) interpreted trust in terms of a firm's ability to fulfil the promises it makes to its customers (competence), its tendency to act in a reliable, ethical, and consistent manner (integrity), and its ability to protect the interest and well-being of its customers (benevolence). Other scholars have acknowledged forms of trust, including continuous trust, which represents an ongoing form of trust that extends beyond the initial acceptance, and initial trust, representing trust at the point of adoption (Siau & Shen, 2003; Talwar et al., 2020c). Although trust has been examined from diverse perspectives, such as economics, behavioural/psychological, and so on, scholars still argue that no universal definition of trust is available in the literature (Chang, Diaz, & Hung, 2015). Based on the prior findings in online settings (e.g., Beldad et al., 2010; Oliveira et al., 2017), we interpret trust 'as an attitude of confident expectation of safety, where consumers' vulnerability would not be exploited in any way.

The existing scholarship has acknowledged trust as a key driver of positive recommendation behaviour (PWOM) in the traditional commerce space and perhaps even more so in the e-commerce setting (e.g., Geffen 2000). For instance, the association has been confirmed for medical tourism (Abubakar & Ilkan, 2016), tourism, and the hospitality sector (Furner et al., 2021; Ladhari & Michaud, 2015). For online businesses as well, several studies have acknowledged that trust influences WOM and recommendation behaviour, such as social commerce (Meilatinova, 2021; Yang et al., 2015). In comparison, the association of trust and NWOM has been less examined. However, the existing findings have acknowledged that trust violations may result in NWOM (Goles et al., 2009; Perugini & Bagozzi, 2001).

Based on the preceding discussion, we expect trust to be associated with the valence of word of mouth, such that high trust (positive attitude

towards FDAs) is associated with high PWOM and low NWOM. In other words, trust has a positive relationship with PWOM and a negative relationship with NWOM. Hence, we posit:

**H4a.** Trust is associated negatively with NWOM for FDAs.

**H4b.** Trust is associated positively with PWOM for FDAs.

### 3.4. Mediation effect of trust

We have proposed a negative association of the three barriers with trust, based on prior findings (e.g., Choi, Wang, & Sparks, 2019; Pengnate & Sarathy, 2017; Leong et al., 2020; Boonlertvanich, 2019). This implies that the existence of barriers would lower the trust of existing FDA users. At the same time, we also propose a negative association of trust with NWOM based on the limited findings (e.g., Goles et al., 2009; Perugini & Bagozzi, 2001), indicating that high trust is likely to dissuade FDA users from spreading NWOM. Given these anticipated direct associations, we argue that trust might act as an intervening mechanism between barriers and NWOM. Our anticipation rests on the fact that some past studies have revealed the mediating role of trust in the relationship of barriers with WOM (e.g., Agag & El-Masry, 2016). Furthermore, we contend that examining the mediation effect of trust on the association of economic, efficiency, and experience barriers with NWOM will effectively bring forth the complexity of consumers' behaviour in the digital domain. Thus, we posit:

**H5.** Trust mediates the association of **a)** economic barrier, **b)** efficiency barrier, and **c)** experience barrier with NWOM for FDAs.

### 3.5. Moderation effect of advertisement overload

Schmitt et al. (2018) explained overload as a situation in which consumers receive more information than they can deal with in a limited time. Such overload is associated with various negative outcomes. For instance, Guo et al. (2020) argued that overload could lead to avoidance behaviour. In the hospitality domain, Park and Jang (2013) found that tourists with more than 22 destinations to choose from could not make the choice decision. In the current study, overload is represented by advertisement overload, which refers to the frequent sending of notifications (e.g., special offers, discounts) to users, due to which they get irritated or annoyed. Pantoja, Rossi, and Borges (2016) indicated that consumers tend to multi-task, and increased advertisement can increase the cognitive load and, in turn, adversely impact their attitude towards the brand. Punyatoya (2019) suggested that sending notifications, asking for post-purchase feedback, requesting a review or rating, and sending promo codes can significantly influence consumer trust as well. Although there is no a priori basis to support our contention, the inputs of the expert panel and the existing findings intuitively lead us to suppose that advertisement overload is likely to enhance the negative association of barriers with trust in FDAs. Hence, we propose:

**H6.** Advertisement overload enhances the strength of the negative association of **a)** economic barrier, **b)** efficiency barrier, and **c)** experience barrier with trust in FDAs.

### 3.6. Control variables

The prior FDA literature has noted the influence of demographic variables on the related consumer behaviour. For instance, Cho et al. (2019) suggested that age, gender, educational background, and economic status directly impact trust in FDAs. Similarly, it has been contended that since younger people are more ready to adopt new technologies, they are more likely to adopt FDAs than older people (Hwang et al., 2019). Some studies have also utilised demographic variables as control variables. For instance, Hwang et al. (2019) controlled age and gender in the context of drone food delivery.

Considering the existing evidence, we also believe that socio-demographic variables may have a confounding effect on the three outcome variables, namely, trust, NWOM, and PWOM. Hence, we have utilised age, gender, educational background, and household size as control variables in the current study.

## 4. Data and method

### 4.1. Measures

Data was collected through a questionnaire developed through a multi-pronged approach. Firstly, we developed the items to measure the three identified barriers based on the content analysis of the open-ended essays. These were then matched with the existing IRT scales to ensure that our measures for FDA-specific barriers, as developed through the qualitative study, were congruent with the existing pre-validated scales. For economic barrier, we referred to Talwar et al. (2020a) and Mani and Chouk (2018), while for efficiency and experience barriers, we referred to Kaur et al. (2020b). Next, we operationalised the measurement scales for trust, NWOM, and PWOM following Churchill's (1979) framework. Accordingly, we reviewed the existing literature to develop the initial instrument and selected items to avoid any overlap among constructs. The measurement scale for trust comprised five items adapted from Kim and Gupta (2012), while the NWOM measure comprised nine items adapted from Alexandrov et al. (2013), Sinha and Lu (2016), and Lam, Ahearne, & Schillewaert (2012). The PWOM measure comprised six items adapted from Alexandrov et al. (2013) and Carroll and Ahuvia (2006), and, lastly, the advertisement overload measure comprised six items developed by the authors based on Schmitt et al. (2018), Pantoja, Rossi, and Borges (2016), and inputs from the expert panel (three professors from the area of consumer behaviour and digital artefacts and one practitioner with relevant experience).

Before commencing the final data collection, we tested the initial instrument for face and content validity. For this purpose, we solicited feedback on the instrument from the expert panel and conducted a pilot study with 15 representatives of the target group. This step helped us assess whether the items were relevant to the study's context and measured what they were intended to measure and whether the wordings were proper and understandable. Open suggestions were also encouraged from the respondents. We prepared the final questionnaire by modifying the initial instrument based on the feedback of the expert panel and the pilot study. All items were measured using a Likert scale ranging from 1- strongly disagree to 5- strongly agree. The questionnaire was developed and administered in English, and the participants were assured of complete anonymity and confidentiality.

### 4.2. Data collection

Data were collected from residents of the United Kingdom through Prolific, an online platform for respondent recruitment. We used a purposive sampling strategy to recruit only adults who had used FDAs during the three months preceding the survey and had faced certain problems or issues. We collected the responses from existing FDA users for two main reasons. First, existing users have experienced ordering food through FDAs and are familiar with the likely issues one would face while using the app. Second, the participants have experience in using FDAs (e.g., a few times per month). Due to this, their recommendation behaviour towards FDAs could be guided by a comprehensive understanding of such platforms.

The United Kingdom was identified as the geography of interest because its expected user penetration is projected to reach 18.9% by the year 2024, with an estimated average user revenue of US\$180.46 (Statista, 2020), which is considerably higher than the estimated worldwide figures of 12.5% and US\$100.61 respectively (Statista, 2021). We contend that it would be useful for service providers to understand whether certain barriers that can erode this estimated FDA usage exist so

that they can then formulate their strategies accordingly. Furthermore, our literature review revealed that there are very few empirical studies examining British consumers' behaviour towards FDAs. Out of the initial 303 responses we collected, 278 were taken forward after removing incomplete questionnaires and outliers (Kim, Lee, Contractor, 2019). The demographic profile of the participants is presented in Table 2.

### 4.3. Data analysis methods

We used the two-step covariance-based structural equation modelling (CB-SEM) approach to analyse the data. Our choice of CB-SEM is based on the suitability of the data in terms of adequate sample size, absence of outliers, and conformity of the data to the multivariate assumptions of normality, absence of multicollinearity, homoscedasticity, and linearity, since these are considered to be essential prerequisites for this method (e.g., Hew et al., 2019). We applied the two-step process in SPSS and AMOS (version 27), whereby we first conducted confirmatory factor analysis (CFA) to assess the reliability and validity of the measures. Thereafter, we analysed the structural paths to test the proposed hypotheses. The output was assessed to determine the overall goodness of fit, the significance of the path coefficients, and the variance explained. Finally, we conducted mediation and moderation analyses using the PROCESS macro.

## 5. Results

### 5.1. Preliminary data analysis

After removing the outliers based on their Z-scores, the sample size of 278 was deemed adequate for using CB-SEM for the statistical analysis. However, the data also needed to be examined for conformity to the multivariate assumptions. To this end, we first established the normality of the data by confirming that the asymmetry and kurtosis values were within the required threshold limits of  $\pm 2$  (George, 2011). Next, we plotted the scatter plot of the residuals to visually confirm the homoscedasticity requirement. We evaluated multicollinearity by generating the Variance Inflation Factor (VIF) and tolerance values to confirm adherence to another multivariate requirement. All values of VIF were below 3, and those of tolerance exceeded 0.1, thereby confirming the absence of multicollinearity, as indicated by recent studies (McBride, Carter, & Phillips, 2020). The data was thus suitable for the use of CB-

**Table 2**  
Demographic profile of respondents.

Demographic measures	Category	Percentage	Frequency
Age	24–30	18.35	51
	31–37	33.09	92
	38–44	20.14	56
	45–51	12.59	35
	52–58	10.07	28
	59–65	3.96	11
	66–72	1.80	5
Gender	Male	41.01	114
	Female	58.99	164
Educational background	Less than high school	0.36	1
	High school	14.03	39
	College	22.66	63
	Professional degree	4.68	13
	Bachelors	42.45	118
	Masters	12.95	36
Household size	Doctorate	2.88	8
	One member	15.11	42
	Two members	26.26	73
	Three members	28.78	80
	Four members	0.36	1
Five members	25.18	70	
More than five members	4.32	12	

SEM. Besides, the correlation values were less than 0.80, as presented in Table 3.

### 5.2. Common method bias (CMB)

The data for the antecedents and outcome variables were collected from a common source. Thus, common method bias (CMB) may exist, which could lead to bias in interpreting results (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Harman's single factor confirmed the absence of CMB in the current study, as the variance explained (34.95%) was lower than the threshold value of 50%.

### 5.3. Validity and reliability

The goodness of fit indices of the measurement model generated through CFA were well-within the recommended values ( $\chi^2/df = 1.62$ ,  $CFI = 0.94$ ,  $TLI = 0.93$ , and  $RMSEA = 0.05$ ) (Hair et al., 2010). Items with factor loadings above 0.7 were taken forward, adhering to a very stringent cut-off criterion (Hair et al., 2010). Loadings above 0.7 indicate that the items used are good measures of each construct, thereby confirming convergent validity in our study (Table 4). In addition, the model scored well on all validity and reliability criteria. First, we determined the reliability of the measure by calculating Cronbach's alpha and composite reliability (CR). The computed values for all constructs were greater than the recommended cut-off value of 0.70 (Hair et al., 2010), thus confirming the reliability of the measures (Table 5). Next, we confirmed the convergent validity of the study measures based on the values of the average variance extracted (AVE), which exceeded the recommended cut-off of 0.5. Finally, we validated the discriminant validity of the study measures by ensuring that all square roots of AVEs were greater than their respective inter-construct correlations (Table 5).

### 5.4. Control variables

We controlled the model for the confounding effect of four socio-demographic variables: age, gender, educational background, and household size, on the three outcome variables of trust, NWOM, and PWOM. None of the control variables was found to have a statistically significant effect on the three outcome variables. Furthermore, the findings related to the control variables were in concordance with prior studies (e.g., Cho et al., 2019).

### 5.5. Structural model

The values of the fit indices for the structural model were also in line with the recommendations ( $\chi^2/df = 1.62$ ,  $CFI = 0.94$ ,  $TLI = 0.93$ , and  $RMSEA = 0.05$ ) (Hair et al., 2010). The coefficients and the associated statistical significance were as follows: H1a: ( $\beta = -0.30$ ,  $p < .001$ ), H1b: ( $\beta = -0.10$ ,  $p > .05$ ), H1c: ( $\beta = -0.42$ ,  $p < .001$ ), H2a: ( $\beta = 0.25$ ,  $p < .001$ ), H2b: ( $\beta = 0.14$ ,  $p < .05$ ), H2c: ( $\beta = 0.19$ ,  $p < .05$ ), H3a: ( $\beta = -0.17$ ,  $p < .01$ ), H3b: ( $\beta = 0.14$ ,  $p < .05$ ), H3c: ( $\beta = -0.03$ ,  $p > .05$ ), H4a: ( $\beta = -0.24$ ,  $p < .01$ ), and H4b: ( $\beta = 0.63$ ,  $p < .001$ ). This implies that the economic and experience barriers have statistically significant negative associations with trust, thereby supporting H1a and H1c. In comparison, H1b, proposing a negative association of efficiency barrier with trust, was not supported. H2a-c were all supported, indicating the existence of a positive association of all three barriers with NWOM. H3a-b, meanwhile, were not supported since we had proposed no association of economic and efficiency barriers with PWOM. However, statistical analysis revealed an unanticipated statistically significant association, which has been discussed in detail in the next part of the study.

In contrast to the rather unexpected outcome for H3a-b, H3c was supported, confirming that there is no association between experience barrier and PWOM. Next, both H4a-b were supported, which confirmed the proposed negative association of NWOM and the positive association of PWOM with trust. Finally, the proposed research model explained

**Table 3**  
Mean, standard deviation, and correlations.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
Age	39.50	10.50	1.00										
Gender	1.59	0.49	-0.05	1.00									
Edu	4.25	1.40	-0.18**	0.01	1.00								
H_Size	3.07	1.51	-0.21**	0.08	-0.01	1.00							
EcB	29.95	0.78	-0.11	-0.02	0.08	-0.07	1.00						
EfB	22.12	0.89	0.06	0.18**	0.08	0.05	0.12*	1.00					
ExB	32.98	0.88	-0.03	0.07	0.08	0.06	0.39**	0.33**	1.00				
TRS	34.32	0.62	0.05	-0.08	-0.14*	0.00	-0.43**	-0.25**	-0.53**	1.00			
PWOM	29.69	0.84	-0.05	0.05	-0.06	0.11	-0.41**	-0.05	-0.38**	0.59**	1		
AO	27.29	0.96	-0.06	0.07	0.12*	-0.14*	0.20**	0.21**	0.26**	-0.29**	-0.24**	1	
NWOM	19.88	0.79	-0.02	-0.02	0.12*	0	0.43**	0.30**	0.46**	-0.47**	-0.40**	0.30**	1

**Note:** Edu = Educational background, H\_Size = Household size, SD = Standard deviation, Economic barrier = EcB, Efficiency barrier = EfB, Experience barrier = ExB, Trust = TRS, NWOM = Negative word of mouth, PWOM = Positive word of mouth.

\* Correlation is significant at the 0.05 level (2-tailed).  
\*\* Correlation is significant at the 0.01 level (2-tailed).

45% variance in trust, 38% variance in NWOM, and 52.6% variance in PWOM (Fig. 2). The deeper implications of the results are deliberated upon under the discussion of results.

### 5.6. Mediation and moderation analysis

We examined the mediation effect of trust on the association of the three barriers with NWOM. In consonance with the contemporary thinking about mediation analyses, as discussed by Hayes and Rockwood (2017), we did not need to establish the significance of the association between the independent variables (the three barriers) and mediator (trust), nor did we need to establish an association between the independent variables (the three barriers) and mediator (trust) with the outcome variable (NWOM). In other words, for a mediation analysis to be conducted, the existence of statistically significant direct effects is not a mandatory condition. With this as a reference, we used the PROCESS macro to deconstruct the relationship between the barriers and NWOM into direct and indirect effects. The results revealed that trust partially mediates the relationship of the barriers with NWOM, indicating statistical support for H5a-c. The output of the statistical analysis is presented in Tables 6 and 7.

We performed moderation analysis to examine if the association of economic, efficiency, and experience barriers with trust was moderated by advertisement overload such that the strength of the negative association is higher for users who perceive FDAs as having a high degree of advertisement overload. We used Model 1 in the PROCESS macro with a bootstrapping effect of 5000 times. The output presented in Figs. 3 and 4 indicates that advertisement overload positively moderates the association of economic and efficiency barrier with trust, thereby supporting H6a-b. However, it does not moderate the association of experience barrier with trust, disconfirming H6c.

## 6. Discussion

The result of the hypotheses testing revealed statistically significant support for H1a, H1c, H2a-c, H3c, H4a-b, H5a-c, and H6a-b. We will first discuss the implications of the supported hypotheses. Support for H1a confirms a negative relationship between economic barrier and trust, and support for H1c confirms a negative relationship between experience barrier and trust. These findings are consistent with the findings of prior studies for price barrier (e.g., Lien et al., 2015) and customer service barrier (e.g., Boonlertvanich, 2019; Klaus, 2013), implying that the existing FDA users who experience barriers due to their perception that FDAs do not offer good food for the price paid will tend to have an attitude that FDAs do not keep their promises and commitments, are not reliable, and are not trustworthy. Such users also feel that FDAs do not care for them and are not capable of doing their job properly. Furthermore, FDA users experiencing a high economic barrier

also perceive FDAs to be expensive, uneconomical, and unreasonably priced and not offering value for money, which thereby lowers their trust in such services.

Similarly, users who perceive that FDAs often refuse to take responsibility for wrong or delayed deliveries and the poor quality of food will have lower trust in them as a result. Such users also tend to think that it is not only difficult to make the FDAs understand their problem or make them take the given feedback seriously but that it is also nearly impossible to get in touch with FDAs. These service-related issues reduce users' trust in FDAs, as does the fact that existing users think that FDAs have very little coordination with their partnered restaurants and often close a complaint without resolving it. A possible reason for this negative association between the economic barrier and trust could be that the users expect the prices charged by FDAs to be lower than what they would pay while dining at restaurants as there is no cost of maintaining an establishment or other fixed costs. If the prices are almost the same as restaurant dining, then it reduces trust. On the other hand, a potential reason for the negative association between service barrier and trust could be that slack service or frequent errors may cause users to perceive that the FDAs and/or the restaurants listed therein do not care about them and just want to make money from whatever orders they can get, without fulfilling the implicit promise of satisfactory service to their customers.

Next, H2a-c was supported, confirming the positive association between the barriers and NWOM. These findings are in concordance with prior studies that revealed the presence of a positive association between barriers and NWOM (e.g., Hsu, Huang, & Chuang, 2017; Mahadin & Akrouh, 2019; Talwar et al., 2020e). The support for these three hypotheses implies that upon perceiving barriers related to prices, the functionality of the apps, and customer service, existing users will show an increased tendency to complain about FDAs, say unfavourable things about them, express an adverse opinion about ordering food from them, and generally warn their friends and relatives not to order food via such services. This behaviour can likely be explained since facing issues and barriers may cause users to experience dissonance using FDAs and may vent their frustration as a coping mechanism. In addition, there might also be an altruistic motive behind spreading NWOM to protect their friends and family from the same issues. However, this is mere speculation since we have not measured this.

H3c was also supported by the results, in consonance with our anticipation based on the prior extended literature (e.g., Talwar et al., 2020e). The finding implies that issues with customer service have no association with PWOM, meaning that bad service experience in the form of delayed deliveries, no resolution of the complaint, and so on will not have any impact on users saying positive things about ordering food via FDAs and recommending such services to others. This result confirms the argument that dichotomous variables are not mere opposites of each other and are driven instead by different motives (e.g., Alexandrov et al.,



**Table 4**  
Measurement items and factor loadings.

Study Measures	Measurement items	CFA	SEM	$\alpha$		
<b>Economic Barrier (EcB)</b>	FDAs do not offer a good product for the price paid	0.67	0.67	0.85		
	FDAs do not offer me value for my money	0.80	0.80			
	Food ordered via FDAs is not economical	0.72	0.72			
	Food ordered via FDAs is not reasonably priced	0.77	0.77			
	Using FDAs is expensive	0.68	0.68			
<b>Efficiency Barrier (EfB)</b>	The interface of FDAs often lags or hangs	0.65	0.65	0.80		
	FDAs often face glitches while adding items to the shopping cart	0.87	0.87			
	While using FDAs, it is common to lose the item in the shopping cart	0.75	0.75			
<b>Experience Barrier (ExB)</b>	FDAs often refuse to take responsibility for wrong or delayed deliveries	0.72	0.72	0.91		
	FDAs often refuse to take responsibility for the poor quality of food	0.69	0.69			
	It is difficult to make the FDAs understand my problem	0.78	0.78			
	FDAs have very little coordination with the restaurants	0.71	0.71			
	Customer feedback is not taken seriously by FDAs	0.78	0.78			
	FDAs often close a complaint without resolving it	0.76	0.76			
	Getting in touch with FDAs is almost impossible	0.68	0.68			
	FDAs do not always take responsibility for common service failures (e.g., late delivery, wrong order, etc.)	0.81	0.80			
	<b>Trust (TR)</b>	The FDA that I am using now keeps its promises and commitments	0.72		0.72	0.86
		The FDA that I am using now can be relied upon	0.81		0.81	
The FDA that I am using now cares about its customers		0.72	0.71			
The FDA that I am using now is capable of doing its job		0.70	0.71			
The FDA that I am using now is trustworthy		0.76	0.76			
<b>Negative word of mouth (NWOM)</b>	I warn my friends and relatives not to order food via FDAs	0.77	0.77	0.94		
	I complain to my friends and relatives about ordering food via FDAs	0.83	0.83			
	I say negative things about ordering food via FDAs to others	0.91	0.91			
	I say bad things about ordering food via FDAs to others	0.94	0.94			
	I say unfavourable things about ordering food via FDAs to others	0.91	0.91			
<b>Positive word of mouth (PWOM)</b>	I share negative opinions about ordering food via FDAs	0.71	0.71	0.91		
	I say positive things about ordering food via FDAs to others	0.82	0.82			
	I recommend ordering food via FDAs to others	0.90	0.90			
	I recommend ordering food via FDAs to someone else who seeks my advice	0.81	0.81			
	I have recommended FDAs to lots of people	0.76	0.77			
I try to spread the good word about FDAs in general	0.77	0.77	0.89			

**Table 4 (continued)**

Study Measures	Measurement items	CFA	SEM	$\alpha$
<b>Advertisement overload (AO)</b>	I receive more information about FDAs than I can deal with in a limited time.			
	Many notifications from FDAs annoy me.			
Promotional messages received from FDAs regarding discounts and special offers increase my information overload.	Frequent notifications from FDAs irritate me.			
	The flooding of advertisements by FDAs overwhelms me.			
	Frequent notifications by FDAs cause interruption in my work			

2013; Talwar et al., 2020e).

**H4a-b**, proposing a negative association of trust with NWOM and a positive association with PWOM, was supported by the results. This outcome is in line with prior findings, albeit with most studies supporting a positive association of trust and PWOM (e.g., Meilatinova, 2021; Yang et al., 2015) and very limited studies providing evidence to support the negative association of trust with NWOM (e.g., Goles et al., 2009; Perugini & Bagozzi, 2001). The findings confirm that the positive attitude of existing users toward FDAs (e.g., thinking that they are caring, capable, responsible, reliable, and trustworthy) would motivate them to spread the good word about FDAs and recommend them to others. At the same time, such a positive disposition in terms of trust in FDAs would cause them to desist from criticising FDAs or spreading unfavourable feedback about them.

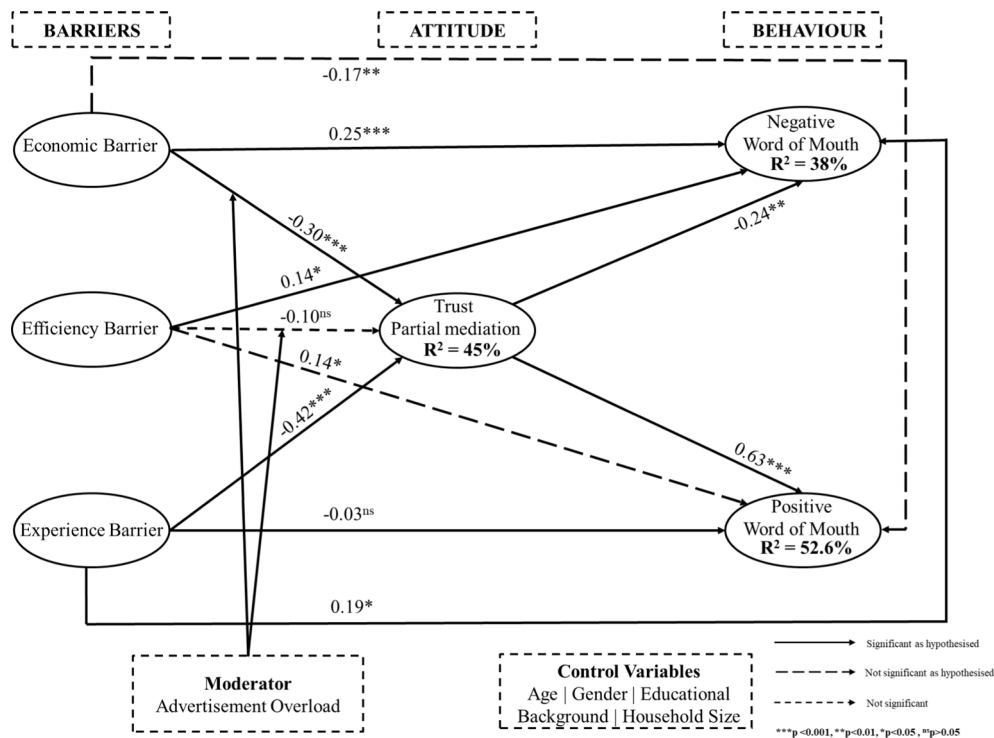
The results also provide evidence supporting the mediation effect of trust on the association of the three barriers with NWOM (**H5a-c**). The findings confirm a partial mediation, implying that the three barriers are not only substantively associated with NWOM by causing dissonance in the minds of the existing users, which causes them to spread negative opinions about FDAs, but also have an indirect effect on it through trust. The moderation analysis results confirmed support for **H6a-b**, indicating that advertisement overload positively moderates the association of economic and efficiency barrier with trust. This implies that FDA users with a high economic barrier (H6a) or high efficiency barrier (H6b), who are experiencing high advertisement overload in the FDA-context, exhibit lower trust than users who experience a low advertisement overload. However, the difference in the economic barrier of FDA users who experience high advertisement overload and those who experience low advertisement overload is higher for users with lower trust than those with higher trust. Similarly, the difference in the efficiency barrier of FDA users who experience high advertisement overload and those who experience low advertisement overload is higher for users with lower trust than users with higher trust.

In contrast to the support for the hypotheses above, **H1b**, **H3a-b**, and **H6c** were not supported. The lack of support for the negative association of efficiency barrier with trust indicates that issues with the interface of the FDA or glitches associated with the shopping cart do not lower the positive attitude that users have in terms of trust in FDAs. This result goes against the prior findings regarding the outcome of the usage barrier in varied contexts (e.g., Leong et al., 2020; Pengnate & Sarathy, 2017). A potential reason could be that users experience the same issues while using other online shopping apps and probably attribute them to

**Table 5**  
Validity and reliability analysis.

	CR	AVE	MSV	MaxR(H)	EcB	EfB	ExP	TRS	PWOM	NWOM
EcB	0.85	0.53	0.25	0.86	<b>0.73</b>					
EfB	0.80	0.58	0.13	0.84	0.12†	<b>0.76</b>				
ExP	0.91	0.55	0.36	0.91	0.43***	0.37***	<b>0.74</b>			
TRS	0.86	0.55	0.45	0.86	-0.50***	-0.30***	-0.60***	<b>0.74</b>		
PWOM	0.91	0.66	0.45	0.92	-0.47***	-0.07	-0.42***	0.67***	<b>0.82</b>	
NWOM	0.94	0.72	0.26	0.96	0.45***	0.30***	0.49***	-0.51***	-0.45***	<b>0.85</b>

**Note:** Composite reliability = CR, Average variance extracted = AVE, Maximum shared variance = MSV, Average shared variance = ASV, Economic barrier = EcB, Efficiency barrier = EfB, Experience barrier = ExB, Trust = TRS, NWOM = Negative word of mouth, PWOM = Positive word of mouth; bold values in diagonal are square roots of AVE, Off-diagonal values are correlations.



**Fig. 2.** Results of hypotheses testing.

internet speed or their smartphone operating system, rather than the FDA per se. However, we recommend that this association be examined further before concluding that functionality issues do not lower the trust of FDA users.

The results of **H3a-b** are the most confounding of all of the results. In the case of **H3a**, the results revealed a statistically negative association of economic barrier with PWOM, going against the growing evidence that PWOM and NWOM are not opposites of each other and that both are motivated by a different set of variables (Alexandrov et al., 2013), wherein PWOM is driven by positive factors, and NWOM by negative factors (Talwar et al., 2020e). One potential reason could be that the study was conducted during the COVID-19 pandemic, wherein many individuals have experienced job loss or reduction in pay, causing them to become more sensitive to products’ prices. In turn, this may be compounded by the perception of FDAs offering low value for money, which may aggravate these users to the point that their PWOM behaviour is adversely impacted. Nevertheless, PWOM is a very important aspect of consumer behaviour, so we refrain from drawing any conclusive inference that might well be an aberration. Our first discussant (Kaur et al., 2020b) also revealed a negative association between image barrier and PWOM. However, that study was conducted drawing a sample from a developing country and when the COVID-19 pandemic was not present as a health crisis.

In contrast, our study has been conducted in the context of a developed country by collecting data during the COVID-19 pandemic. Thus, the results may not be considered comparable. Due to this, we suggest that the relationship between negative aspects/barriers and PWOM should be explored deeply in the contexts of different products/services and cultural and geographical settings to glean a more nuanced understanding of the association.

The unanticipated, statistically significant positive association between the efficiency barrier and PWOM is perhaps the most important outcome of this study. The result confirms the existence of a paradoxical phenomenon, wherein users recommend FDAs as a way of ordering food to others despite experiencing issues with interfaces and glitches related to the shopping cart. As in the case of **H3a**, the outcome is not in agreement with some prior studies (e.g., Alexandrov et al., 2013; Talwar et al., 2020e), yet it is in concordance with an evolving body of literature in varied contexts where consumers have exhibited paradoxical behaviours, as discussed in our theoretical implications. A potential reason for this paradoxical recommendation behaviour of FDA users could be that they feel that the interface issues related to the functionality of the FDA apps are not really a barrier; rather, such issues are part and parcel of digital products/services. They might also think that FDAs need to be penalised for such technical glitches. This finding is also in consonance with the results of the study by Kaur et al. (2020b), which uncovered the

**Table 6**  
Results of mediation analysis.

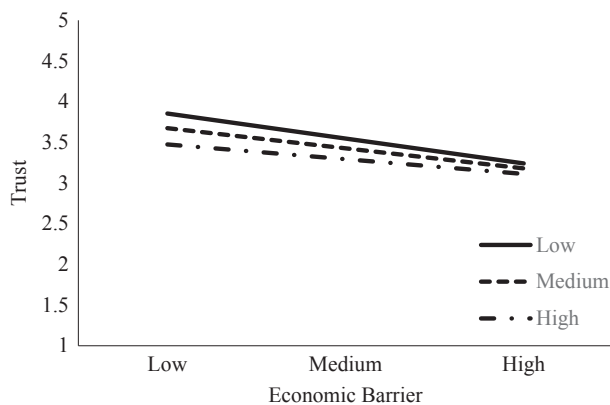
EcB → TRS → NWOM						
	$\beta$	se	t	p	LLCI	ULCI
EcB → TRS	-0.34	0.04	-7.97	0.00	-0.4280	-0.2585
EcB → NWOM	0.28	0.06	4.85	0.00	0.1658	0.3925
TRS → NWOM	-0.44	0.07	-6.08	0.00	-0.5835	-0.2979
Total effect of EcB → NWOM	0.43	0.06	7.80	0.00	0.3218	0.5390
EfB → TRS → NWOM						
	$\beta$	se	t	p	LLCI	ULCI
EfB → TRS	-0.17	0.04	-4.31	0.00	-0.2541	-0.0948
EfB → NWOM	0.17	0.05	3.54	0.00	0.0750	0.2632
TRS → NWOM	-0.53	0.07	-7.72	0.00	-0.6672	-0.3962
Total effect of EfB → NWOM	0.26	0.05	5.14	0.00	0.1615	0.3621
ExB → TRS → NWOM						
	$\beta$	se	t	p	LLCI	ULCI
ExB → TRS	-0.38	0.04	-10.45	0.00	-0.4458	-0.3045
ExB → NWOM	0.27	0.05	4.95	0.00	0.1620	0.3760
TRS → NWOM	-0.39	0.08	-5.05	0.00	-0.5414	-2377
The total effect of ExB → NWOM	0.42	0.05	8.65	0.00	0.3207	0.5096

**Note:** Economic barrier = EcB, Efficiency barrier = EfB, Experience barrier = ExB, Trust = TRS, NWOM = Negative word of mouth.

**Table 7**  
Indirect effects between dependent and independent variable.

	Effect	se	LLCI	ULCI
EcB → TRS → NWOM	0.15	0.03	0.0867	0.2231
EfB → TRS → NWOM	0.09	0.03	0.0437	0.1508
ExB → TRS → NWOM	0.15	0.04	0.0793	0.2190

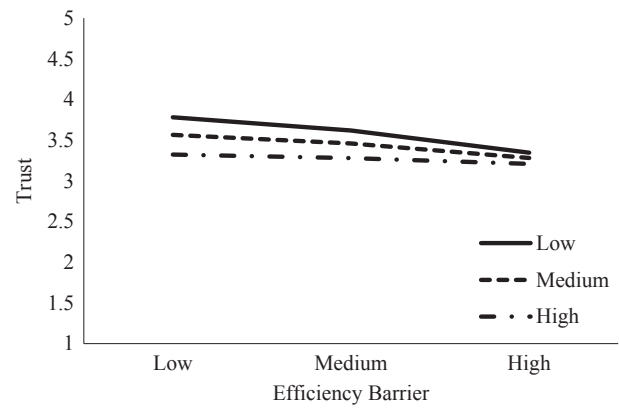
**Note:** Economic barrier = EcB, Efficiency barrier = EfB, Experience barrier = ExB, Trust = TRS, NWOM = Negative word of mouth.



**Fig. 3.** Association of economic barrier and trust moderated by advertisement overload.

existence of a positive association of PWOM with value barrier (measured in terms of quality control issues) and image barrier (measured in terms of customer experience). Although the geographical and external context in the form of the COVID-19 pandemic of this study is different from the current investigation, yet it serves as a basis for a more granular perception of our results.

The lack of support for **H6c**, proposing a positive moderation effect of advertisement overload on the association of experience barrier with trust, is rather inexplicable and needs to be better understood by collecting data from a larger and more diverse sample.



**Fig. 4.** Association of efficiency barrier and trust moderated by advertisement overload.

**7. Conclusion, implications, limitations, and future research areas**

The present study examined the barriers faced by FDA users in the United Kingdom. The study’s key motivation was to understand better how the barriers/issues/challenges faced by existing FDA users affect their attitude and recommendation behaviour. We articulated our study’s objectives through four research questions. Through **RQ1.**, we sought to identify the barriers that consumers have towards FDAs. To respond to this question, we conducted open-ended essays to seek the inputs of existing FDA users, and, based on the content analysis of 32 responses; we identified economic, efficiency, and experience barriers as specific to FDAs. We responded to **RQ2** by analysing the data collected from 303 FDA users to reveal the negative association of economic and experience barriers with trust. However, the relationship was not supported in the case of the efficiency barrier. Regarding recommendation behaviour, we examined the association of the barriers with both PWOM and NWOM. We proposed and confirmed a positive association between the barriers and NWOM. Similarly, although we proposed that the barriers would have no association with PWOM, we found an interesting paradoxical positive association of efficiency barrier. Furthermore, we examined the association of trust with both PWOM and NWOM and found a positive association of trust with PWOM and a negative association with NWOM, in line with our expectations. Next, in response to **RQ3.**, we conducted a mediation analysis in the PROCESS macro and confirmed the partial mediation effect of trust on the association of the three barriers with NWOM. Finally, in response to **RQ4.**, we developed a measure for advertisement overload and confirmed its positive moderation effect on the negative association of the economic and efficiency barriers with trust.

Our study makes four novel contributions. First, it is the maiden empirical attempt to adapt the generic IRT barriers to the FDA context from existing users’ perspective during a health crisis. The identified FDA-specific barriers are economic, efficiency, and experience. The study thus contributes to theoretical advancement in the accumulated knowledge around consumer resistance. Second, the study uncovered paradoxical PWOM behaviour, wherein existing FDA users positively recommended FDAs despite experiencing functionality issues that reduce the service’s usage efficiency. With the rapid digitalisation of various services and the growing prominence of the online-to-offline model, in which customer reviews are very important, insights about paradoxical recommendation behaviour can help practitioners focus on key result areas. Third, the study examined and revealed the negative moderation effect of advertisement overload on the association of barriers with trust in the case of FDAs for the first time. In fact, in the absence of any a priori measure, the study has generated the items to measure advertisement overload. By doing so, the study has offered

strategic input to managers who feel pressured to increase their promotional budgets and provided a measure by which future researchers can assess the negative outcome of over-zealous advertising by FDAs. Lastly, the study examined the possibility of the recommendation behaviour of FDA users, as manifested through the valence of the word of mouth, i.e., PWOM and NWOM. As such, the study contributes to the growing understanding that the two are distinct behaviours that can exist together.

In a nutshell, the study augments the existing learnings by uncovering the complexities of consumer behaviour in the digital space and revealing that individuals might not always act as rationally as anticipated, despite the presence of external stressors, such as a health crisis. Based on an analysis of the data collected through a convergent mixed-method study, our results offer useful theoretical and managerial implications, as discussed below.

### 7.1. Theoretical implications

The study offers four key theoretical implications. First, the study is the first empirical attempt to investigate consumers' resistance towards O2O services within the specific context of FDAs. Our first discussant identified and examined FDA-specific barriers in the context of a developing country and examined their association with intentions to use FDAs. In contrast, we examined the barriers experienced by existing FDA users and investigated their influence on attitude, represented by trust. Attitude is recognised in the consumer behaviour literature as a key global motive associated with actual behaviour (Sahu et al., 2020). Thus, our study enriches the related literature in the following ways: (a) by providing the resistance perspective on consumer behaviour toward FDAs, which has largely been skewed towards the positivist agenda of the drivers of adoption (e.g., Roh & Park, 2019; Cho et al., 2019), through identifying and examining FDA-specific barriers, namely, economic, efficiency, and experience to represent consumer resistance toward FDAs. In doing so, the study lays the ground for future research on consumer resistance and digital innovations, which has been acknowledged to be an under-explored domain (Talwar et al., 2020d); (b) by positing hitherto unexplored associations between two key aspects, namely, barriers and attitude, in the FDA-context; and (c) by providing insights into the barriers towards digital artefacts experienced by consumers in developed countries, which have been observed in consumers from developing countries both anecdotally and by the existing scholarship. In addition to this, by positing trust as an attitude that mediates the association of the three barriers with NWOM, the present study advances the understanding of trust in the context of FDAs in particular and O2O services in general. It also adds another dimension to the position taken by our first discussant (Kaur et al., 2020b) by proposing trust issues as a tradition barrier that had a negative association with both intentions to use FDAs and PWOM.

Second, it explores recommendation behaviour, which has been identified as a key concern in the hospitality literature (e.g., Correia Leal, & Ferreira, 2019), wherein consumers are considered brand ambassadors who can either contribute towards creating a positive image for the firm or act as revenge-seekers who can destroy the firm's reputation upon experiencing dissonance. We have gone beyond recommendation behaviour in aggregate to examine its valence, proposing the association of both PWOM and NWOM. Not only is recommendation behaviour less dynamic in the direct context of FDAs, but the consideration of its valence is also a completely new concept in this setting. By positing and confirming that inhibitors or barriers drive NWOM, we take forward the pioneering study by Talwar et al. (2020e), our second discussant. At the same time, by positing no association between PWOM and barriers, we sought to clarify the contrary findings available in the prior literature. In this regard, our finding, in terms of the existence of a paradoxical association between the barriers and PWOM, served to elucidate better the results of our first discussant, Kaur et al. (2020b), which had proposed a potential negative association of the barriers with

PWOM. Therefore, our study adds another dimension to the accumulated knowledge and key outcome variables for researchers to focus on.

Third, in addition to enriching the literature by considering the valence of recommendation behaviour, our study also brings forth the paradoxical PWOM behaviour of FDA users. Specifically, our study revealed that despite having an efficiency barrier, FDA users exhibit high PWOM behaviour, implying that they recommend FDAs to others despite experiencing interface-related difficulties. By bringing forth the paradoxical behaviour of consumers in the context of resistance, our study contributes in two key ways: (a) it illuminates the complex contours of consumer behaviour that go beyond the rational expectations, yielding valuable insights for researchers to provide more useful inputs for managerial decision-making, and (b) it deepens the evolving literature around the paradoxical behaviour of resistant consumers, which has been observed in varying contexts (e.g., Talwar et al., 2020a; Tandon et al., 2021).

Fourth, to our knowledge, this is one of the limited studies that have extended IRT to develop a theory-driven framework for investigating consumer behaviour toward FDAs. Thus, the study not only provides a new perspective on consumer behaviour in the digital setting but also contributes to the advancement of IRT itself by adapting it to the context of FDAs and providing empirical evidence for the same. By doing so, the study also paves the way for future researchers to broaden the applicability of IRT in two ways: (a) by identifying additional barriers in the context of FDAs, particularly the ones that may be related to the food habits in the geography under investigation, and (b) by extending IRT to other mobile app-based hospitality and tourism services.

### 7.2. Managerial implications

The study offers three key implications for managers. First, the study revealed the pivotal role of trust in FDAs. High trust increases PWOM for FDAs, while low trust leads to NWOM. This indicates that trust is an important construct that service providers can leverage not only to keep existing users engaged but also to acquire new users through the recommendations of these users. Given that users' trust encompasses their belief that the FDAs are reliable, trustworthy, capable, caring, and willing to fulfil their promises to customers, service providers should make sure that their marketing communications and on-ground efforts should be focused on projecting and maintaining such an image. In addition, we found that economic and experience barriers reduce trust; therefore, we suggest that FDAs try to increase trust through various visible measures, such as (a) offering meaningful discounts and value for money meals by better negotiating with the partner restaurants, as price impacts the perceived value of FDAs (Cho et al., 2019), and (b) place immense emphasis on not only the process of customer service but also on the robust mechanism for service recovery, which can impact recommendation behaviour as well (Akinci & Aksoy, 2019).

Second, the study findings suggest that users exhibit positive recommendation behaviour despite experiencing efficiency barriers. Since this paradoxical behaviour may stem from users understanding that issues in the digital milieu are beyond the control of FDAs and can thus be forgiven for lapses in the in-app interface, service managers should make sure that they underscore the fact that the performance of the app is subject to many external factors that are beyond their control. This could be particularly useful in situations where FDAs are not willing to spend much on the app architecture except for the basic security, privacy, and user interface features.

Finally, the findings indicate that frequent notifications create advertisement overload for the users, which not only irritate the users but may also have more serious consequences in terms of reduced trust and the resulting NWOM (Punyatoya, 2019; Bellini & Aiolfi, 2019), both of which could be detrimental for increasing the adoption and continued usage of FDAs. Thus, managers should optimise the notifications or advertisements sent to FDA users. One way to do so is to develop short, crisp notifications for advertisements or other benefits to be shared at a

fixed frequency rather than bombarding users indiscriminately through mass messaging.

### 7.3. Limitations and future scope

Despite its notable contributions, our study has some limitations. First, the study focuses on FDAs users from the United Kingdom. Thus, the findings of this study may not apply to other cultural contexts or app-based services. However, our study offers a robust conceptual model that can be tested in multiple cultural contexts to make a cross-cultural, cross-product comparison, thereby enriching the accumulated learnings. Second, the study uses a cross-sectional design for data collection, which comes with the attendant social desirability bias and issues. Although we have taken all procedural precautions to lower the effect of any such biases, we still suggest that future studies use an experimental or longitudinal study design to provide additional insights into the evolution of consumer behaviour in digital settings. Lastly, our study has proposed its conceptual model based on insights from IRT alone. It would thus be quite useful for practitioners to have an additional understanding of consumer behaviour toward FDAs through other theoretical lenses, such as Behavioural Reasoning Theory (Westaby, 2005).

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