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Shopping for fresh food online during Covid-19 in Shanghai

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Aim: The main goal is to examine the role of perceived risk in determining customers' willingness to purchase fresh food online.

Research methods: Data were collected through an online survey. Respondents were recruited via a call on online platforms. A total of 287 fresh food e-commerce consumers participated.

Conclusions: The results showed that perceived risk of COVID-19 infection had a positive effect on purchase intention, perceived risk of purchase behavior had a negative impact on purchase intention, and attitude was a mediating variable between perceived risk and purchase intention. Past experience moderated the relationship between perceived risk of purchase behavior and attitude. Actual consumer behavior was explained directly by purchase intention

Originality: Next to attitude, subjective norms, and perceived behavioral control, the effects of perceived risk of COVID-19 infection, perceived risk of purchase behavior, and past experience on purchase intention and actual behavior to purchase fresh food online were examined in an extended Theory of Planned Behavior model. Previous studies measured overall risk perception as risk perception associated with purchase behavior and risk perception related to Covid-19 infection. The influence of both types has rarely been examined distinctively.

Implications: Retailers can contribute to lowering consumers' risk perception of purchasing fresh food online and offer creative promotions to attract repeat purchases.

Limitations: Only attitude correlated significantly with purchase intention, implying that additional variables may influence purchase intention. Also, although the influence of past experience is considered, a detailed distinction was not made.

Keywords: Theory of Planned Behavior, fresh food e-commerce, perceived risk, purchase intention, past experience, Covid-19
JEL: D01, D81

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1. Introduction

During the Covid-19 outbreak, the Chinese government declared lockdown strategies to restrict people's movement and to impose self-quarantine in high-risk areas to minimize the danger of virus transmission. In February 2020, all neighborhoods in Shanghai implemented closed management (Liu 2020). In several areas only one person (at a time) per household was allowed to go outside to purchase groceries (Yang 2021). The pandemic significantly changed the way people buy their groceries: the frequency of grocery shopping was reduced and people attempted to shop as swiftly and effectively as possible in order to avoid contact with others and minimize the infection risk (Shamim et al. 2021). As a result of these precautions and restrictions, people felt more reluctant to buy fresh food in brick-and-mortar stores. An increased demand for online fresh food delivery services arose (Ferguson 2021) and China's fresh produce e-commerce grew rapidly (Ellison et al. 2020; Hongyu 2020). Chinese consumers have been developing a new habit of "shopping online for fresh food" (Wenzhuo 2020; Yu et al. 2018).

A commonly adopted theory to investigate consumers' purchase behavior in the food industry and online shopping area is the Theory of Planned Behavior (TPB). TPB predicts consumers' intention to take part in a certain behavior and therefore assumes that consumers act rationally, based on their attitudes, subjective norms and perceived behavioral control. This theory aims to explain every behavior over which we as consumers have the capability to exercise self-control. However, only taking into account attitudes, subjective norms, and perceived behavioral control, is sometimes insufficient to predict purchase intention and behavior. According to Ajzen (1991), the original TPB model can be modified by adding other relevant variables. Therefore, many scholars suggest improving and extending the TPB theory to make this model applicable to more scenarios.

Bauer (1960) introduced the idea of perceived risk, which has since been widely utilized to address a variety of issues in consumer behavior. Compared to other forms of internet buying, fresh food purchases are distinctive due to their perishability. The perceived risk associated with the unpredictable nature of online purchasing perishable food is a crucial barrier for online retailers (Nguyen et al. 2021). Previous research consistently shows that risk perception has a detrimental effect on attitude

and purchase intention (Zhao et al. 2021). However, people perceive the risk of Covid-19 infection in addition to the perceived risk of purchase behavior. Recent theoretical developments have revealed that the perceived threat of Covid-19 infection while shopping is a significant predictor of changes in purchase behavior (Lu et al. 2021; Schmidt et al. 2021). But the link of this type of risk perception to purchase behavior is distinct from earlier findings. Consumers' assessments of Covid-19 threat's severity positively influenced their attitude on switching shopping channels (Youn et al. 2021). Long and Khoi (2020) indicated that during Covid-19, consumers' overall risk perception positively affected food hoarding intentions. They assumed that it is because people perceived high risks from COVID-19 but low risks from other aspects due to fear. They measured overall risk perception including risk perception associated with purchase behavior and risk perception related to Covid-19 infection. However, the influence of these two different types of risk perception has rarely been examined distinctively. In light of the new environment caused by the pandemic, this study examines the role of perceived risk in determining customers' willingness to purchase fresh food online. Therefore, in the current study, perceived risk of Covid-19 infection and perceived risk of buying fresh food online are added to the TPB model.

As mentioned above, TPB investigates the relationship between consumers' attitude toward behavior and purchase intention (Azjen 1991). In other words, attitude is a critical indicator that is commonly used to anticipate customer purchase intentions. In addition, perceived risk has a direct influence on attitude toward buying behavior (Zhao et al. 2021). This study will therefore examine the potential mediating effect of attitude in the relationship between perceived risk of Covid-19 infection and perceived risk of buying fresh food online and purchase intention.

In an e-commerce context, it is critical to understand how previous experience impacts purchase behavior since repeat customers behave in a different way than new customers. Past experience can directly influence customers' attitude and purchase intention (Alexa et al. 2021; Mainardes et al. 2019). However, few studies examine the moderating role of past experience. Marks and Olson (1981) mentioned that a product's or service's perceived evaluation may differ because of consumers' related experience. It is reasonable to assume that, due to lack of purchasing experience,

consumers will be more concerned about the risks associated with purchasing fresh food online, thus the greater the negative impact of perceived risk.

Based on previous studies and on the existing body of knowledge, following research questions will be addressed in this study:

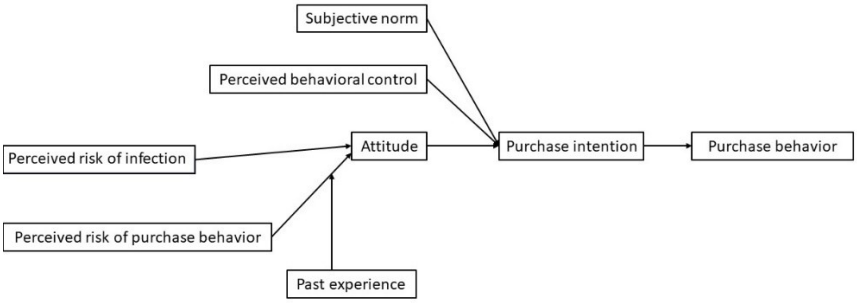
> *RQ1: How do two kinds of perceived risk influence consumers' intention toward purchasing fresh food online?*
>
> *RQ2: What is the mediating effect of consumers' attitude when investigating the impact of two types of perceived risk and purchase intention on actually purchasing fresh food online?*
>
> *RQ3: What is the moderating effect of past experience on the impact of consumers' perceived risk to purchase fresh food online and attitude?*

We propose an extended TPB model and apply a structural equation modeling (SEM) approach to assess the impact of each construct. This study helps classifying the impact of two types of risk perception on purchase intention and behavior in the fresh produce e-commerce domain during the COVID-19 pandemic. In addition, the current research aims at identifying the mediating role of attitudes and the moderating role of past experiences in the extended TPB model.

2. Theoretical background

The current study uses TPB to explain Chinese consumers' behavior to purchase fresh food online during the pandemic and proposes an enhanced TPB model by adding three constructs (perceived risk of Covid-19 infection, perceived risk of purchase behavior, and past experience), see Figure 1.

Figure 1. Conceptual framework



2.1. Perceived risk

Prior research showed that risk perception is essential to buying decisions (Lo 2013). Many researchers have explored the detrimental impact of perceived risk on online purchase intention in the context of e-commerce (e.g. Chen et al. 2015). For example, Ha (2020) and Ahmed et al. (2021) concluded that consumers' perception of risk influenced their intention to shop online negatively. The adverse effect is also shown in the food business, Vijayasarathy and Jones (2000) demonstrated that customers' perceived risk is quite a large obstacle to buy food. In other words, when customers perceive high risk regarding purchasing food, they are less likely to purchase or repurchase it (Ariff et al. 2014; Klerck, Sweeney 2007). Due to the perishability of most food, consumers want to reduce risk rather than maximize value when selecting food (Mitchell 1999). However, some prior research demonstrated that there is no association between perceived risk and purchasing intention. For example, Muda et al. (2016) indicated that perceived risk had little effect on Generation Y buyers' buying preferences. Similarly, Chaudary et al. (2014) found no effect of perceived risk on online purchasing acceptance. Both findings imply that the effect of perceived risk on behavioral intention may vary according to context.

Perceived risk of Covid-19 infection during shopping is an important predictor for changes in purchase behavior (Schmidt et al. 2021). Risk perception appears to have a beneficial influence on consumer attitudes toward food hoarding, which in turn

has a positive effect on consumer food hoarding intentions (Long, Khoi 2020). Long and Khoi (2020) suggested that when consumers believe stockpiling food to be safer than not stockpiling, the higher the perceived risk, the more motivated people are to stockpile. This hypothesis sheds new light on the effects of risk perception. However, the overall risk perception defined in Long and Khoi (2020) includes risk perception of Covid-19 infection and risk perception of purchase behavior, such as price risk, product quality risk, and social risk. Long and Khoi (2020) assumed that during the pandemic, people perceive high risks from Covid-19 but low risks from other aspects possibly causing anxiety and emotional stress. Prior research has not yet described the influence of these two distinct types of risk perceptions separately but rather described the overall impact of risk perception. In light of the pandemic, it is highly relevant to classify the influence of two types of risk perceptions. Therefore, the current study examines the effect of the perceived risk of Covid-19 infection and the perceived risk of purchasing fresh food online on purchase intention, respectively:

H1: Consumers' perceived risk of Covid-19 infection positively affects consumers' intention to purchase fresh food online.
H2: Consumers' perceived risk of purchase behavior negatively affects consumers' intention to purchase fresh food online.

2.2 Theory of planned behavior

The TPB model explains that attitudes, subjective norms, and perceived behavioral control influence behavior, with behavioral intention mediating the effects. TPB has been used to analyze green food purchases (Qi, Ploeger 2021), nonperishable food stockpiling (Lehberger et al. 2021), intention to stockpile food during the pandemic (Long, Khoi 2020), and food delivery services (Kim et al. 2021). Some argued that attitude, subjective norms, and perceived behavioral control might not be sufficient predictors of intention and behavior.

To address the research questions, we extend the TPB model with three variables: perceived risk of purchase behavior, perceived risk of Covid-19 infection, and past experience.

2.2.1. Perceived risk and Attitude

The TPB's initial construct attitude refers to a person's degree of positivity or negativity toward a certain activity (Ajzen 1991). Numerous articles have established a link between perceived risk of buying behavior and attitude. Huang (1993) discovered that customer attitudes toward pesticide use are substantially influenced by perceived risk. Similarly, Li et al. (2020) show that perceived risk of purchase behavior has a detrimental effect on consumer sentiments. Following that, research in e-commerce supports the notion that risk perception of purchase behavior has a negative effect on online purchase behavior and attitudes toward it (Jarvenpaa et al. 2006; Zhang et al. 2011; Ariff et al. 2014). That is, when consumers believe a particular action is risky, their attitude toward that action will most likely be negative.
Attitude and purchase intention

Attitude is a major predictor of future behavioral intentions (Ajzen 1985). An individual who understands that the consequence of a particular conduct is favorable is more likely to have an optimistic attitude toward engaging in that behavior. Additionally, if a person has a favorable attitude toward an certain action, that person is more likely to participate in that action (Ajzen 1985). This positive correlation has been found in a variety of scenarios. For example, in e-commerce, an attitude refers to customers' positive or negative feelings when purchasing online (Ha 2020; Hao et al. 2020; Li et al. 2020). When applied to the food sector, attitude is recognized as the most robust predictor of food purchase intention (Scalco et al. 2017). Following hypotheses are formulated based on the above-mentioned literature:

H3: Consumers' attitude toward purchasing fresh food online mediates the relationship between consumers' perceived risk of Covid-19 infection and purchase intention.

H4: Consumers' attitude toward purchasing fresh food online mediates the relationship between consumers' perceived risk of purchase behavior and purchase intention.

2.2.2. Subjective norms

Subjective norms refer to the social pressure exerted by others to engage in or refrain from a specific activity (Ajzen 1991). Individuals' subjective norms are affected by the opinion of influential others (e.g., friends, family members, colleagues). Using the TPB, previous research demonstrated a positive association between subjective norms andintention (Chen 2007; Youn et al. 2021). However, some studies indicate that the influence of subjective norms on behavioral intention is not as strong as the influence of attitude on intention. For instance, Yazdanpanah and Forouzani (2015) discovered that intention is not significantly predicted by subjective norms. Additionally, Armitage and Conner (2001) asserted that subjective norms have a low predictive value. To determine whether subjective norms have a significant effect on purchase intention during a pandemic, we propose following hypothesis:

H5: Subjective norms positively affect purchase intention.

2.2.3. Perceived behavioral control

Perceived behavior control (PBC) is described in TPB as a person's confidence in his or her ability to complete the behavior (Ajzen 1991). Perceived behavioral control contains two dimensions: the degree to which an individual has control over a behavior; and the level of an individual's confidence in his or her capacity to engage in that behavior. The PBC construct was developed from the concept of self-efficacy (i.e. an individual's belief in his or her ability to complete tasks) (Bandura 1977). PBC was introduced to the TPB model to address the situation that people may not have complete control over a given action. Fan et al. (2004) examined the interaction effect between PBC and behavioral intention using a variety of techniques. They discovered that the majority of research revealed evidence for a positive interaction effect. However, research also revealed that PBC has an insignificant effect on purchase intention (Yazdanpanah, Forouzani 2015; Kwong, Park 2008). To examine this inconsistent relationship, the following hypothesis is presented:

H6: Perceived behavioral control positively affects purchase intention.

2.2.4. Purchase intention

According to the TPB framework, the most important predictor of actual behavior is behavioral intention (Ajzen 1985). Individuals with a high behavioral intention to engage in certain conduct are significantly more likely to actually express that behavior than those with a poor behavioral intention. To further verify this relationship in the fresh produce e-commerce industry, the following hypothesis is proposed:

H7: Purchase intention will positively influence actual purchase behavior.

2.3. Past experience

Repeat customers have a better comprehension of the products or services and behave differently from customers who have never bought fresh food online. Prior research showed that one's past experience has a large impact on one's attitude and buying intention. According to Ghose and Chandra (2020), while previous experience helps build positive views, a buyer who has never used a particular product may even have a negative attitude towards that product. Moreover, previous experience was mentioned as a critical component in gaining consumers' confidence and in influencing future purchases. Marks and Olson (1981) also mentioned that the perceived assessment of a product or service might differ because consumers with more product or service experience are more familiar with it than those with no or limited experience. Therefore, it is possible that the negative relationship between perceived risk of purchase behavior and attitude is moderated by past experience and is more intensive for customers with little past purchasing experience. Lack of purchase experience would prompt customers to pay more attention to the risks resulting from online fresh food purchases, thus inhibiting them from using fresh food e-commerce platforms. Hence, it seems plausible to infer that past experience has a moderating effect on the relationship between consumers' risk perception of purchase behavior and attitude. Following this reasoning, we propose:

H8: Past experience will moderate the negative relationship between consumers' perceived risk of purchase behavior and consumers' intention to purchase fresh food online. Specifically, the effect of consumers' perceived risk on their attitude will be

weaker for consumers with a rich experience in purchasing fresh food online than for those with limited experience.

3. Methods

3.1. Questionnaire

To investigate the constructs, eight variables were measured on five-point Likert scales. All operationalizations were derived from measurements scales used and validated in other academic studies and adapted to fit the context of this study. *Past experience* was measured by three items adapted from Mitterer-Daltoé et al. (2013), *Perceived risk of purchase behavior* was measured by five adapted items from Bianchi and Andrews (2012), Grazioli and Jarvenpaa (2000), and Teo and Liu (2007), *Perceived risk of Covid-19 infection* was measured by five items from Schmidt et al. (2021), *Attitude* was measured by four adapted items from Wang et al. (2013), *Subjective norms* was measured by four adapted items from Tommasetti et al. (2018) and Al-Swidi, *Perceived behavioral control* was measured by four adapted items from Al-Swidi et al. (2014) and Ajzen (2019), *Purchase intention* was measured by six adapted items from Bianchi and Andrews (2012) and Tomasetti et al. (2018), and *Actual behavior* was measured by five adapted items from Schmidt et al. (2021).

Prior to launch, the questionnaire was pre tested to evaluate all questions on content and wording.

3.2. Data collection and profile of respondents

The respondents are fresh food e-commerce consumers in Shanghai. The empirical data for the present study were collected through an online survey, allocated online for the time period of one week. Respondents were encouraged to participate via a call on online platforms Facebook and LinkedIn. After excluding invalid answers, a total of 287 complete responses were used (see Table 1).

Table 1. Respondents' demographics

Demographics		Frequency	Percent
Age	18-24 years old 24-30 years old 31-40 years old 41-50 years old Older than 50 years old	65 103 63 42 14	22.60 35.90 22.00 14.60 4.90
Gender	Female Male Confidential	143 87 57	49.80 30.30 19.80
Education	No Degree Middle School Certificate College Degree Bachelor Degree Master's degree or above	11 54 89 91 42	3.80 18.80 31.00 31.70 14.60
Yearly Household Income	Less than 80.000 80.000 – 150.000 150.000 – 300.000 300.000 – 1000.000 More than 1000.000	92 76 63 33 23	32.10 26.50 22.00 11.50 8.00
Occupation	Student Freelancer Entrepreneur Employee Housewife	68 93 34 65 27	23.70 32.40 11.80 22.60 9.40
Total		287	100

Source: authors' own research.

4. Results

4.1. Reliability and validity

The measurement models achieved a composite reliability value of 0.84 or higher, demonstrating reliability of the construct measurements (Gefen et al. 2000). For convergent validity, all AVEs were above the threshold value of 0.50. Rho_A levels were above 0.7, representing an acceptable assessment of the construct scores (Henseler et al. 2016). Hetero-Trait-Mono-Trait values are below 1, suggesting sufficient discriminant validity (Hair et al. 2022; Henseler et al. 2016).

4.2. Hypotheses testing

Standardized root means square residual (SRMR) is used to assess the fit of the research model. Results show an adequate SRMR value of 0.06 (Hair et al. 2022).

The predictive power of the model was analyzed using the coefficient of determination (R^2). As Figure 2 shows, the R^2 value of actual behavior, attitude, and purchase intention is respectively 0.52, 0.51, 0.51, all of which can be characterized as acceptable (Hair et al. 2017).

Perceived risk of Covid-19 infection ($\beta = 0.46$, $p < .001$) positively influences attitude, perceived risk of purchase behavior ($\beta = -0.27$, $p < .001$) negatively impacts attitude, and attitude ($\beta = 0.69$, $p < .001$) positively influences purchase intention (Table 2).

Figure 2. Final model

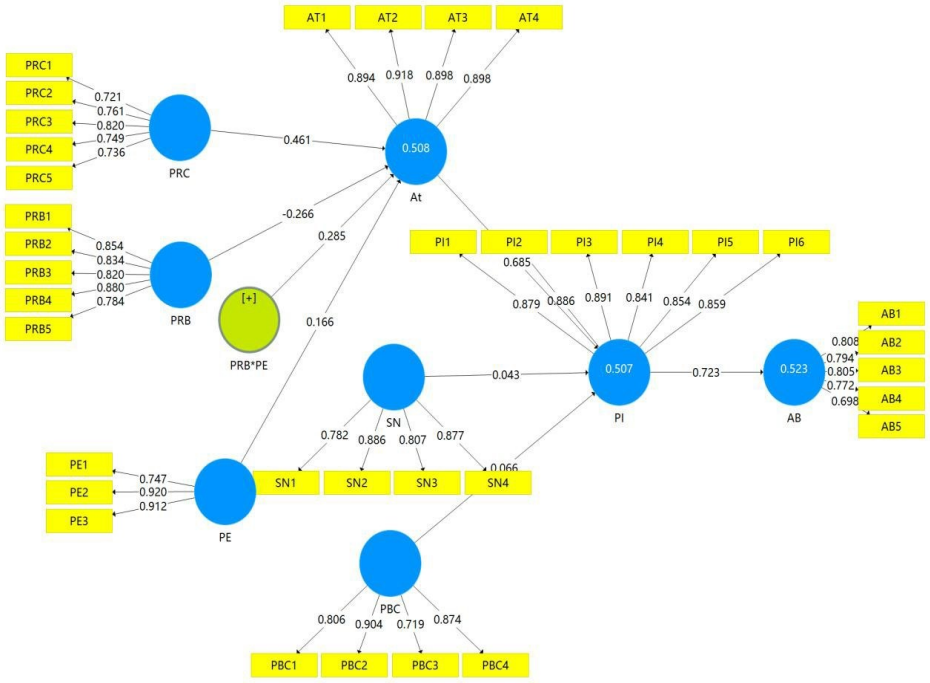


Table 2. Path coefficients

Path	β	t-values	p-values	result
At -> PI	0.69	12.70	.00	Significant
PBC -> PI	0.07	1.27	.20	Not Significant
PE -> At	0.17	3.47	.00	Significant
PI -> AB	0.72	23.98	.00	Significant
PRB -> At	-0.27	5.34	.00	Significant
PRB*PE -> At	0.29	6.33	.00	Significant
PRC -> At	0.46	10.25	.00	Significant
SN -> PI	0.04	0.97	.33	Not Significant

Source: authors' own research.

In testing the mediating effect of consumers' attitude, this study found that the indirect effects of perceived risk of Covid-19 infection (β = 0.32), perceived risk of purchase behavior (β = -0.18) on consumers' purchase intention were statistically significant at the 1% level with t = 7.69 and t = 5.1 respectively (see Table 3). Hence, H1, H2, H3, and H4 are statistically supported.

Table 3. Specific indirect effects

Path	β	t-values	p-values	result
PE -> At -> PI -> AB	0.08	3.15		Significant
At -> PI -> AB	0.50	10.90		Significant
PRC -> At -> PI -> AB	0.23	7.13		Significant
PBC -> PI -> AB	0.05	1.25		Not Significant
SN -> PI -> AB	0.03	0.96		Not Significant
PE -> At -> PI	0.11	3.18		Significant
PRB -> At -> PI	-0.18	5.10		Significant
PRC -> At -> PI	0.32	7.69		Significant

Source: authors' own research.

Results in Table 2 show that past experience has a significant moderating impact on the relationship between perceived risk of purchase behavior and attitude (β = 0.29, p < .001). Hence, H8 is supported. In addition, it is found that past experience (β = 0.17, p = .001) directly and positively affects attitude. The indirect effect of past experience (β = 0.11, p = .001) on consumers' purchase intention was statistically significant, with t = 3.18. Therefore, past experience influences purchase intention through the mediating role of attitude.

However, subjective norms (β = 0.04, p > .05) and perceived behavioral control (β = 0.07, p > .05) do not have a significant influence on purchase intention. Thus, H5 and H6 are not supported.

As expected, purchase intention ($\beta = 0.72$, $p < .001$) explains actual behavior, supporting H7. Meanwhile, the indirect effect of attitude on actual behavior is significant ($\beta = 0.5$, $p < .05$), indicating the existence of a mediating effect of purchase intention.

5. Discussion

The primary goal of this study was to examine the constructs that influence consumers' purchase intention and actual behavior toward purchasing fresh food online during the Covid-19 pandemic.

Five out of seven constructs in the model influenced online fresh food purchase behavior. Perceived risk of Covid-19 infection and attitude positively influenced consumers' purchase intention. These results confirm hypotheses 1 and 3, respectively. Perceived risk of purchase behavior had a negative impact on attitude and purchase intention, allowing hypotheses 2 and 4 to be accepted. Past experience moderates the relationship between perceived risk of purchase behavior and attitude, hereby accepting hypothesis 8. However, there was no statistical support for the influence of subjective norms and perceived behavioral control on purchase intention. Hypotheses 5 and 6 respectively are therefore rejected. Purchase intention predicted consumers' actual behavior positively, accepting hypothesis 7. Using the expanded TPB model as a framework, this study examined perceived risk effects as promoters of fresh food online purchase behavior in the context of the pandemic. Addressing RQ1, the findings imply that the impact of perceived risk on behavioral intention differs depending on the type of risk. The correlations show two directions, perceived risk of purchasing fresh food online negatively influenced purchase intention. However, perceived risk of Covid-19 infection had a positive influence on consumers' purchase intention.

Perceived risk of purchase behavior negatively affected consumers' attitude during the Covid-19 outbreak, which in turn negatively influenced behavioral intention. In other words, consumers may not buy fresh food online due to potential uncertainty and harmful consequences of this behavior, which confirms prior research

(Hao et al. 2020; Park et al. 2005). Possibly, people perceive buying fresh food on e-commerce platforms riskier than buying it in brick-and-mortar stores.

Perceived risk of Covid-19 infection positively influences consumers' attitude toward purchasing fresh food online, which subsequently affects intention and actual behavior, consistent with Long and Khoi (2020). Similarly, Youn et al. (2021) revealed that perception of Covid-19's threat influences consumers' attitude toward online shopping. Stories in the media of people being infected while going out to buy food possibly may have affected the respondents' answers.

In line with Alexa et al. (2021), Mainardes et al. (2019), Ghose and Chandra (2020), the present study found a moderating effect of past experience on the relationship between perceived risk and attitude, answering RQ3. Moreover, despite studies arguing for a direct connection between past experience and purchase intention (Alexa et al. 2021; Kim, Chung 2011), the current research finds that past experience positively influences purchase intention through mediation of attitude. In other words, risk perceptions associated with buying fresh food online were a stronger predictor for customers with limited shopping experience than those with more experience. Because repeat customers are already familiar with fresh food e-commerce, their risk perceptions may not be a major factor influencing their decisions. This contrasts with Fuchs and Reichel (2011) who found that repeat customers are sensitive to risks associated with service quality. This finding demonstrates that attitude is a factor that predicts purchase intention in the context of the COVID-19 pandemic. Moreover, attitude plays a mediating role between perceived risk of purchasing fresh food online and purchase intention (RQ2). On the one hand, this finding is consistent with prior research indicating that perceived risk associated with purchase behavior has a negative influence on customers' attitude toward online purchase behavior (e.g., Ghose, Chandra 2020). On the other hand, this result verifies the assertion that attitude is a strong predictor of purchase intention (Alexa et al. 2021), particularly in the food consumption area (Lehberger et al. 2021), highlighting the critical role of attitude in the TPB.

Subjective norms did not significantly affect consumers' intention to utilize fresh food e-commerce during the pandemic, suggesting that pressure from family members, friends, and coworkers does not have an influence on behavioral intention.

However, the results being not significant is in line with Qi and Ploeger (2021) who found no correlation between consumers' subjective norms and their intentions to purchase green foods during the pandemic. This contrasts with previous studies, in which subjective norms positively increased intention to purchase (Alexa et al. 2021), as well as intention to stockpile nonperishable foods (Hao et al. 2020; Lehberger et al. 2021). According to Armitage and Conner (2001) and Conner and Sparks (2005), subjective norms is the least reliable predictor of behavioral intention and has low predictive value. It is also consistent with Ajzen's (1991) observation that about half of comparable research fails to establish a connection between subjective norms and purchase intention. Possibly, individuals mainly were advised by the government and professional medical organizations to go out less, which raises the awareness of self-protection.

The current study found no correlation between perceived behavioral control and purchase intention. This suggests that consumers' confidence or lack of confidence in their ability to complete an online fresh food purchase did not impact their purchase intention. Perhaps, as most consumers are already familiar with fresh food e-commerce, their confidence may have less of an impact on future intentions. Fresh produce e-commerce platforms are designed to be easy to understand, with straightforward operating tips and functions of voice input and animated prompts, so that most people can use them efficiently. Respondents indicated being sufficiently knowledgeable and capable of ordering fresh produce online. This is similar to Armitage and Conner (2001) who found that perceived behavioral control is only important when people believe they have no control over the action. It was also verified by Barua (2013) who stated that the role of perceived behavioral control differs according to the circumstances. Another assumed explanation could be that if customers feel they have the capacity to utilize fresh produce e-commerce but prefer to buy fresh produce in a brick-and-mortar shop, it is possible that they are affected by other factors that need further investigation. For example, consumers can be skeptical or dissatisfied with fresh food e-commerce and, as a result, do not intend to buy fresh food online. It also implies that in addition to a positive attitude, there are other factors that affect the willingness to buy. The results revealed that purchase intention influences actual behavior positively and significantly, in corroboration with

Alexa et al. (2021), Lehberger et al. (2021), and Lucarelli et al. (2020) and Youn et al. (2021).

Theoretical contribution

First, this study presents an extended TPB model, which provides a theoretical framework for examining the relationships between two distinct forms of risk perceptions and actual behaviors respectively during the Covid-19 pandemic. Second, this study discovers the moderating effect of prior experience on the link between risk perception and customer attitude toward purchase behavior, allowing for a better understanding of motivations of both regular and new online consumers during the pandemic. Third, there are few related studies in the fresh food e-commerce service in China, and more specifically in the Shanghai area during Covid-19.

Practical implications

This research provides practical recommendations for fresh food online providers on how to improve sales. We observed that consumers' risk perception associated with Covid-19 could inspire their positive attitudes and intentions to purchase fresh produce online. Overall, it is the online fresh food retailer's duty to strengthen health and safety standards. First, online retailers can reduce consumer considerations by providing safety and hygiene inspections for food packages and improving safety training for workers. User-friendly return and refund policies can be delivered to alleviate consumers' concerns regarding e-commerce transactions, especially since fresh products are perishable. Moreover, providing accurate information on production locations and shipping details is an excellent way to show consumers that the product is entirely safe. Cooperating with logistics companies to provide shipment insurance is a good way to reduce possible consequences for consumers. Second, a positive attitude is vital for fresh food e-commerce usage. Enhanced security, traceability, and customer services can also have an impact on customer attitude. Third, given that more online-related experiences may result in a good attitude and lower negative influence of perceived risk of purchase behavior, e-commerce companies should apply a variety of creative marketing strategies to encourage more orders from regular customers. For example, marketers can provide step-by-step recipes corresponding to each product to stimulate the desire to buy fresh food. Since consumers are concerned about virus infections, the benefits of fresh food for

immunity and health can also be explained in the product description. Moreover, promotional activities such as offering discounts and no threshold coupons to customers are recommended to encourage repeat purchases.

Limitations

There are some limitations in this study that need to be addressed in future studies. First, the data is primarily from Shanghai and given the extent of the pandemic differs by area and region, as does the extent of fresh produce e-commerce development, the results may not apply for the general Chinese population. The sample size and regional reach do not allow for generalization. Second, the present findings show that among the three factors of TPB, only attitude correlated significantly with purchase intention, implying that additional variables may influence purchase intention. Future research should include motivational factors such as trust, mood, culture, habits, and satisfaction, to provide a more thorough understanding of the several dynamics. A third limitation is that although the influence of past experience is considered, a detailed distinction was not made. Future studies should specify past experience into satisfying past experience and unsatisfying past experience.

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