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# Consumer adoption of Online-To-Offline food delivery services: a conceptual model

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**Abstract.** There is a dramatic growth in the market of Online-To-Offline food delivery services (O2O-FDS) recently. A need exists for the stakeholders of food and catering industries to better understand the market of O2O-FDS in order to create suitable marketing strategies and promotion policies for this promptly changing e-commerce era. However, there is a lack of understanding of the significant factors influencing the consumer adoption of O2O-FDS. This study develops a conceptual model to help systematically understand those important factors. The model is developed based on a literature review concerning the O2O-FDS topic and other relevant topics in food marketing and consumer behaviour. It shows that the O2O-FDS adoption is significantly influenced by *food choice motives*, *socio-demographics*, *innovation-adoption characteristics*, and *APP-service quality*.

**Keywords.** Consumer, O2O; food delivery service; conceptual model; e-commerce.

## 1 Introduction

A decade or so ago, we entered the era for e-commerce food shopping. Today, the process speeds up, and new e-commerce modes appear and grow dramatically in food consumption and marketing. As a traditional e-commerce mode, Business-to-Consumer (B2C) food shopping has experienced a quick growth in the past decade (Wang and Somogyi 2018). However, its defect is obvious in food marketing; mainly suitable for packaged foods, rather than fresh foods and cooked meals (Wang and Somogyi 2018). Online-To-Offline Food Delivery Services (O2O-FDS) is one of the emerging modes to supplement the role of B2C in e-commerce food shopping. The O2O-FDS digitalises traditional offline food delivery services with information technologies for mobile payment and meal ordering (Wang, Somogyi, and Charlebois 2020). Consumers can use O2O-FDS platforms to order and to make payment for meals from local restaurants or other food service sectors, with those meals delivered to them (Wang, Somogyi, and Charlebois 2020). This could hardly come true through the B2C platforms.

The explosion of O2O-FDS first appears in developing countries due to their low logistics and labour costs, cheap mobile devices and services and huge population bases in contrast with developed countries. China is the best case in this scope and leads the O2O-FDS revolution in the world (Cho, Bonn, and Li 2019; Xiao, Fu, and

Liu 2018). China's market size of O2O-FDS reached 35 billion US dollars in 2018, doubled the value in 2015 (Thibaud 2019; Tong, Dai, Xiao, and Yan 2020). Internet giants i.e. Uber Eats are trying to copy China's success globally and the O2O-FDS market shares increase quickly in other corners of the world including developed countries i.e. U.S. and South Korea (Eadicicco 2019; Roh and Park 2019; Wang, Somogyi, and Charlebois 2020). This trend results into an increased importance for the stakeholders of food and catering industries to better understand the O2O-FDS market, in particular its consumer behaviour, in order to create marketing strategies and promotion policies that meet this promptly changing e-commerce era.

A number of studies have been conducted to explore important factors that influence consumer adoption of B2C food shopping (Wang and Somogyi, 2018; Wang, Somogyi, and Charlebois 2020). The B2C food shopping is significantly influenced by innovation-adoption characteristics, food choice motives, consumer segments, socio-demographic characteristics, reference effect, and food categories (e.g. Hansen 2005; Hansen 2008; Heng, Gao, Jiang, and Chen 2018; Wang and Somogyi 2018; Wang, Somogyi, and Charlebois 2020). While only a few studies could be found related to food consumer behaviour on the O2O-FDS, most published in 2018 and 2019 and half using China as their research location due to the large market size and fast development of the O2O-FDS industry in China (Wang, Somogyi, and Charlebois 2020). These new findings are scattered and there is a lack of systematically understanding of the significant factors influencing the consumer adoption of O2O-FDS.

To address the gap, this study will develop a conceptual model to help systematically understand the important factors that have effects on the O2O food delivery shopping behaviour. In order to achieve our goal, this conceptual paper provides a literature review concerning the O2O-FDS topic as well as other relevant topics in food marketing and consumer behaviour.

## **2 Selection of the relevant consumer studies with O2O-FDS**

Published articles were used as a base to develop a conceptual model with the factors influencing consumer adoption for O2O-FDS. The articles were selected through the Google Scholar. The relevant journal articles were recognized by using the following key words: "Consumer" and [O2O OR Online to offline] and [food delivery]. Furthermore, the following criteria were hired to select relevant articles: 1) the research provided information on the consumer adoption of O2O-FDS; 2) the research was published in an academic journal and its full-text was available for review; 3) the research was an empirical study. Based on these criteria, 10 articles were finally selected for in-depth analysis shown in Table 1.

Most of the 10 studies were conducted in Asian emerging countries including China, India, Indonesia and Malaysia. This is in line with the reality that the O2O-FDS

market has the first explosive growth in developing countries due to the far lower logistics and labour costs, cheaper mobile devices and services and larger population than developed countries (Cho, Bonn, and Li 2019; Xiao, Fu, and Liu 2018). While two studies were found to use samples from a developed country- South Korea. This corresponds that the O2O-FDS market share has started to speed up among developed countries after the explosion in developing countries (Eadicicco, 2019; Roh and Park 2019; Wang, Somogyi, and Charlebois 2020).

Table 1 Overview of selected studies about the consumer adoption of O2O-FDS

No	Author	Research location	Data collection approach	Sample size	Respondent type
1	Wu et al (2015)	China	Survey	260	University students
2	Yeo et al (2017)	Malaysia	Survey	224	University students
3	Kang and Namkung (2019)	South Korea	Survey	351	Consumers
4	Cho et al (2019)	China	Survey	311	Consumers
5	Lee et al (2019)	South Korea	Survey	340	Consumers
6	Ray et al (2019)	India	Survey	395	Consumers
7	Roh et al (2019)	South Korea	Survey	500	Consumers
8	Suhartanto et al (2019)	Indonesia	Survey	405	Consumers
9	Xu et al (2019)	China	Experiment	477	University Students
10	Wang et al (2020)	China	Survey	954	Consumers

### 3 The conceptual model for consumer adoption of O2O-FDS

As shown in Figure 1, a conceptual model is developed based on the findings from the 10 studies in Table 1. It indicates the significant factors that influence consumers on their adoption of O2O-FDS. Only those factors which have statistically significant effects on the O2O-FDS adoption are involved in this model. The consumer adoption is composed of two stages with consumers' general attitudes and their consumption behaviours (e.g. real consumption or consumption intentions) towards O2O-FDS (Wang, Somogyi and Charlebois 2020). The attitude is consumers' summary evaluations (positive or negative) of the O2O-FDS and it has strongly significant influences on their consumption or consumption intentions of food products

through the O2O-FDS platforms (Cho, Bonn and Li 2019; Kang and Namkung 2019; Wang, Somogyi and Charlebois 2020; Yeo, Goh and Rezaei 2017). This indicates that those factors with direct effects on the O2O-FDS attitudes have indirect influences to the O2O-FDS consumption through the O2O-FDS attitudes (Wang, Somogyi, and Charlebois 2020).

Based on theories in the e-commerce food shopping behaviour, those significant factors can be grouped into four types: food choice motives, socio-demographics, innovation-adoption characteristics, and APP-service quality (Wang and Somogyi 2018; Wang, Somogyi and Charlebois 2020). The following sub-sections will discuss the effects of those important factors on the O2O-FDS adoption by each of the four factorial types.

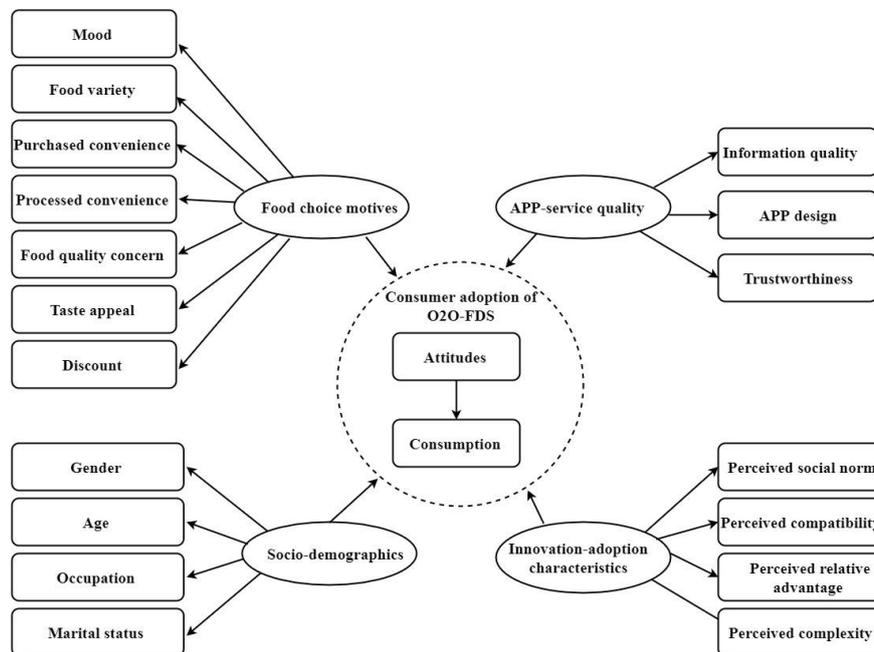


Fig. 1 Conceptual model of the important factors for consumer adoption of O2O-FDS

### 3.1 Food choice motives and the O2O-FDS adoption

Stephoe, Pollard, and Wardle (1995) indicate nine important motives for consumers' daily food choices. These nine food choice motives (FCMs) include *health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity* and *ethical concern*. Scholars have associated these FCMs with many kinds of dietary attitudes and consumption behaviours in order to recognize significant motives that have effects on it i.e. consumer adoption of traditional food, sustainable foods, and social-network-related dietary quality (Wang, Somogyi, and Charlebois 2020).

A recent study by Wang, Somogyi, and Charlebois (2020) has systematically recognized consumers' FCMs related to e-commerce food shopping by using both qualitative and quantitative methods. That include *taste appeal*, *value for money*, *cheap*, *variety*, *safety concern*, *quality concern*, *processed convenience*, *purchase convenience*, *others' reviews* and *discount*. The study has also explored associations between these FCMs and the consumer adoption of O2O-FDS, and found that *quality concern*, *processed convenience*, *purchase convenience*, and *taste appeal* have significant influences on consumers' attitudes or consumptions towards the O2O food delivery shopping. Furthermore, other studies confirm the significant associations between the O2O-FDS adoption and the FCMs *quality concern*, *processed convenience*, and *purchase convenience* (Cho, Bonn, and Li 2019; Roh and Park 2019; Suhartanto, Helmi Ali, Tan, Sjahroeddin, and Kusdibyo 2019; Yeo, Goh, and Rezaei 2017). In addition, *mood (or hedonic motivation)*, *food variety* and *discount* are also important FCMs for the O2O-FDS adoption found by three studies (Cho, Bonn, and Li 2019; Ray, Dhir, Bala, and Kaur 2019; Yeo, Goh, and Rezaei 2017).

In sum from the findings, those consumers who attach more importance to the food choice concerning *food quality*, *purchase convenience*, *processed convenience*, *available food variety*, *discount* and *mood enhancement*, are more likely to adopt O2O-FDS than other consumers. While those consumers who attach more importance to the food choice with *taste appeal* are less likely to adopt O2O-FDS than others.

### ***3.2 Innovation-adoption characteristics and the O2O-FDS adoption***

Hansen (2005) indicates a five-factorial construct for innovation-adoption characteristics that have effects on consumers' e-commerce food shopping behaviours. The five factors include *perceived social norm* (i.e. the peer pressures on an individual's adoption of e-commerce food shopping), *perceived compatibility* (i.e. if the e-commerce food shopping is in line to an individual's lifestyle and values), *perceived relative advantage* (i.e. the superiority of e-commerce food shopping in comparison with offline ones such as time or money saving), *perceived complexity* (i.e. the usage complexity of the e-commerce food shopping services), and *perceived risk* (e.g. the usage risk such as payment and exchange problems) (Hansen 2005; Wang and Somogyi 2018). A lot of studies have fully or partly confirmed the important influences of consumers' innovation-adoption characteristics on their adoption of B2C food shopping (Wang and Somogyi 2018; Wang, Somogyi, and Charlebois 2020).

There is still a lack of studies to systematically and fully explore effects of the five innovation-adoption characteristics on the O2O-FDS adoption. While some of the

10 studies partly confirms the significant effects related to *perceived social norm*, *perceived compatibility*, *perceived relative advantage* and *perceived complexity*. Although researchers use different terms including *perceived usefulness*, *post-usage usefulness*, *performance expectancy*, *customer experience* and *perceived value*, all these factors should belong to the scope of consumers' *perceived relative values* based on measurement contents used in their studies which are related to time saving, money saving or receiving e-coupons and all have positive influences on the O2O-FDS adoption (Kang and Namkung 2019; Lee, Sung, and Jeon 2019; Ray, Dhir, Bala, and Kaur 2019; Roh and Park 2019; Suhartanto, Helmi Ali, Tan, Sjahroeddin, and Kusdibyo 2019; Wu, Zhao, and Tzeng 2015; Yeo, Goh, and Rezaei 2017). This term replacement also appears for *perceived social norm* (i.e. social influence), *perceived compatibility* (i.e. habit and the prior online purchase experience) and *perceived complexity* (i.e. mobile anxiety and the 'perceived ease of use' as a reverse measurement); which *perceived social norm* and *perceived compatibility* have positive effects, while *perceived complexity* has a negative effect on the O2O-FDS adoption (Kang and Namkung 2019; Lee, Sung, and Jeon 2019; Ray, Dhir, Bala, and Kaur 2019; Roh and Park 2019; Wu, Zhao, and Tzeng 2015; Yeo, Goh, and Rezaei 2017).

### ***3.3 Socio-demographics and the O2O-FDS adoption***

Some socio-demographic characteristics have been confirmed with the significant effects on consumers' adoption of B2C food shopping, including *age*, *marital status*, *gender*, *occupation*, *income*, *educational level* and *household-size* (Wang and Somogyi 2018; Wang, Somogyi, and Charlebois 2020). Regarding the O2O-FDS adoption, only 2 of the 10 studies provide the empirical findings in this scope. Wang, Somogyi, and Charlebois (2020) point out that those consumers who have a *male gender*, a *younger age*, a *higher level position*, and/or are *married* or *unmarried but with a partner*, are more willing to adopt O2O-FDS than their counterparts with a *female gender*, an *older age*, a *lower level position*, and/or being *single*. Another study by Roh and Park (2019) mentions that *married consumers* are more inclined towards converting their convenience-seeking-motivation into the adoption of O2O-FDS.

### ***3.4 App-service quality and the O2O-FDS adoption***

The rise of O2O-FDS is mainly driven by the high smartphone penetration and the mature of mobile payment technology (Wang, Somogyi, and Charlebois 2020). The service quality of mobile apps has therefor direct effects on consumer experiences with the O2O-FDS provided by it. Such effects have been explored by 5 of the 10

studies. The findings show a three-factorial construct of the app-service quality perceived by consumers for O2O-FDS including *information quality*, *app design* and *trustworthiness* (Cho, Bonn, and Li 2019; Kang and Namkung 2019; Lee, Sung, and Jeon 2019; Ray, Dhir, Bala, and Kaur 2019; Xu and Huang 2019). *Information quality* refers to the degree that the accuracy, adequacy, timeliness, understandability and accessibility of information provided by a O2O-FDS app fits with consumers' expectations (Kang and Namkung 2019; Lee, Sung, and Jeon 2019; Xu and Huang 2019). A good *APP design* represents the effective design for issues that support the easy usage or understanding to consumers e.g. logic, payment, warranty, the food and restaurant listing, food and consummatory images, and message sidedness (Cho, Bonn, and Li 2019; Kang and Namkung 2019; Ray, Dhir, Bala, and Kaur 2019; Xu and Huang 2019). *Trustworthiness* is the degree that consumers trust into the information provided by a O2O-FDS APP, and the operational capability and reputation of its operator (Cho, Bonn, and Li 2019; Kang and Namkung 2019). In general, a high *app-service quality* will enhance the O2O-FDS adoption by consumers.

#### 4 Conclusion

This study is the first to develop a conceptual model related to the important influencing factors for consumer adoption of O2O-FDS. There are four types of factors that have statistically significant influences on the O2O-FDS adoption including food choice motives, socio-demographics, innovation-adoption characteristics, and APP-service quality. The findings have significant academic contributions and provide reliable materials for researchers to design their future studies related to the O2O-FDS consumer behaviours i.e. developing and testing a confirmatory model in the scope (Wang and Somogyi 2018).

Further, it also has important managerial and policy contributions. By the model, food producers, marketers and policy-makers can comprehensively understand consumer behaviours in terms of adoption of O2O-FDS. This can help them to develop effective marketing strategies and promotion policies for selling their food products and services in O2O-FDS platforms e.g. selling their food products and services to right consumer segments (male, young, married consumers...) and promoting it to meet true consumer needs (high quality, taste appeal, purchase/processed convenience...).

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