

Research Paper

Investigating Usage and Loyalty of Food Delivery Applications for Working Adults in Malaysia

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Abstract: The purpose of this study is to investigate factors influencing the usage attitude of food delivery applications (FDAs), as well as the relationship between customer satisfaction and loyalty. The current study combined the uses and gratifications (U&G) theory and satisfaction-loyalty theory for the development of a research framework to investigate usage attitude, customer satisfaction and loyalty of working adults towards using FDAs. A quantitative research approach was adopted to collect data through an online questionnaire. A total of 300 valid responses were collected. The study's measurement model and structural equation model were assessed using partial least squares – structural equation modeling (PLS-SEM). Results demonstrate that quality control, convenience, ease of use, delivery experience and listing positively influence the usage attitude of FDAs, while the effect of search of restaurants was found to be insignificant. Delivery experience was the most conspicuous factor among all. In addition, word-of-mouth, intention to reuse and recommendation of FDAs were found to be significantly affected by customer satisfaction. This paper extends the literature of online food delivery associated with usage attitude and loyalty while the findings provide valuable insights and practical recommendations to managers of food delivery companies.

Keywords: Food delivery applications, loyalty, uses and gratifications theory, satisfaction-loyalty theory, Malaysia

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Introduction

According to Nielsen (Nezakati, Kuan, & Asgari, 2011), in 2005, 59% of adults ate at take-away restaurants at least once a week. The phenomenon is due to the fact that fast-food restaurants can reduce the waiting time of customers, provide convenience to customers, and is suited for an increasingly busy lifestyle (Sadoff & Samek, 2019). However, there are also many who cannot go to fast-food restaurants directly because of busy work, bad weather or other reasons, which provides an opportunity for delivery services and applications. Not surprisingly, “new delivery” players are expanding their development, and by 2025, the potential market for food delivery applications is expected to exceed €20 billion (Hirschberg, Rajko, Schumacher, & Wrulich, 2016). In addition, the transaction amount of food delivery applications accounted for about 20% of the total food industry in 2018 (Lee, Sung, & Jeon, 2019). The global revenue from online food orders was reported at \$107.4 billion in 2019 and is expected to increase to \$164 billion by 2024; the revenue refers to the value of total commodities here (Zhao & Bacao, 2020; Muangmee, Kot, Meekaewkunchorn, Kassakorn, & Khalid, 2021).

In the service industry, on the one hand, food delivery applications are supposed to meet the demand and expectations of existing customers. On the other hand, there is an increasing demand for more suppliers from other industries to join, which intensifies the competition in food delivery industry (Andriani et al., 2021). Despite previous studies that have investigated the factors influencing food delivery services, understanding further possible factors is still required to support the growth and development of the industry (Saad, 2020; Kapoor & Vij, 2018; Alalwan, 2020). For instance, while customers are loyal to the restaurants they prefer, it is becoming increasingly clear that many new local restaurants who work with delivery applications still have difficulty in gaining customer loyalty (Nezakati et al., 2011). Even though there is a vast literature on satisfaction and loyalty towards FDAs (Prasetyo et al., 2021; Cha & Seo, 2020; Sidharta, 2021), very few have examined FDAs during the COVID-19 pandemic in Malaysia. Thus, this study sets out to analyse the usage attitude of customers, satisfaction and loyalty of FDAs.

This study combined the uses and qualifications (U&G) theory and satisfaction-loyalty theory to study the usage attitude of working adults towards FDAs and its impact on satisfaction and loyalty dimensions (word-of-mouth, intention to reuse and recommendation). By combining these two theories, we will not only understand the different U&Gs behind the usage of food delivery applications in Malaysia but also gauge better the impact of customer satisfaction and loyalty on customer attitude towards using FDAs. In recent years, Malaysia’s annual GDP growth has been stable between 4% and 6%. As of 2018, Malaysia’s per capita GDP at PPP (purchasing-power parities) was 31782.153 (current international \$) (World Bank, 2019), which means that the living standard and purchasing power level of Malaysian people are

steadily improving. With the gradual changes in lifestyle, more and more people are willing to order food via FDAs to meet their needs. Young white-collar workers and students are the main users of FDAs. Thus, the demand of working adults who order food from FDAs is quite huge. The present study can elucidate vital insights to help the stakeholders of the food delivery chain system to increase their understanding of market segments so that they can provide customers with customised services and develop marketing strategies to achieve higher customer loyalty.

This paper reviews the relevant literature on FDAs in the following section, and discusses the factors that affect usage attitude and the impact of usage attitude on satisfaction and loyalty. Next, the methodology section explains the research instrument, data collection, sampling, and data analysis procedures used for the study. As for the results section, partial least squares (PLS) was used to evaluate the measurement and structure model, and the results are discussed guided by literature. The final section concludes with theoretical and practical contributions as well as study limitations.

Literature Review

The proposed framework of the present study covered 14 dimensions which combines the uses and gratifications (U&G) theory and the satisfaction-loyalty theory. There were six independent variables (convenience, ease of use, delivery experience, quality control, search of restaurants and listing) related to the usage attitude of FDAs. In terms of quality control, the dimensions included information quality, service quality and food quality, which leads to delivery experience and ease of use as mediators between quality control and usage attitude of FDAs. The dependent variable, loyalty was divided into the dimensions of word-of-mouth, intention to reuse and recommendation of FDAs.

Food Delivery Service and Applications

In the food delivery and catering industry, food delivery applications, as a carrier, safeguards the rights and interests of customers and its own reputation by controlling the quality of food and environment of restaurants (Chandrasekhar, Gupta, & Nanda, 2019). Furthermore, delivery applications also offer more services in their process of online delivery and distribution (Kimes, 2011). This kind of service can coordinate the relationship between customers, restaurants and distribution personnel which provides customers a seamless online service (Jeong, 2016). At the same time, due to the growing economic cooperation between different countries, most countries will have local expatriates where multilingual delivery personnel are needed for smooth operations and better service (Chandrasekhar et al., 2019). Food delivery applications follow the rule of “customer first”, solving various problems for customers to

improve customer satisfaction (Chandrasekhar et al., 2019). Meanwhile, through global positioning systems (GPS), location errors can be avoided (Gupta, 2019). When customers make payment orders, FDAs offer customers a variety of flexible payment methods by way of promoting the era of cashless payment (Pigatto, Machado, dos Santos Negreti, & Machado, 2017; Muangmee et al., 2021).

During the COVID-19 pandemic, our food ecosystem was severely tested. For instance, Power, Doherty, Pybus and Pickett (2020) believed that in crises, the fragile food system faces the challenge of severe hoarding. During the COVID-19 pandemic, Kim (2020) found that in the face of consumers hoarding food and supplies, food delivery applications play an important role in enhancing the flexibility of the food supply chain during the pandemic.

Uses and Gratifications Theory

This study is underpinned by the uses and gratifications (U&G) theory. First developed in the 1940s, the U&G theory posits a mature and cutting-edge theoretical framework that can be adapted according to the social investigation focus (Ruggiero, 2000). Secondly, the U&G theory has been applied in many fields, such as social media applications, internet applications, mobile applications and so on. In this study of FDAs, the U&G theory was used to specifically explore how FDAs, from the perspective of consumers, offer customer satisfaction and demand. The insights can help the relevant stakeholders of FDAs to improve further customer satisfaction and loyalty. Based on the above literature, the relationship between motivation, behavior intention and satisfaction can be simply described in the context of FDAs as follows:

Motivations → Usage attitude → Gratifications

Factors Influencing the Usage Attitude of FDAs

Based on previous literature, the following six variables were identified for empirical analysis in the present research.

Quality control

Quality control can be defined as any process or procedure to ensure that the final results obtained by a person or group through a series of actions are infinitely close to the theoretical model, thus forming a quality standard with credibility. Information quality, service quality and food quality comprise the quality control of the service delivery. According to past studies, information quality is defined as information given by a system that is ultimately helpful to users. The characteristics of high-quality information include clear and concise format, complete and timely (Au,

Ngai, & Cheng, 2008; Islam & Rahman, 2017). Kang and Namkung (2019) found that the quality of information provided by O2O (online-to-offline) commerce has a positive impact on the perceived usefulness and ease of use in the purchase of food. Based on the technology acceptance model (TAM), Shih (2004) found that information quality is positively correlated with ease of use in online shopping.

Moreover, Cheng, Chang and Chen (2021) pointed out that system operation has a vital importance in the online food delivery industry. As the service depends on the performance of people, service quality is well reflected by employees with professional knowledge, a lot of service experience and good appearance (Kim & Cha, 2002). A study on whether higher education affects students' satisfaction, image and loyalty found that service quality can significantly affect student satisfaction, image and loyalty (Ali, Zhou, Hussain, Nair, & Ragavan, 2016). Teng and Chang (2013) also believed that service quality affects customer emotional response. According to Gallarza and Saura (2006), good service quality will subconsciously guide customers to develop memorable dining experiences, which improve satisfaction and loyalty.

As a platform that sends food for customers, it is essential for FDAs to control the quality of food, because food quality is one of the important factors affecting the usage attitude of food delivery applications (Teng, & Chang, 2013). In addition, the quality of food can also affect the food purchase of consumers to some extent (Sahin, Demir, Aycicek, & Cihangiroglu, 2007). Based on the discussion above, this study proposes the quality control of FDAs as a decisive factor to predict that:

- H1: The quality control of food delivery applications is positively related to ease of use.
- H2: The quality control of food delivery applications is positively related to delivery experience.
- H3: The quality control of food delivery applications is positively related to the usage attitude of FDAs.

Ease of use

Ease of use refers to the user's perception of whether a particular service or technology is easy to use (Wu & Wang, 2005). In the context of FDAs, ease of use refers to the comfort of food choices, ease of payment after placing an order, and then using order tracking to obtain delivery information. In his study on the ease of use of technological innovation, Davis (1989) argued that perceived ease of use can have a certain impact on future user acceptance. Belarmino, Raab, Tang and Han (2021) investigated the motivations towards using FDAs and found that ease of use significantly impacts customer satisfaction. Furthermore, perceived usefulness and

perceived ease of use also positively affect user attitude towards FDAs (Lee, Lee, & Jeon, 2017). Meanwhile, Song, Ruan and Jeon (2021) pointed out that ease of use positively impacts the attitude towards using FDAs. Therefore, we believe that:

H4: The ease of use of food delivery applications is positively related to usage attitude of food delivery applications.

Delivery experience

Delivery experience refers to the experience of the delivery employees after a user places an order with FDAs. Briggs, Landry and Daugherty (2007) highlighted that the higher the quality of interactive experience, the easier it is to connect customers with employees and their companies and optimize the economic benefits of customers. In their study on interactive retail service environment, Berry et al. (2010) found that the good use of cross channel synergy has an important impact on service delivery, and improves consumers' consumption preferences. A study on the utilitarian value and hedonic value of online shopping by shopping websites pointed out that delivery speed significantly affects the perceived utility value of students (Kim, Galliers, Shin, Ryoo, & Kim, 2012). Further, Dinakaran (2021) pointed out that customer attitude is affected by timely delivery and quality of food. Therefore, the present study predicts that:

H5: The delivery experience of food delivery applications is positively related to usage attitude of food delivery applications.

Convenience

Convenience refers to the use of something that can brings convenience to users (Gehrt & Yale, 1993). In other words, without sacrificing consumers' time, space and effort, the handier the products are, the more convenient consumers feel. For instance, the FDAs not only provides customers locations and price comparison of eateries in the surrounding areas, but helps cut down time and cost. At the same time, FDAs also reduce traffic congestion and air pollution by reducing the number of motorists on the road. This type of convenience is closely related to the application of various technologies, such as e-commerce, e-banking and e-government services (Laforet & Li, 2005; Yoon & Kim, 2007; Zhang et al., 2011). In their work, van Heerde, Dinner and Neslin (2019) explored the use of retail mobile applications and found that convenient mobile applications help those from remote regions to purchase or sell. As Yale and Venkatesh (1986) highlighted, "convenience is many things to many people". In other words, different consumers require different layers

of convenience configuration. Therefore, convenience can affect consumer decisions to varying degrees. Thus, this study believes that:

H6: The convenience of food delivery applications is positively related to usage attitude of food delivery applications.

Search for restaurants and listing

Previous studies support the relationship between information search and usage attitude. Both search and listing can be defined as usability. A study on parents' perception of educational applications revealed that the usability of the applications has a vital significance on the attitude of parents (Vaiopoulou, Papadakis, Sifaki, Stamovlasis, & Kalogiannakis, 2021). Similarly, the usability of FDAs has an important impact on the usage attitude of customers. According to Wilson (1997), when people want to meet their needs or try to verify information obtained from different sources, they may "continue" to search for information. In the context of food delivery, users not only can order food from home, but can also search their preferred food or cuisine. Listing refers to the information on eateries, cuisine, as well as type and quantity of dishes displayed when ordering. Moreover, in their work on Nigerian consumers, Inegbedion, Obadiaru and Bello (2016) concluded that privacy, product demand, consumers' previous online experience and usability can strongly affect consumer's online shopping attitude.

In addition, Salameh (2017) conducted a questionnaire survey on English majors in the University of Hail, in which the participating students gave a high evaluation of usability of mobile applications. Based on their research on the loyalty of young consumers to tourism websites, Martínez-González and Álvarez-Albelo (2021) found that the functional aspects of websites (mainly usability and content) significantly affect consumers' purchase intention and loyalty to the website. In terms of online food delivery, some studies found that the contents, functions and usability of the website can attract many new users (Pigatto et al., 2017). Therefore, based on the discussion above, this study assumes the following hypotheses:

H7: The search of restaurants in food delivery applications is positively related to the usage attitude of FDAs.

H8: The listing of food delivery applications is positively related to the usage attitude of FDAs.

Mediating Role of Quality Control

In studies of online ordering, quality control has been shown to have a significant impact on users' intention to use (Ahn, Ryu & Han, 2004) through the mediating

role of usability and ease of use. Similarly, Shih (2004) contended that perceived information quality is positively correlated to users' willingness to e-shopping through ease of use and usefulness. On the other hand, Mehrabian and Russell (1974) believed that emotional change caused by customer experience is the main factor driving customer behavior. For instance, when a consumer places an order in a FDA and the delivery personnel delivers the food quickly, the mood of the consumer becomes pleasant and a satisfactory evaluation is given to the FDA. In addition, Suhartanto, Helmi Ali, Sjahroeddin and Kusdiby (2019) contended that food quality is a decisive factor affecting customer loyalty of online food delivery service. However, the service provided can also affect the customer's perception of food quality, which in turn affects the customer's loyalty. In other words, an efficient food delivery service can play a mediating role in customers' perception of food quality and loyalty to online food delivery services. Therefore, this study proposes:

- H9: The delivery experience of delivery applications plays a mediating role between quality control and usage attitude of food delivery applications.
- H10: The ease of use of delivery applications plays a mediating role between quality control and usage attitude of food delivery applications.

Satisfaction and Usage Attitude of Food Delivery Applications

Guided by previous studies, Giese and Cote (2000) arrived at this definition of satisfaction, "a response pertaining to a particular focus determined at a particular time." Meanwhile, most scholars think that satisfaction is a summative emotional response of different intensities over time (Giese & Cote, 2000). Taghizadeh and Hajhosseini (2021) believed that a positive attitude can create higher satisfaction. For instance, customers who regularly ordered food via FDAs find higher satisfaction than customers who occasionally use food delivery applications to order food. Evidently, customer satisfaction usually occurs after purchase behavior (Olsen, 2002). Therefore, in terms of FDAs, customer satisfaction should refer to their response to the use of FDA after they get the food. Additionally, Kang, Jun and Arendt (2015) explored customers' choice of healthy food in fine dining restaurants. By using the value–attitude–behavior model, they found that the higher the quality of products, the more likely they are to be favored by customers; thus, not only does the restaurant get a favorable response, the customers would also recommend it to others. In addition, Magrath and McCormick (2013) believed that for e-commerce, users will make rational choices based on their perception of quality when they purchase goods online. Therefore, based on the above literature, this study predicts the following:

H11: The usage attitude of food delivery applications is positively related to customer satisfaction.

Satisfaction-Loyalty Theory

This satisfaction-loyalty model was originally used to study passenger behavioural intention in the transportation industry (Jen, Tu, & Lu, 2011). The research model includes the relationships among service quality, perceived cost, customer satisfaction, perceived value and conversion barriers in predicting passenger behavioural intention. In order to understand customer behavioural intention more deeply, the model builds the customer behavioural intention on the change of customers' attitude, which effectively develops and promotes the models that mostly use objective and quantifiable variables. Moreover, Thakur (2019) stated that there is a positive and direct relationship between customer satisfaction and loyalty. Based on previous research on loyalty, word-of-mouth generated by customer satisfaction is usually accompanied by repurchase intention and recommendation intention (Maxham III, 2001; Ranaweera, & Prabhu, 2003; Molinari, Abratt, & Dion, 2008; Kim, Ng, & Kim, 2009). Thus, the present study used word-of-mouth, intention to reuse, and recommendation as variables to evaluate loyalty.

Word-of-Mouth

From the perspective of customers, word-of-mouth plays an important role as a reliable source of information on products and services (Chu & Kim, 2011). In addition, word-of-mouth is also the first impression that potential consumers encounter in the new media (Park & Kim, 2008). A study on the importance of university catering system revealed a strong and positive relationship between customer satisfaction and word-of-mouth (Kim et al., 2009). Additionally, Ranaweera and Prabhu (2003) confirmed that satisfaction has a significant positive correlation with employee retention and word-of-mouth. Furthermore, an investigation on public healthcare concluded that patient satisfaction has a significant impact on word-of-mouth communication (Kitapci, Akdogan, & Dortyol, 2014). Moreover, Anastasiei and Dospinescu (2019) demonstrated that satisfaction can significantly impact the volume and value of word-of-mouth associated with online retailers. Further, in the context of e-commerce, Tseng, Chang, Wang, Wang, and Lin (2021) who explored online consumer reviews on hotel accommodation found that satisfaction has a significant positive impact on word-of-mouth. Moreover, Park and Kim (2008) contended that the presence of word-of-mouth alleviates information asymmetry and makes the market more transparent. Therefore, we propose:

H12: Customer satisfaction is positively related to word-of-mouth of food delivery applications.

Intention to re-use

The intention to reuse means that consumers intend to continue using a certain product or service. Most past studies have confirmed that the relationship between satisfaction and intention is linear (Kumar, Dalla, Pozza, & Ganesh, 2013). For example, using the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) on the characteristics of mobile ordering software, Alalwan (2020) empirically predicted and analysed factors influencing Jordan's FDA e-satisfaction and customers' continuous use of FDAs. In addition, Ray, Dhir, Bala and Kaur (2019) found that customer experience, search of restaurants and ease of use can promote the intention of users to use. Moreover, a study on revisiting FDAs in the COVID-19 pandemic illustrated that satisfied customers are more likely to reuse FDAs (Kumar, & Shah, 2021; Choi, Zhang, Debbarma, & Lee, 2021). Thus, the following hypothesis is suggested:

H13: Customer satisfaction is positively related to intention to re-use food delivery applications.

Recommendation

An important feature of online storefronts is to provide recommendations to consumers. According to Choi, Lee and Kim (2011), personalized recommendation enhances users' social online experience. In addition, in using the framework of Planned Behavior Theory, Lin (2010) noticed that persuasion from others may affect a job seeker's intention to apply for jobs online. In another research by Suhartanto et al. (2019), if the food purchased is of high quality, consumers are more likely to repurchase the same food via online food delivery applications and recommend it to others. In their work on mobile phone application and word-of-mouth, based on the Theory of Planned Behaviour, Belanche, Flavián and Pérez-Rueda (2020) found that the more favourable the attitude of consumers to the use of FDAs, the more likely they will increase their usage of FDAs and recommend it to others. Therefore, this study posits that:

H14: Customer satisfaction is positively related to recommendations for food delivery applications.

Conceptual Framework

Figure 1 shows the relationship between the study variables in the construction of the research framework. The study posits that six variables influence the usage attitude of working adults who use food delivery applications, while ease of use and delivery experience play a mediating role between quality control and usage attitude.

In addition, based on the six exogenous variables, this study assumes that the usage attitude of FDAs also impacts on satisfaction and loyalty dimensions (word-of-mouth, intention to reuse and recommendation).

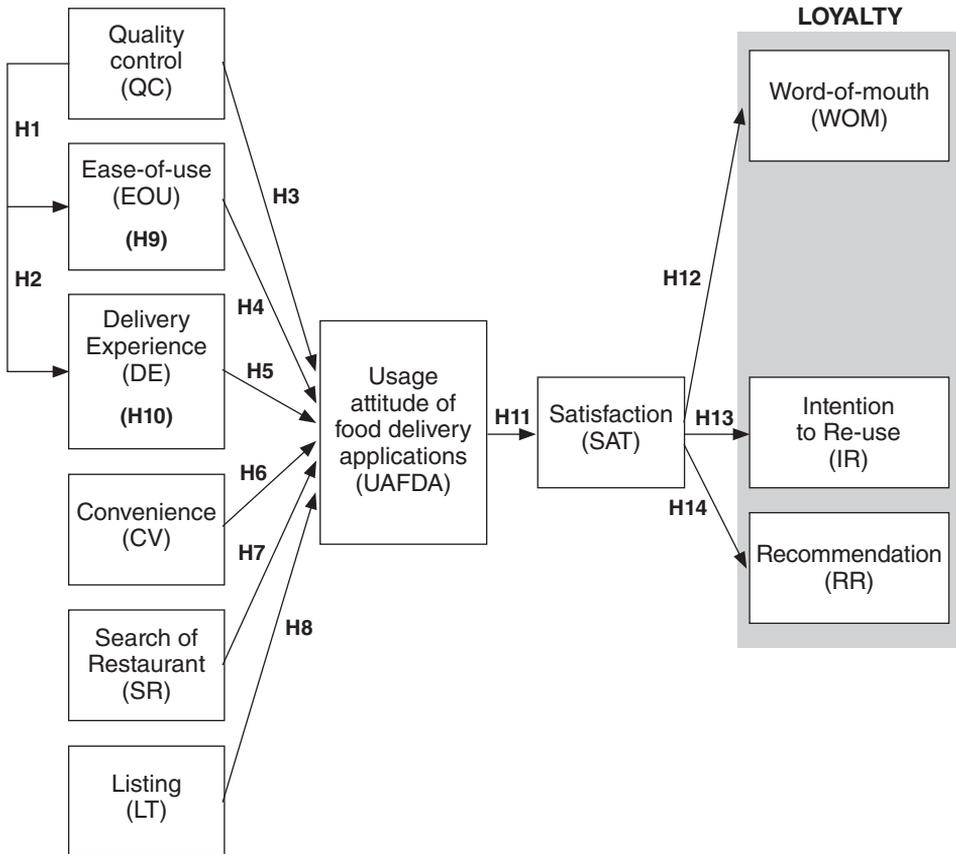


Figure 1. Research framework

Methodology

Based on the literature review and hypotheses developed, this study adopted a positivist paradigm and deductive research approach. Underpinned by the U&G theory and satisfaction-loyalty theory, data on the identified variables was collected using a questionnaire, to test the hypotheses. Based on the primary data collected, the researchers analysed which factors could influence users’ attitude towards FDAs. On this basis, this study examined the relationship between users’ attitude towards using food delivery applications and customer satisfaction and loyalty dimensions.

Specifically, the study investigated factors that influence working adults' attitude towards using food delivery applications and the impact of the attitude on satisfaction and loyalty dimensions based on the responses of the survey.

The survey items for the six aspects of usage attitude towards using food delivery applications were adapted from literature: quality control (6 items), ease of use (4 items), delivery experience (5 items), convenience (2 items), search of restaurants (3 items), and listing (2 items) (Ray et al., 2019; Lee et al., 2019). Survey items based on U&G theory for customer satisfaction (3 items: Cho, Bonn, & Li, 2019) and loyalty (3 items: Jung & Yoon, 2013). Based on the Satisfaction-Loyalty theory, word-of-mouth (3 items; Hwang, Lee, & Kim, 2019), intention to re-use (3 items: Ray et al., 2019) and recommendation (2 items: Coker, 2013; Almohaimmeed, 2019) were taken as constructs to measure loyalty. Since satisfaction and loyalty are latent variables, we cannot get the results directly. In order to more intuitively understand the attitude, satisfaction and loyalty of working adults in using food delivery applications, it is necessary to measure the different extents. Therefore, all responses were measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). In addition, as the questions used in the survey have been used in previous consumer behaviour studies, the reliability and validity of the study can be guaranteed substantially.

The target population for this study was limited to working Malaysian adults, who order food at least 3–5 times in a month (considered as frequent user). Working adult refers to a person (employer, employee, own-account worker, or unpaid domestic worker) who works for at least one hour at any time during the working age of 15 to 64 years for pay, profit, or family benefit. The English-language questionnaire survey was administered online using non-probability purposive sampling. To ensure the reliability and validity of the questionnaire, 30 respondents were selected for a pre-test, and the data was subjected to the Cronbach's alpha test. Considering the confidence level of 95% and confidence interval of 6, the questionnaire satisfied the necessary sample size of 267 respondents. A total of 300 valid questionnaire were used for the subsequent analysis. The FDAs selected for the study were foodpanda, honestbee, GrabFood and dahmakan in Malaysia. These applications are regarded as the most popular FDAs in Malaysia and are the main players of the food delivery market (Lim, 2018).

According to the formulated theoretical framework, this study includes two levels of endogenous variables, in which satisfaction and loyalty dimension are reflective latent variables. In order to analyse and test the theoretical framework and hypotheses more effectively, the partial least squares (PLS) modelling of structural equation model (SEM) was employed. SEM is a multivariate statistical method that integrates factor analysis and path analysis (Gefen, Rigdon, & Straub, 2011). It offers a strong advantage in quantitative studies by examining the interactions

between variables. Meanwhile, as a comprehensive analysis method, PLS-SEM is suitable for the pre-design of complex concept work. It can be used to evaluate both measurement and structural models (Tan, Md Noor, Rasoolimanesh, & Mustafa, 2020). Therefore, PLS-SEM was deemed helpful to analyse the interaction between variables in this study. Moreover, throughout the analysis process, Smart PLS analysis software was used to conduct data analysis and test the theoretical framework and hypotheses.

Findings

Demographics

The study findings were derived from a sample of 300 completed questionnaires. Table 1 provides an overview of the respondents' demographics. Of the 300 respondents, more than half of the respondents were younger than 34 years old, accounting for 60%. In addition, the vast majority of the respondents (93%), have been using food delivery applications for more than a month.

Table 1. Profile of respondents (n=300)

		Frequency	Percentage (%)
Gender	Male	123	41.0
	Female	177	59.0
	Total	300	100.0
Age	15–24 years	90	30.0
	25–34 years	110	36.7
	35–44 years	90	30.0
	45–54 years	7	2.3
	55 years or above	3	1.0
	Total	300	100.0
Marital Status	Single	123	41.0
	Married	177	59.0
	Total	300	100.0
Nationality	Malaysian	252	84.0
	Non-Malaysian	48	16.0
	Total	300	100.0
Monthly Income (in MYR / RM)	Less than 500	98	32.7
	501–1,500	152	50.7
	1,501–2,500	43	14.3
	2,501–3,500	0	0.0
	3,501 or above	7	2.3
	Total	300	100.0

Table 1 (con't)

		Frequency	Percentage (%)
FDA Usage Duration	Less than a month	21	7.0
	Less than three months	88	29.3
	Less than six months	47	15.7
	Less than a year	71	23.7
	More than a year	73	24.3
	Total	300	100.0
Working Environment	Indoor work	136	45.3
	Outdoor work	102	34.0
	Both	62	20.7
	Total	300	

Assessment of Measurement Model

In this study, PLS-SEM analysis was conducted on 300 valid datasets, and the measurement model and structural model were assessed as well. This section looks at the reliability and validity of the measurement model. As a statistical method, PLS-SEM has its own rules of thumb in evaluating a model (Hair Jr, Hult, Ringle, & Sarstedt, 2016). The framework of this study is composed of reflective constructs, which are Convenience (CV), Ease of Use (EOU), Delivery Experience (DE), Search of Restaurant (SR), Listing (LT), Usage Attitude of Food Delivery Applications (UAFDA), Satisfaction (SAT), Word-of-mouth (WOM), Intention to Re-use (IR) and Recommendation (RR). Therefore, the PLS-SEM analysis adopted a reflectivity structure. In essence, the rule of thumb is to have different interpretation criteria for evaluation, according to the field of study (Hair, Risher, Sarstedt, & Ringle, 2019). In the context of this study, we referred to behavioural science.

As mentioned earlier, the study’s measurement model was assessed for validity and reliability. First of all, reliability and convergent tests for squared loadings, Cronbach’s alpha, rho_a and average variance extracted (AVE) were carried out. Table 2 shows that most of the values derived were higher than 0.70, which is considered acceptable. As the composite reliability (CR) and AVE of the corresponding constructs produced factor loadings of between 0.50 and 0.70, all the corresponding constructs are deemed acceptable. At this point, all factor loadings conform to the required standards (Ali, Rasoolimanesh, Sarstedt, Ringle, & Ryu, 2018). At the same time, all the constructs generated CR and rho_a values higher than 0.70, implying that the framework and constructs are acceptable. Further, the AVE values for all the constructs were also higher than 0.50, as recommended by Fornell and Larcker (1981).

Table 2. Validity and reliability of constructs

Construct	Items	Statements	Loadings	Cronbach's alpha	rho_a	CR	AVE
Quality Control (QC)	QC1	FDA's provide photos, reviews and ratings, which help me to shortlist restaurants.	0.602	0.955	0.955	0.955	0.955
	QC2	FDA's provides photos and reviews of food items, which help me to finalise my order.	0.516				
	QC3	FDA's provide photos, reviews and ratings, which help me to finalise the menu.	0.821				
	QC4	Using food delivery apps provides accurate information.	0.844				
	QC5	Using food delivery apps provides information at the right level of detail.	0.582				
	QC6	Using food delivery apps presents the information in an appropriate format.	0.860				
Ease of use (EOU)	EOU1	Food delivery app is easy to use.	0.875	0.786	0.851	0.857	0.608
	EOU2	The order placement process via a food delivery app is easy for me.	0.883				
	EOU3	I like the feature to track order progress (order accepted/prepared/picked up) via a food delivery app.	0.769				
	EOU4	The filter options (e.g., type of cuisine, estimated delivery time) are helpful to me.	0.542				
Delivery Experience (DE)	DE1	I like the FDA's provision to order food at late night.	0.736	0.799	0.819	0.859	0.551
	DE2	I like the FDA's provision for locating the delivery address on the map.	0.696				
	DE3	I like the FDA's provision of free delivery for specific orders.	0.677				
	DE4	I like the FDA's provision to estimate time of delivery.	0.845				
	DE5	I like the FDA's provision for tracking the delivery person in real time.	0.746				

Table 2 (con't)

Construct	Items	Statements	Loadings	Cronbach's alpha	rho_a	CR	AVE
Convenience (CV)	CV1	FDAs help me to avoid traffic.	0.967	0.955	1.116	0.977	0.955
	CV2	FDAs help me to avoid waiting time at restaurants.	0.987				
Search of Restaurant (SR)	SR1	FDAs help me to search or hunt for restaurants.	0.985	0.715	2.004	0.835	0.724
	SR2	FDAs help me to discover nearby eateries.	0.690				
Listing (LT)	LT1	I like the way restaurants are listed area-wise on FDAs.	0.788	0.704	0.704	0.835	0.628
	LT2	I like the way restaurants are listed cuisine-wise on FDAs.	0.784				
	LT3	I like the way the menu is appropriately categorised on FDAs (without fancy names).	0.805				
Usage Attitude of Food Delivery Applications (UAFDA)	UAFDA1	Using the food delivery app is useful.	0.880	0.706	0.803	0.830	0.628
	UAFDA2	I am strongly in favour of ordering food through the delivery app.	0.573				
	UAFDA3	I desire to use the delivery app when I purchase food.	0.884				
Satisfaction (SAT)	SAT1	FDAs exceeded my expectations.	0.878	0.795	0.851	0.878	0.708
	SAT2	I am pleased to use the FDAs.	0.716				
	SAT3	Overall, I am satisfied with my experience using FDAs.	0.917				
Word-of-mouth (WOM)	WOM1	I am likely to say positive things about food delivery services to others.	0.897	0.846	0.921	0.904	0.760
	WOM2	I am likely to recommend food delivery services to others.	0.934				
	WOM3	I am likely to encourage others to use food delivery services.	0.777				

Table 2 (con't)

Construct	Items	Statements	Loadings	Cronbach's alpha	rho_a	CR	AVE
Intention to Re-use (IR)	IR1	I may use FDAs more frequently in future.	0.894	0.734	0.808	0.812	0.596
	IR2	If I have an opportunity, I will order food through the FDAs.	0.793				
	IR3	I intend to keep ordering food through the FDAs.	0.599				
Recommendation (RR)	RR1	I will recommend FDAs to my friends and others.	0.885	0.850	1.096	0.925	0.860
	RR2	I recommend to my friends and colleagues to visit & purchase through the same FDAs as I do.	0.968				

Next, to assess discriminant validity, Fornell-Larcker criterion and Heterotrait-monotrait (HTMT) criterion were used. As a traditional metric, Fornell-Larcker criterion is extensively used to assess the discriminant validity. Fornell and Larcker (1981) contended that the AVE of each construct should be compared with the square correlation between constructs of all the reflective measured constructs in the structural model. At the same time, the shared variance of all the constructs should not be higher than their AVEs. Table 3 illustrates that all of the constructs are acceptable according to the Fornell-Larcker criterion.

If the factor loading value is slightly different for a construct, the Fornell - Larcker criterion will not perform well in discriminant validity assessment. Henseler, Ringle and Sarstedt (2015) suggested an alternative new criterion called Heterotrait-monotrait (HTMT) as a replacement to assess discriminant validity. The Heterotrait-monotrait (HTMT) criterion can be used to assess structural equation model based on both variance and covariance (Tan et al., 2020). In this regard, Henseler et al. (2015) proposed that if the constructs whose conception are very similar in the structural model like satisfaction and loyalty, the HTMT ratio should be lower than 0.90. Table 4 showed that all the constructs in the structural model were lower than 0.90, meeting the Heterotrait-monotrait (HTMT) criterion. In comparing both criteria, all the constructs were found to perform well by meeting both criteria standards (Table 3 and Table 4).

Table 3. Discriminant validity using the Fornell-Larcker criterion

Constructs	1	2	3	4	5	6	7	8	9	10	11
Quality Control (1)	0.718										
Ease of Use (2)	0.304	0.780									
Delivery Experience (3)	0.704	0.374	0.742								
Convenience (4)	0.144	-0.179	0.325	0.977							
Search of Restaurant (5)	0.426	0.251	0.556	0.084	0.851						
Listing (6)	0.262	0.056	0.223	0.146	0.096	0.792					
Usage Attitude of Food Delivery Applications (7)	0.652	0.442	0.719	0.331	0.356	0.325	0.792				
Satisfaction (8)	0.571	0.498	0.561	0.295	0.301	0.214	0.626	0.841			
Word-of-Mouth (9)	0.569	0.218	0.385	0.037	0.294	0.274	0.372	0.590	0.872		
Intention to Re-Use (10)	0.529	0.247	0.659	0.168	0.601	0.086	0.424	0.362	0.420	0.772	
Recommendation (11)	0.016	0.089	0.032	-0.070	0.055	-0.001	-0.054	0.193	0.214	0.051	0.927

Note: Square root of average variances extracted (AVE) are shown on diagonal in bold.

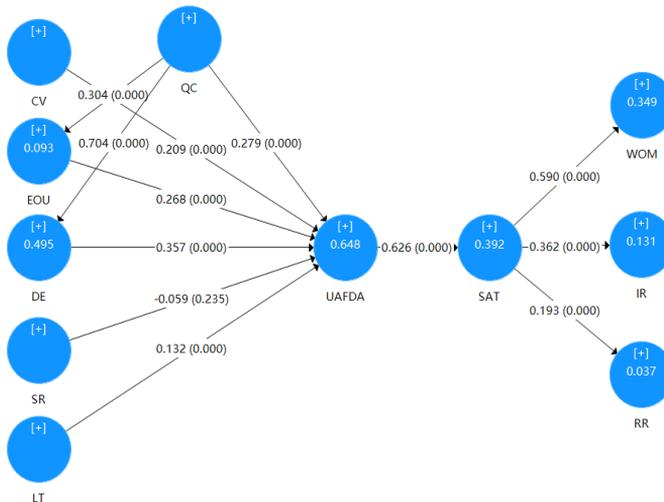
Table 4. Discriminant validity using Heterotrait-monotrait (HTMT) criterion

Constructs	1	2	3	4	5	6	7	8	9	10	11
Quality Control (1)											
Ease of Use (2)	0.389										
Delivery Experience (3)	0.823	0.467									
Convenience (4)	0.226	0.259	0.334								
Search of Restaurant (5)	0.483	0.285	0.709	0.144							
Listing (6)	0.359	0.092	0.284	0.170	0.120						
Usage Attitude of Food Delivery Applications (7)	0.743	0.536	0.890	0.385	0.447	0.454					
Satisfaction (8)	0.646	0.582	0.634	0.318	0.357	0.279	0.765				
Word-of-Mouth (9)	0.686	0.277	0.419	0.194	0.310	0.342	0.428	0.685			
Intention to Re-Use (10)	0.605	0.281	0.841	0.173	0.838	0.104	0.503	0.404	0.480		
Recommendation (11)	0.099	0.114	0.116	0.085	0.077	0.093	0.115	0.219	0.247	0.085	

Assessment of Structural Model

After successfully assessing the measurement model, the next step is to assess the structural model. When assessing the structural model, normally each endogenous latent variable is assessed using the coefficient of determination (R^2) first (Hair Jr, Hult, Ringle, & Sarstedt, 2017). R^2 can be used to explain the amount of variance in the structural equation model. In behavioural science, when the R^2 value of endogenous variables exceeds 0.20, it can be considered as a high value to explain variance (Rasoolimanesh, Jaafar, Kock, & Ahmad, 2017). From Figure 2, the results show that the majority of endogenous variables in the model performed well. The model explained 49.5% of the variance for delivery experience and 9.3% of the variance for ease of use. In addition, an R^2 value of 0.648 for usage attitude of food delivery applications can be considered as a high value. What is more, the R^2 values of 0.349, 0.131, 0.037 explained 34.9% of the variance for word-of-mouth, 13.1% for intention to reuse and 3.7% for recommendation, respectively.

Further, another way to assess the structural model is Stone-Geisser's Q^2 , which has the capability to predict the structural model. If the value of Q^2 is greater than 0, the exogenous variable is deemed acceptable (Ali et al., 2018). The results of cross validated redundancy revealed that the Q^2 values for delivery experience, ease of use, usage attitude of food delivery applications, satisfaction, word-of-mouth, intention to re-use and recommendation were 0.261, 0.047, 0.382, 0.260, 0.247, 0.057 and 0.025, respectively. All these values of validated redundancy are greater than 0, which suggests the predictive ability of the model.



Note: Solid line shows path coefficients, p-values are included in brackets

Figure 2. Structural model

Moreover, Table 5 illustrates the results of the relationship and hypotheses testing via path coefficients, t-value, p-value and confidence interval (bias corrected). In addition, using the bootstrapping method with 5,000 resamples, path coefficients in the structural model were assessed in the present study. A total of 14 hypotheses were tested in this study, of which 12 of them were direct relationships while 2 represented indirect relationships (mediators). For the direct relationship hypotheses, H1, H2, H3, H4, H5, H6, H11, H12 and H13 were verified, as their path coefficients were at least 0.20 (Chin, 1998) and met the criteria of t-value, p-value and confidence interval (bias corrected). As for H8 and H14, even though the path coefficients were lower than 0.20, the other values met the standard of t-value, p-value and confidence interval (bias corrected). Thus, H8 and H14 were acceptable as well. Unfortunately, H7 was not acceptable in this study.

To assess indirect relationships which refer to mediators, the bootstrap resampling method might be the best approach, as it offers the most trustworthy way that focuses on investigating a non-zero effect (Hayes & Scharkow, 2013). As shown in Table 5, H9 and H10 were found acceptable in the testing of the structural model. These results indicate that the delivery experience and ease of use play a mediating role between quality control and usage attitude of FDAs.

The results also suggest that quality control has a greater effect on delivery experience than ease of use. Further, results also demonstrate a stronger effect for delivery experience on the usage attitude of FDAs, whereas listing has a weaker effect on the usage attitude of FDAs. Moreover, the effect of satisfaction on word-of-mouth is greater than that of intention to use and recommendations.

Table 5. Results for hypotheses testing

Hypothesis	Relationship	Type of Effect	Path Coefficient	T Statistics (O/STDEV)	P Values	Confidence Interval (Bias Corrected)	Supported
H1	QC → EOU	Direct	0.304	5.366	0.000	[0.185, 0.408]	Yes
H2	QC → DE	Direct	0.704	26.416	0.000	[0.645, 0.751]	Yes
H3	QC → UAFDA	Direct	0.279	5.491	0.000	[0.184, 0.384]	Yes
H4	EOU → UAFDA	Direct	0.268	5.912	0.000	[0.180, 0.360]	Yes
H5	DE → UAFDA	Direct	0.357	5.046	0.000	[0.218, 0.493]	Yes
H6	CV → UAFDA	Direct	0.209	5.526	0.000	[0.134, 0.282]	Yes
H7	SR → UAFDA	Direct	-0.059	1.188	0.235	[-0.164, 0.031]	No
H8	LT → UAFDA	Direct	0.132	3.671	0.000	[0.061, 0.201]	Yes
H9	QC → DE → UAFDA	Indirect (Mediator)	0.453	12.447	0.000	[0.375, 0.518]	Yes
H10:	QC → EOU → UAFDA	Indirect (Mediator)	0.063	3.104	0.002	[0.030, 0.106]	Yes

Table 5 (con't)

Hypothesis	Relationship	Type of Effect	Path Coefficient	T Statistics (O/STDEV)	P Values	Confidence Interval (Bias Corrected)	Supported
H11:	UAFDA → SAT	Direct	0.626	12.169	0.000	[0.520, 0.721]	Yes
H12:	SAT → WOM	Direct	0.590	15.789	0.000	[0.509, 0.656]	Yes
H13:	SAT → IR	Direct	0.362	9.143	0.000	[0.276, 0.433]	Yes
H14:	SAT → RR	Direct	0.193	3.625	0.000	[0.103, 0.297]	Yes

Note: QC= quality control, EOU= ease of use, DE= delivery experience, CV= convenience, SR= search of restaurant, LT= listing, UAFDA= usage attitude of food delivery applications, SAT= satisfaction, WOM= word-of-mouth, IR= intention to re-use, RR= recommendation.

Discussion and Conclusion

In any business environment, customer satisfaction and customer loyalty are considered extremely significant resources. In other words, customer satisfaction and customer loyalty can provide a measurement index for the stakeholders of the food system and provide a booster for the service industry to promote faster deliveries. In investigating usage attitude, customer satisfaction and loyalty of FDAs, the results demonstrate that most of the hypotheses are supported to varying degrees.

This study confirmed the impact of quality control on ease of use, as well as the relationship between quality control and delivery experience. Interestingly, quality control has a particularly positive influence on delivery experience, which is consistent with the results from the study of McKnight, Choudhury, and Kacmar (2002). This suggests that quality control can strongly influence the perception of delivery experience of working adults in Malaysia who use FDAs. This corroborates with the findings of Corbitt, Thanasankit, and Yi (2003) who contended that the trust of customers in e-commerce is affected by their perception of website quality. If users have a stronger perception of the website quality, the market positioning and credibility of e-commerce will become better.

Besides, the present study examined factors influencing the usage attitude of FDAs which include quality control, convenience, ease of use, delivery experience, search of restaurant and listing. The results indicate that all the listed factors have a positive impact on the usage attitude of food delivery applications, except for search of restaurant. The present study also found that quality control is positively related to usage attitude, which is consistent with the results shown in previous literature (Kim & Lennon, 2013). For working adults, obtaining food is the main reason for using FDAs. Thus, if food quality is not up to standard, customers will develop a unfavourable attitude towards FDAs. The positive influence of convenience on usage attitude is also consistent with past research (Correa et al., 2019; Roh & Park, 2019). Working adults prefer buying food through FDAs as this saves them the hassle of

traffic jams, long waiting hours, and so on. Similar results, where ease of use positively influences usage attitude, were found in past literature (Lu & Su, 2009; Song et al., 2021). Working adults are attracted to the ease of use of FDAs, which can be seen in the order placement process, payment process and real-time monitoring of delivery personnel. Dinakaran (2021) revealed that delivery experience has a strong positive correlation with customer attitude. Similarly, the present results also demonstrate a strong positive influence of delivery experience on usage attitude (Kim et al., 2012).

The present study found that listing is positively related to usage attitude, which is contradictory to a past study (Ray et al., 2019). The difference might be due to the target group of both studies. Similarly, search of restaurants had no significance on usage attitude, which contradicts that of previous studies (Ray et al., 2019). In addition, the results of the mediation assessment demonstrate that under the mediation of delivery experience, the indirect impact of quality control on the usage attitude of FDAs is greater than the direct impact, which suggests that delivery experience plays a strong mediating role. However, mediated by ease of use, the indirect influence of quality control on usage attitude of FDAs is not as good as its direct influence. This implies that although ease of use could be a mediator between quality control and usage attitude of FDAs, it is a weak positive correlation instead of a strong and effective one between the two variables.

Next, a positive impact of usage attitude on customer satisfaction, was confirmed, which concurs with the study of Kang et al. (2015). In literature (Cha & Seo, 2020), customer satisfaction has a positive impact on customer loyalty. In the present study, word-of-mouth, intention to reuse and recommendation of FDAs comprise customer loyalty. Results demonstrate that all three aspects are affected by customer satisfaction, which is consistent with the results of previous studies (Katircioglu, Mehtap-Smadi, Kilinç, & Ünlücan, 2012). In fact, results show that the most positive effect of customer satisfaction is word-of-mouth; highly similar to past findings (Barreda, Bilgihan, & Kageyama, 2015; Kim, Jin, & Chang, 2009).

In their study, Chang, Chou, and Lo (2014) found that if customers are satisfied with the food quality in OGB (Online Group Buying), they will have the intention to repurchase the food. The present study supports this as it verified the influence of satisfaction on intention to reuse FDAs. It agrees with Alalwan's (2020) statement, "in general, people who are happy about the outcomes of their prior behaviour and experience are more likely to keep repeating such behaviour". Results also imply a positive influence of satisfaction on recommending FDAs, which is similar to the findings of Finn, Wang, and Frank (2009). However, customer satisfaction has a lower impact on customers' intention to recommend FDAs to other people compared to word-of-mouth and intention to reuse. It shows that compared to word-of-mouth, people do not have a stronger intention to recommend FDAs to others, even if the relationship between customer satisfaction and recommendation is positively

correlated. There may be some hidden reasons. For example, while people may praise something casually, they are only willing to recommend it to others under certain conditions or circumstances.

Theoretical and Practical Implications

This study contributes several theoretical implications. The proposed research framework in the present study combined two theories to investigate usage attitude, customer satisfaction and loyalty. The results can be extended to other studies about online food service and FDAs. Further, given the current limited understanding of the role of mediating variables between usage attitude and their influencing factors, especially in modern service industries, this paper provides evidence on delivery experience as a mediating effect.

Apart from this, this study also offers several practical implications. As delivery experience is not only the most outstanding factor influencing usage attitude but also positively mediates between quality control and usage attitude, managers should periodically enhance the soft power and hard power of their delivery service. For delivery employees, reward mechanisms, regular knowledge training and assessment of their professional level and emergency response can help them become more professional. Further, this insight is also conducive to the internal management of managers. Secondly, customer satisfaction is significantly affected by usage attitude. Thus, managers should be concerned with the feedback from customers.

Thirdly, due to the significant influence of intention to re-use FDAs among working adults, managers should work on retaining current customers through old user plans, such as additional services, or more discounts, as token of appreciation for their loyalty. Last but not least, as word-of-mouth is the most significantly affected factor, managers could push for more activities based on customer feedback. As recommendation of FDAs is also strong factor, managers should encourage current customers to share their personal experiences and opinions on social media, in exchange for token rewards, to attract potential customers.

Limitations and Avenues for Future Research

At this juncture, the limitations of the present study need to be discussed. First, although the study collected data from various countries, the proportion of respondents from countries other than from Malaysia is relatively small. Future studies should include more respondents from other countries. Second, as the study targeted working adults, the results may not be generalisable to the whole population. Hence, future studies could collect data from different segments of the population to verify the model. Additionally, the quantitative method adopted for this study may not be able to provide a holistic understanding of the changes in usage attitude of

working adults towards FDAs over time. Therefore, a longitudinal investigation is recommended. Future studies could fruitfully explore this issue further by adopting qualitative or mixed method, and including the perspectives of products suppliers or managers from food delivery companies for more in-depth insights. Besides, additional factors and individual differences could be added to extend the model.

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