

Factors Affecting Malaysian College and University Students' Satisfaction in Using Online Food Delivery Applications

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Abstract: *Online food delivery (OFD) has existed in Malaysia since 2012 but the market for OFD expanded widely and quickly since the year 2020 when the Covid-19 pandemic hit the country. Since then, the OFD business has become increasingly popular amongst food and beverage (F&B) merchants of all sizes. While the demographics of OFD apps users ranged from youths to the elderly, there were many undiscovered factors and preferences from certain demographic groups, in particular Malaysia college and university students, which affected their experiences and satisfaction when using the apps. This research explored the factors affecting the students' satisfaction when using OFD apps through questionnaire survey responses and statistical analysis output. The research found that apps content and user interface design was the most significant predictor that affect students' satisfaction towards OFD apps. This was followed closely by perceived e-service quality, payment methods applied and perceived ease of use. The study also showed that there are more factors which contributed to the OFD customer satisfaction model in addition to those discovered using the Technology Acceptance Model (TAM) model.*

Keywords: Apps contents and UI design, Customer satisfaction, Online food delivery, Technology Acceptance Model

1. Introduction

In the past decade, mobile-commerce (M-commerce) has been developing and growing rapidly. Amongst various M-commerce applications, online food delivery applications (OFD apps) are increasingly becoming popular over the years (Eu and Sameeha, 2021). OFD apps allow users to access menus of F&B merchants, place orders, complete payments, and receive F&B items that are delivered to the users' doorsteps. According to the Food Delivery App Revenue and Usage Statistics (2023) compiled by Curry (2023), China was the largest market for F&B delivery, with a market size of \$27.3 billion in 2021. This was followed by the F&B delivery markets in United Kingdom and United States. The online food delivery business started to grow in Malaysia since 2012 and delivery services was provided via OFD apps. The two most competitive OFD apps in Malaysia are Foodpanda and GrabFood (Tan and Kim, 2021).

There are several reasons which contributed to the rapid development of the OFD business in the past few years. Firstly, when Covid-19 pandemic struck and hit most of the countries in the world in 2020, most Malaysians only have the option of either cooking their own meal or using food delivery services to deliver meals to their doorsteps due to the highly restrictive

Movement Control Order (MCO) lockdowns imposed by the Malaysian government. As reported by Mohamad et al. (2020), the pandemic enabled OFD service to be expanded at a faster rate than ever before. Thus, the availability of OFD apps changed the attitudes and purchasing habits of customers during the lockdowns (Troise et al., 2020). Secondly, the ease of accessing the Internet via mobile technology in Malaysia enabled customers to use OFD apps anywhere to make F&B orders much more easily (Aryani et al., 2022). Thirdly, even after the lockdowns were lifted, college/university students dissatisfied with food offered by campus canteens led to the unexpected growth of food delivery services, due to the wide variety of food and pricing available via such services (Ganatra et al., 2021).

Due to these factors, many OFD businesses were quickly established since the pandemic started. However, many of the OFD apps were developed and launched in a hurry without detailed planning and emphasis on quality design and customer satisfaction. The confusing structure of these websites/apps, coupled with out-of-date information may cause the OFD business to lose its customers (Ray et al., 2019). Still, the affordability of mobile phones and internet accessibility allowed OFD apps to expand and reach a wider demographic range, from young people to the elderly. Customers also had many OFD purchase choices and various expectations towards the usage of OFD apps. Therefore, it is crucial to understand the needs of customers to provide quality OFD apps and services. There is a gap whereby no research has been conducted to explore the factors which affects Malaysian college/university students' satisfaction with OFD apps. Therefore, research was conducted to explore the relationships between various factors affecting the OFD apps: perceived ease of use, privacy and security, payment methods, content and UI design, perceived e-service quality, and students' satisfaction. This research will provide insights to the design and service quality requirements of the apps towards the OFD service providers.

In the introduction, the paper discusses the background of M-commerce and the OFD apps development landscape in Malaysia. This is followed a review and analysis of the business models for OFD apps, and the various factors which affect customer satisfaction, in the literature section. The research methodology used to conduct the exploratory study will be covered in the third section, after which it will be followed by the analysis of the research findings. Finally, this paper will conclude with a discussion of the direction for future research.

2. Literature Review

Existing Research on Customer Satisfaction of Online Food Delivery Apps

a) Customer Satisfaction

According to Kumar (2020), satisfaction refers to a passionate or psychological reaction to a center such as desires, item, user experience, and so on immediately at or after the time of utilization. It can also be described as a post-purchase sensation. As commented by Lahap et al. (2018), customer satisfaction occurs when the requirements, expect or goal fulfils a customer's expectations. In this research's context, customer satisfaction could be defined as the output of a customer evaluation of their online food ordering experience from a restaurant compared to their previous user experiences, and their resulting state of emotional fulfilment (Suhartanto et al., 2019).

b) Perceived Ease of Use

Perceived Ease of Use (PEOU) is an essential part of the Technology Acceptance Model (TAM) (Davis, 1989). It is a key determinant of technology adoption or otherwise. Generally, PEOU could be defined as "the ease with which an innovation can be understood and

implemented” (Zeithaml et al., 2002). In the context of this research, if an OFD app is perceived as easy and simple to use, then users may begin to enjoy using the apps and develop an interest in learning about them. Then the app is considered as having PEOU.

In Sheryl’s (2011) study, it was discovered that the PEOU of OFD apps were regarded as important to both customers and non-customers. A research study by Israel et al. (2019) discovered that PEOU of OFD apps influenced customers in Chennai, India to continue using OFD apps. The features which contributed to the PEOU include the availability of order placement process which tracked an order’s progress/history, and filter options of an OFD app (Ray et al., 2019). Later research by Prasetyo et al., (2021) also discovered that if the OFD apps are tedious and difficult to use, it will adversely affect customers’ intention in continuing to adopt and use those apps. However, there were other studies which claimed that PEOU was not a significant factor contributing to customers’ satisfaction when using OFD apps, such as Chai and Yat (2019) and Jun et al., (2021). These studies argued that improved computer literacy skill, and experience in using the OFD apps, reduced the importance of PEOU as a factor affecting customer satisfaction. Moreover, Generation Z users and beyond were born in the information technology era, where they were exposed to, and familiar with, using various types of apps (Akhmadi, Alfathah and Susanawati, 2021). There will be no issue in using the OFD apps by these customers, which in turn would affect the satisfaction level of OFD apps.

c) Privacy and Security

According to Badrinarayanan et al. (2010), privacy is “a degree to which an online shopping website is secure and protect the customer information”. The privacy and security variable are focused on protecting a customer’s personal and payment information (Blut, 2016). The information could include details such as name, phone number, bank account no., email address, password, and others.

According to Sultan and Uddin (2011), there was a strong relationship between privacy and security, and the decision to engage in online food delivery apps. The researchers discovered that almost all respondents in their study agreed that trustworthiness is important when conducting online F&B purchase. Another study from Chai & Yat (2019) also supported the argument that privacy and security affect customers’ satisfaction when using OFD apps. Among the privacy and security concerns from the research findings include e-wallet security (Andrew and Tan, 2019), personal information handling (Libaque-Saenz et al., 2021), and technological vulnerabilities that could lead to data breaches involving personal and credit card information (Cheng et al., 2021; Chopdar, et al., 2018; Pigatto et al., 2017).

d) Payment Method

Payment refers to the process of exchanging value for a product or service, from one party to another, using various payment methods. In OFD apps, payment methods available include credit card, bank transfer, e-wallet, as well as cash on delivery. Research from Gupta (2019) showed that OFD apps must provide a variety of payment methods for customers to choose from to complete the food purchase process. Nayan and Hassan (2020) also concluded that a variety of payment methods was one of the key factors to increasing customer satisfaction towards OFS apps. Most of the research conducted worldwide include Lu et al. (2017) from China, Israel and Velu (2019) from Israel, Song, et al. (2017) from Korea, and Ghosh and Saha (2018) from India indicated significant positive correlation between payment method variety and customer satisfaction.

Furthermore, research by Koiri, Mukherjee and Dutta (2019) also discovered that OFD apps are very popular amongst the younger generation nowadays. They prefer digital payment methods, including the face recognition payment method, all of which are faster and more convenient than traditional payment methods (Zhong et al., 2021). This research was also supported by Patra and Mahensaria (2022), which verified that generation Z customers were more in favour of using digital payment methods.

e) App Content and User Interface Design

In OFD apps, app content and user interface (UI) design are crucial in allowing users to obtain accurate information before making their purchases. According to Cyr et al. (2006), visual design includes the consistency, aesthetics, glare and touch of the mobile apps interface, attractiveness of the apps, appearance of the websites including fonts, images, animation, and colours used. The OFD apps must create an impression including having an attractive app layout, a simplistic style, the ease of understanding of features menu items and payment method) on the apps. This too could increase customer satisfaction of OFD app users.

Research conducted by Fakfare (2021) and Sinha, et al. (2022) further confirmed that customer satisfaction was greatly influenced by good application design. The research found that a simple purchasing process, supported by easy navigation design and interactive features can make the customers feel more confident and comfortable when placing an order. Colourful icons, user-friendly features and good aesthetic value are also good design elements that would contribute towards increasing customer satisfaction. This argument is supported by research from Shodiq, Hidayatullah and Ardianto (2018) which indicated that website design, and information design, were important determinants affecting customer satisfaction towards OFD apps. However, studies from India (Chakraborty, 2019) showed a negative relationship between apps design quality and customer satisfaction. The users in these countries were more concerned with an app's capability to finish its main task, that is the successful completion of an order, rather than quality and design standard of the app. It is noted that there were little or no research relating to app design and customer satisfaction which involved college/university students. Therefore, there is a need to further explore this factor from their perspective.

f) Perceived E-Service Quality

According to Chandon, Wansink, and Laurent (2000), e-service quality refers to a comprehensive customer assessment to determine the quality of online services. Such services would include the delivery service itself, as well as services related to pre and post-purchases. As discovered by Chinomona, Masinge and Maxwell (2014), the attributes of e-services that can influence customer satisfaction include quality, accuracy, and customisation of information. This argument is reinforced by research from Wang and Lai (2014), Kedah et al. (2015), Yeo et al. (2017), Suhartanto et al., (2018), Gupta (2019), Perumal et al. (2021) and Sinha et al. (2022), which covered findings from countries such as Malaysia, Singapore and Taiwan. It was found that the e-service quality of OFD apps has a significant impact on customer experiences. Among expected quality include 24x7 availability, timely, truthful and responsive support, easy-to-use complaints platform, up-to-date and detailed information about the restaurant, and clear, transparent food/event promotion and/or discount. Again, there is no research on perceived e-service quality involving college/university students, warranting further exploration from this demographic's perspective.

Derivation of Research Theoretical Framework

It is observed that the researchers did not only purely adopt an existing technology evaluation model such as the Technology Acceptance Model (TAM), which is an underlying theory to

explore technology acceptance and adoption (Hussien and Mansour, 2020). In addition to the TAM variables such as perceived ease of use and perceived usefulness, researchers also adopted other relevant factors to form their own research theoretical framework, namely privacy and security, payment methods, app content and UI design, and perceived e-service quality. Although several research on customer satisfaction towards OFD apps had been conducted in Malaysia, none of the research had combine the variables proposed, of which three main aspects would be focused on: 1) apps usability & design, 2) security & payment, and 3) e-service quality features. Furthermore, the previous research conducted from 2015 to 2022 also did not target the new generation of users (college / university students) in the research context. The proposed research theoretical framework is shown in Figure 1.

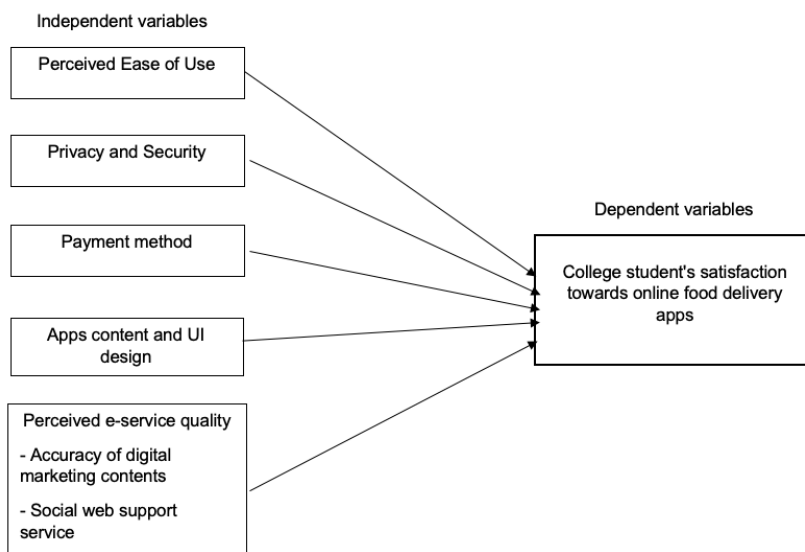


Figure 1: Theoretical framework of the research

The hypotheses to test the theoretical framework are as follow:

- H1:** Perceived ease of use has positive and significant relationship with Malaysian college/university students' satisfaction towards online food delivery apps.
- H2:** Privacy and security has positive and significant relationship with Malaysian college/university students' satisfaction towards online food delivery apps.
- H3:** Payment method has positive and significant relationship with Malaysian college/university students' satisfaction towards online food delivery apps.
- H4:** Apps content and UI design has positive and significant relationship with Malaysian college/university students' satisfaction towards online food delivery apps.
- H5:** Perceived E-service quality has positive and significant relationship with Malaysian college/university students' satisfaction towards online food delivery apps.

3. Research Methodology

This exploratory research attempted to explore the factors that affecting Malaysian college/university students' satisfaction towards online food delivery apps. This research adopted a quantitative research approach by using hypotheses testing and statistical analysis to determine the significant relationships between the factors affecting college student's satisfaction when using OFD apps. The target population of the research were students who were pursuing tertiary education in Malaysian colleges and universities. The minimum age of the target respondents must be 17 years old and above. The respondents must also have prior experience in using any OFD apps in Malaysia. This research used purposive and convenient

sampling techniques to conduct questionnaire survey. In addition to that, inclusion criteria were used to determine the right respondent for the research. This would ensure the accuracy of the research outcome, as commented by Amin et. al. (2014).

The target sample size (N) of the questionnaire survey was 150 respondents. It was more than the minimum sample size requirement of 100, as suggested by Bullen (2013), and exceeded the required sample size of $N > 50 + 8m$ (where m = number of independent variables) specified using the formula by Pallant (2011). Since there were five independent variables to be examined in the theoretical model, the sample size must be more than 90 ($N > 50 + 8(5)$).

An online questionnaire was designed via Google Form to collect responses. The questionnaire consisted of seven sections. Section 1 pertains to the demographics and background information of the respondents. Section 2 to Section 6 covers the respondent's feedback on the factors being investigated such as Perceived Ease of Use (PEOU), Privacy and Security (PS), Payment Method (PM), Apps content and UI design (UID) and Perceive E-service Quality (PEQ). Each section has five questions. The response was measured using a 5-point Likert scale. Lastly, section 7, also using 5-point Likert scale, asked about the respondent's satisfaction level towards OFD apps.

The questionnaire was first used in a pilot study which involved 31 Malaysian college/university students who had experience using OFD apps. Statistical analysis techniques such as reliability test and factor analysis were applied in the pilot study phase. The questionnaire was revised according to the pilot study's outcome. The revised questionnaire was then posted on social media platforms such as Facebook, WhatsApp group and Instagram. An email invitation was also sent to invite students to participate in the survey. To maintain research integrity, all responses are anonymous, and the survey responses will be recorded securely and strictly used for research purposes only. The total duration of data collection period via the survey was three weeks.

Statistical analysis techniques include descriptive analysis, reliability test, factor analysis, Pearson correlation analysis and multiple regression analysis were applied on the survey results using IBM SPSS statistics version 29.0. Hypothesis testing was included in the multiple regression analysis as well. The output of the multiple regression and hypothesis testing were used to construct the theoretical framework which determined the factors affecting the satisfaction level of college/university students in Malaysia towards OFD apps.

4. Research Findings and Analysis

Pilot Study

The reliability test is summarized in Table 1. On the first test run, it was shown that the independent and dependent variables of Factors 1 to 5 demonstrated sufficient reliability in terms of Cronbach Alpha value ranging from 0.755 to 0.869. Some items could be removed to increase the reliability value. Hence, in the second test run, one item from PEOU, UID and CS factors/variables was removed. As a result, the final Cronbach Alpha values showed a significant reliability improvement, ranging from 0.789 to 0.891.

Table 1: Output of reliability test in pilot study

Factor	Cronbach's Alpha	Removal of items	Cronbach's Alpha
Factor 1: Perceived Ease of Use (PEOU)	(before)		(after)
PEOU1: Learning how to use online food delivery apps for ordering and purchasing food is easy for me. PEOU2: My interaction with online food delivery apps for order and purchase of food is clear and understandable. PEOU3: It is easy for me to become skilful at using online food delivery apps for purchasing foods PEOU4: I can easily find my favourite restaurant or food that I need in online food delivery apps. PEOU5: I feel so easy when using online food apps to track my order delivery status.	0.755	PEOU4	0.790
Factor 2: Privacy and security (PS)			
PS1: I feel that the online food delivery apps protected my personal data and credit card information. PS2: I feel that it is safe to use an online food delivery app. PS3: I feel that online food delivery apps have adequate features to protect customer's personal information PS4: A good authentication of an online food delivery apps leads me to purchasing and top-up money frequently. (e.g., shopee pay, grab pay) PS5: I purchase food or beverage from restaurant without any fear of frauds and hackers' transportation charges.	0.803	-	0.803
Factor 3: Payment method (PM)			
PM1: I find that I can choose my preferred payment method when payment. PM2: A various type of payment method (e.g., E-wallet, Cash on Delivery, Credit card) is easy and convenience to me PM3: I feel so easy when top-up my wallet (e.g., GrabPay, ShopeePay). PM4: I find that I can complete transaction quickly. PM5: The payment gateway on online food delivery is safe and secure.	0.854	-	0.854
Factor 4: Apps content and UI design (UID)			
UID1: The apps design of the online food delivery apps is simple and user-friendly UID2: The structure of online food delivery apps is easy to follow. UID3: The online food delivery apps have attractive colours and fonts UID4: I think the payment interface in online food delivery apps is easy to understand. UID5: The food photos as shown in the online food delivery apps always meet my expectations for delivered items.	0.785	UID5	0.883
Factor 5: Perceived E-service quality (PEQ)			
PEQ1: I find that the online food delivery apps provide me with up-to-date information related to restaurant, food, promotion and discounts. PEQ2: I find that the online food delivery apps provide a variety form of contact channels (FAQ, email, telephone number and others). PEQ3: I find that the online food delivery apps enabled me to enquire online about the delivery food made. PEQ4: The information for estimated food preparation and delivery time in the online food delivery apps is always accurate. PEQ5: Problems was resolved after contacting customer service.	0.789	-	0.789
Dependent variable: Customer Satisfaction (CS)			
CS1: The experience when using the online food delivery apps is as expected.	0.869	CS1	0.891

CS2: I feel satisfied with the way of the online food delivery apps carried out the transaction.			
CS3: Overall, I feel satisfied with the convenience provided by the online food delivery apps			
CS4: I will continue to use the online food delivery apps.			

Factor analysis was then conducted with various test tools. The analysis showed that the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value was 0.592, which is a both acceptable and mediocre value, between 0.5 and 0.7. Additionally, the Bartlett's Test of Sphericity value is significant at $p = 0.000$. The Total Variance Explained table captured five significant components (PEOU, PS, PM, UID, PEQ) with initial eigenvalue of more than (>1), which are 9.353, 2.831, 2.200, 1.672, 1.565. The Rotated Component Matrix also mapped five variables to each group in a significant manner. As a result, the questionnaire tool was found to be suitable for use in the research.

Full Study

The questionnaire was disseminated to Malaysian colleges/universities students via social media platforms. A total of 156 completed responses were successfully collected in three weeks. The full demographic analysis of section 1 is shown in Table 2. The analysis showed that most respondents was ranged from 20-22 years to 23-25 years, with the majority (71.2%) of the respondents identified as female. The respondents came from every Malaysian state, with highest number of respondents from Sarawak, followed by Pahang, Kedah and Johor. Most of the respondents were bachelor's degree students. The top three OFD apps used by the college/university students were Grabfood, Foodpanda and ShopeeFood. There were two usage trends discovered in the survey. Firstly, while 30% of respondents only used OFD apps several times a month, as much as 28% of respondents would use OFD apps several times a week. With the high usage recorded, it is believed that the respondents would be able to provide accurate responses in the questionnaire based on their experience using the apps.

The statistical analysis began with reliability tests and factor analysis. The reliability tests, as shown in Table 3, had a Cronbach's Alpha coefficient value for each variable in the ideal range of 0.783 to 0.867 respectively. Thus, all variables fulfilled the minimum requirements for good reliability and were suitable for factor analysis. The generated KMO value was 0.909, which was excellent and surpassed the minimum value of 0.5 and was closer to the ideal value of 1. The Bartlett's Test value was also highly significant at $p\text{-value} = <0.001$. This indicates that the factor model had sufficient correlation amongst the variables and was suitable for further analysis. Moreover, the Varimax rotation method, with Kaiser Normalization, was also able to capture all five sets of original variables.

The statistical analysis was performed using Pearson Correlation analysis for each independent variable (PEOU, PS, PM, UID, PEQ) and dependent variable (CS). The analysis showed a significant positive relationship for all pairs of IV/DV, with p value < 0.01 . There was a strong correlation between UID-CS (correlation coefficient = 0.711), a moderately strong correlation between PM-CS, PEQ-CS and PEOU-CS (correlation coefficient of 0.648, 0.591 and 0.566 respectively), and weak correlation between PS-CS, with correlation coefficient of 0.454.

Multiple regression analysis (MRA) was conducted to test the hypotheses and construct theoretical framework for the proposed research. The R value of 0.771 indicated that there was strong relation between the dependent and independent variables. The R -squared value of 0.594 shows that 59.4% of the changes in Customer Satisfaction can be explained by the variations in the variables PEOU, PS, PM, UID and PEQ. Based on the generated table of coefficient, the

p value for variable PS is 0.970 (> 0.05) and thus the hypothesis for H2, which claimed that there is significant relationship between perceived privacy and security and college/university students' satisfaction towards OFD apps, would be rejected. Other hypotheses (H1, H3, H4, H5) were accepted as p value was less than 0.05. The summary of MRA is shown in Table 4.

Table 2: Demographic analysis output

Demographic Variables	Frequency	Percentage (%)
Age		
17 – 19 years old	17	10.90%
20 – 22 years old	75	48.08%
23 – 25 years old	50	32.05%
26 – 28 years old	5	3.20%
29 years old and above	9	5.77%
Gender		
Female	111	71.2%
Male	45	28.8%
Which state are you come from		
Johor	13	8.3%
Kedah	28	17.9%
Kelantan	3	1.9%
Malacca	6	3.8%
Negeri Sembilan	1	0.6%
Pahang	38	24.4%
Penang	7	4.5%
Perak	1	0.6%
Perlis	2	1.3%
Sabah	7	4.5%
Sarawak	47	30.1%
Terengganu	3	1.9%
Education Level		
Foundation / A-Level / O-Level	8	5.1%
Certificate	1	0.6%
Diploma	20	12.8%
Bachelor's Degree	111	71.2%
Master's Degree	12	7.7%
Doctor Degree (PhD)	4	2.6%
Current semester		
Semester 1 - 2	17	10.9%
Semester 3 – 4	24	15.4%
Semester 5 – 6	30	19.2%
Semester 7 and above	66	42.3%
Internship	19	12.2%
Which type of online food delivery apps that you most frequency used?		
GrabFood	138	88%
Foodpanda	126	81%
ShopeeFood	57	37%
DeliverEat	2	1%
Airasia food	6	4%

EASI (Hungry)	2	1%
DahMakan	5	3%
Bungkusit	2	1%
How often do you order food or beverage using online food delivery apps in a week ?		
Everyday	4	2.6%
Several time in a week	44	28.2%
Once a week	24	15.4%
Once a month	15	9.6%
Several times in a month	48	30.8%
Rarely	21	13.5%

Table 3: Output of reliability test

Items	Variable	Cronbach's Alpha
PEOU1 – PEOU3	Perceived ease of use	0.838
PS1 – PS5	Privacy and security	0.854
PM1 – PM5	Payment method	0.867
UID1 – UID4	Apps content and UI design	0.828
PEQ1 – PEQ5	Perceived E-service quality	0.826
CS2 – CS4	Customer satisfaction	0.783

Table 4: Summary of MRA and hypothesis testing

Hypothesis	Relationship	Pearson correlation coefficient	p-value	Hypothesis Result
H1	PEOU-CS	+0.566	0.023	Accepted
H2	PS-CS	+0.454	0.970	Rejected
H3	PM-CS	+0.648	0.008	Accepted
H4	UID-CS	+0.711	<0.001	Accepted
H5	PEQ-CS	+0.591	0.002	Accepted

The MRA was run again to construct a regression model for the theoretical framework. Based on the standard coefficients value, the regression model was formed as shown in equation (1). It was concluded that the satisfaction level towards OFD apps amongst students in Malaysian colleges/universities was strongly affected by app content and UI design. This was followed by E-service quality, payment method and ease of use.

$$\text{Customer satisfaction} = 0.324 (\text{Apps content and UI Design}) + 0.232 (\text{Perceived E-service Quality}) + 0.209 (\text{Payment method}) + 0.161 (\text{Perceived Ease of Use}) \quad (1)$$

5. Discussion

Based on the findings from the multiple regression analysis, it is proven that the relationships between all independent and dependent variables are significant, except for one independent variable (privacy and security). Thus, it also proven that the proposed theoretical framework can be used to significantly explain the satisfaction level of students in Malaysian colleges/universities towards OFD apps. The first accepted hypothesis (H1) showed that there was a significant relationship between the perceived ease of use of OFD apps, and the satisfaction level amongst students. The finding is consistent with the several other research findings, such as those from Doub et al. (2015), Okumus et. al. (2018) and Hussien and Mansour (2020).

The second hypothesis (H2) which measured the relationship between privacy and security and college/university students' satisfaction towards OFD apps was largely rejected in this research. All the business apps in Malaysia are required to comply with Malaysia statutes such as the Personal Data Protection Act 2010, and students do feel safe in making online business transactions through the apps, where they are also aware that their personal data and information are being protected. However, while OFD apps provide various options of payment such as cash-on-delivery (COD), bank transfer, credit card and e-wallet, the students often chose non credit card options, as was discovered by Prasetyo et al. (2021). Thus, not much personal payment details were needed to be recorded in the apps. As a result, the students felt that there were no or minimum threat to their privacy and security.

However, this research found that payment method was one of the significant factors which affects the satisfaction of college/university students in Malaysia towards OFD apps (H3 is accepted). The finding is aligned with research done by Song et al. (2017), Rahman et al. (2017) and Yoopetch et al. (2022). It was found that users were looking for flexible, secure, efficient, and a more varied range of payment options. The better the payment services provided, the higher the satisfaction level amongst the students who used OFD apps.

It was also discovered that app content and UI design had the most significant relationship with the students' satisfaction towards OFD apps (H4 is accepted). This aligns with previous research findings from Goh et al. (2021) and Sinha et al. (2022). With a high number of OFD apps in Malaysia, this created a highly competitive environment for the OFD apps as users of the OFD apps could easily compare the features, contents, and design between various OFD apps, and rate those apps accordingly. Any apps with incomplete, inaccurate or outdated information might be abandoned by the users.

Furthermore, this research discovered that perceived e-service quality (H5) is another significant factor that positively impacts the satisfaction level of college/university students in Malaysia towards OFD apps. This finding is aligned with research studies carried out by Suhartanto et al. (2018) and Yeo et al. (2017). It was suggested that OFD apps must provide up-to-date information for items such as promotion or discounts, and a high level of quality customer service to the users. The better the e-service provided by the apps, such as a fast and responsive customer-service helpdesk, cancellation and refund settlement, and ordering and delivery accuracy, the higher the satisfaction level would be from the users. With reference to the low satisfaction rating of the OFD apps, the users also commented about the poor e-service quality provided by the apps.

6. Conclusion and Future Work

In conclusion, the research showed that app content and UI design was the most significant predictor that affect the satisfaction level of college/university students in Malaysia towards OFD apps. This was followed by perceived e-service quality, payment methods and perceived ease of use. It showed that besides adopting the TAM model, there were other significant factors and variables to be explored to determine a customer's satisfaction level towards OFD apps.

This research offers several future recommendations or areas of improvement for OFD app developers. Since apps contents and UI design is the most significant factor affecting students' satisfaction, the app developer must concentrate on improving on their app design and development by providing more attractive content and interactive UI. In order to capture high

app retention rate amongst college/university students, the app developer should further explore desired content and UI design preferences of this group of users. For future exploratory research, factors/criteria from ISO 9126-1, ISO 25010 standard or Jakob Nielsen's 10 general principles (Usability Heuristic), which focus more on product (software apps) quality characteristics, can be considered. By understanding the needs and expectations of the users, OFD apps developers would be able to take significant steps towards building an app that is sustainable and well-received by various groups of customers.

References

- Akhmadi, H., Alfathah, A.R. & Susanawati (2021). Generation Z consumer's preferences for online food ordering application: a study of Gofood and Grabfood. *E3S Web of Conferences*, 316, 01011. <https://doi.org/10.1051/e3sconf/202131601011>
- Amin, M., Rezaei, S. & Abolghasemi, M. (2014). User satisfaction with mobile websites: the impact of perceived usefulness (PU), perceived ease of use (PEOU) and trust. *Nankai Business Review International*, 5, 258 – 274. <https://doi.org/10.1108/NBRI-01-2014-0005>
- Andrew, J.V. & Tan, K.E. (2019). A model of factors influencing consumer's intention to use e-wallet system in Malaysia: A systematic review. *Malaysian Journal of Business and Economics (MJBE)*, 6(2), 53-53. <https://doi.org/10.51200/mjbe.v0i0.2172>
- Aryani, D., Singh, P., Khor, Y., Kee, D., Selvia, K., Lee, C., Lee, Y. & Anantharavoo, L. (2022). Factors influencing consumer behavioral intention to use food delivery services: A study of Foodpanda. *Journal of The Community Development in Asia*, 5(1), 69-79. <https://doi.org/10.32535/jcda.v5i1.1386>
- Badrinarayanan, V., Becerra, E.P., Kim, C.H. & Madhavaram, S. (2010). Transference and congruence effects on purchase intentions in online stores of multi-channel retailers: initial evidence from the U.S. and South Korea. *Journal of the Academy of Marketing Science*, 40(4), 539–557. <https://doi.org/10.1007/s11747-010-0239-9>
- Bhotvawala, M.A., Balihallimath, H., Bidichandani, N. & Khond, M.P., (2016). Growth of food tech: a comparative study of aggregator food delivery services in India. *Proceedings of the 2016 International Conference on Industrial Engineering and Operations Management*, Detroit, Michigan, USA, 140-149.
- Blut, M. (2016). E-service quality: development of a hierarchical model. *Journal of Retailing*, 92(4), 500–517. <https://doi.org/10.1016/j.jretai.2016.09.002>
- Bullen, P.B. (2013). How to choose a sample size (for the statistically challenged). Retrieved from: <https://tools4dev.org/resources/how-to-choose-a-sample-size/> Accessed 4 December 2022.
- Bunarunraksa, P. & Nuangjamnong, C. (2022). Factors affecting customer satisfaction with online food delivery application during the covid-19 outbreak in Bangkok: A case study of top three applications. *AU-HIU International Multidisciplinary Journal*, 2(2), 48–61. <https://repository.au.edu/handle/6623004553/25401>
- Chai L.T., & Yat D.N.C. (2019). Online food delivery services: making food delivery the new normal. *Journal of Marketing Advances and Practices*. 1(1), 62–77.
- Chakraborty, D. (2019). Customer satisfaction towards food service apps in Indian metro cities. *FIIB Business Review*, 8(3), 245-255. <https://doi.org/10.1177/2319714519844651>
- Chandon, P., Wansink, B. & Laurent, G. (2000). A benefit congruency framework of sales promotion effectiveness. *Journal of Marketing*, 64(4), 65-81. <https://doi.org/10.1509/jmkg.64.4.65.18071>
- Cheng, C.C., Chang, Y.Y. & Chen, C.T. (2021). Construction of a service quality scale for the online food delivery industry. *International Journal of Hospitality Management*, 95,

102938. <https://doi.org/10.1016/j.ijhm.2021.102938>
- Chinomona, R., Masinge, G. & Maxwell (2014). The influence of e-service quality on customer perceived value, customer satisfaction and loyalty in South Africa. *Mediterranean Journal of Social Sciences*, 5(9), 332–341. <https://doi.org/10.5901/mjss.2014.v5n9p331>
- Chopdar, P.Kr. & Sivakumar, V.J. (2018). Understanding psychological contract violation and its consequences on mobile shopping applications use in a developing country context. *Journal of Indian Business Research*, 10(2), 208-231. <https://doi.org/10.1108/JIBR-07-2017-0109>
- Cyr, D., Head, M., & Ivanov, A. (2006). Design aesthetics leading to m-loyalty in mobile commerce. *Inform. Manag.* 43 (8), 950–963. <https://doi.org/10.1016/j.im.2006.08.009>
- Curry, D. (2023). Food Delivery App Revenue and Usage Statistics (2023). Retrieved from: <https://www.businessofapps.com/data/food-delivery-app-market/> Accessed 6 February 2023.
- Davis, F., Bagozzi, R. & Warshaw, P. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*. 35(8), 982-1003. <https://doi.org/10.1287/mnsc.35.8.982>
- Doub, A., Levin, A., Heath, C., & LeVangie, K.(2015). Mobile app-etite: Consumer attitudes towards and use of mobile technology in the context of eating behavior. *Journal of Direct, Data and Digital Marketing Practice*. 17 (2), 114–129. <https://doi.org/10.1057/dddmp.2015.44>
- Eu, E.Z.R. & Sameeha, M.J. (2021). Consumers' perceptions of healthy food availability in online food delivery applications (ofd apps) and its association with food choices among public university students in Malaysia. *Frontiers in Nutrition*, 8, 674427. <https://doi.org/10.3389/fnut.2021.674427>
- Fakfare, P. (2021). Influence of service attributes of food delivery application on customers' satisfaction and their behavioural responses: The IPMA approach. *International Journal of Gastronomy and Food Science*, 25, 100392. <https://doi.org/10.1016/j.ijgfs.2021.100392>
- Ganatra, V., Kaakandikar, R., Izzuddin, M., Kee, D., Zainuddin, N., Bukhari, M., Nurhakim, M. & Panwar, V. (2021). The impact of food delivery apps on customer perceived value among university students. *Journal of the Community Development in Asia (JCDA)*, 4(3), 68-78. <https://doi.org/10.32535/jcda.v4i3.1182>
- Ghosh, R. & Saha, T.R. (2018). A study of e-payment system on food delivery industry: a case study on Swiggy. *International Journal on Recent Trends in Business and Tourism*, 2(3), 19–25.
- Goh, M.L., Tiep, H. & Ng, E. (2021). Customer satisfaction towards mobile food delivery apps during covid-19 pandemic. *Global Conference on Business and Social Sciences Proceeding*, 12, 58-58. [https://doi.org/10.35609/gcbssproceeding.2021.12\(58\)](https://doi.org/10.35609/gcbssproceeding.2021.12(58))
- Gupta, M. (2019). A study on impact of online food delivery app on restaurant business special reference to zomato and swiggy. *International Journal of Research and Analytical Reviews*, 6(1), 889–893.
- Gupta, A. (2022). Best business model for an online food delivery startup? Jumpstart. Retrieved from: <https://www.jumpstartmag.com/best-business-model-for-an-online-food-delivery-startup/> Accessed 14 November 2022.
- Mohamad, A.H., Hamzah, A.A., Ramli, R. & Fathullah, M. (2020). E-commerce beyond the pandemic coronavirus: Click and collect food ordering. *IOP Conference Series: Materials Science and Engineering*, 864 (1), 012049. <https://doi.org/10.1088/1757-899X/864/1/012049>
- Hussien, F.M. & Mansour, N.M. (2020). Factors affecting customer satisfaction towards

- mobile food ordering applications (MFOAs). *The Scientific Journal of the Faculty of Tourism and Hotels*, 17(1), 17–35.
<https://doi.org/10.21608/THALEXU.2020.27727.1008>
- Israel, D. J., & Velu, R. (2019). Consumer's intention to continuous use of mobile food delivery aggregator app. *Journal of Advanced Research in Dynamical and Control Systems*, 11(7), 119-128.
- Jun, K., Yoon, B., Lee, S. & Lee, D.S. (2021). Factors influencing customer decisions to use online food delivery service during the covid-19 pandemic. *Foods*, 11(1), 64.
<https://doi.org/10.3390/foods11010064>
- Kedah, Z., Ismail, Y., Haque, A., & Ahmed, S. (2015). Key success factors of online food ordering services: An empirical study. *Malaysian Management Review*, 50(2), 19–36.
- Koiri, S.K., Mukherjee, S. & Dutta, S. (2019). A study on determining the factors impacting consumer perception regarding the online food delivery apps in Guwahati. *GIS Business*, 14(6), 521–542.
- Kumar, V. (2020). Factors influencing customer satisfaction of online food delivery apps. *International Journal of Current Engineering and Scientific Research (IJCESR)*, 7(10), 10–20.
- Lahap, J., Azlan, R. I., Bahri, K. A., Said, N. M., Abdullah, D., & Zain, R. A. (2018). The effect of perceived waiting time on customer's satisfaction: a focus on fast food restaurant. *International Journal of Supply Chain Management*, 7(5), 259-266.
<https://doi.org/10.59160/ijscm.v7i5.2057>
- Libaque-Sáenz, C.F., Wong, S.F., Chang, Y. & Bravo, E.R. (2021). The effect of Fair information practices and data collection methods on privacy-related behaviors: A study of Mobile apps. *Information & Management*, 58(1), 103284.
<https://doi.org/10.1016/j.im.2020.103284>
- Lu, J., Wei, J., Yu, C. S., & Liu, C. (2017). How do post-usage factors and espoused cultural values impact mobile payment continuation?. *Behaviour & Information Technology*, 36(2), 140-164. <https://doi.org/10.1080/0144929X.2016.1208773>
- Nayan, N.M. & Hassan, M.K.A. (2020). Customer satisfaction evaluation for online food service delivery system in Malaysia. *J. Inf. Syst. Technol. Manag*, 5(9), 123-136.
<https://doi.org/10.35631/JISTM.5190010>
- Okumus, B., Ali, F., Bilgihan, A., & Ozturk, A. B. (2018). Psychological factors influencing customers: acceptance of smartphone diet apps when ordering food at restaurants. *International Journal of Hospitality Management*, 72, 67–77.
<https://doi.org/10.1016/j.ijhm.2018.01.001>
- Pallant, J. (2011). *SPSS survival manual: A step by step guide to data analysis using SPSS*. 4th edn. NSW: Allen and Unwin.
- Patra, S. & Mahensaria, K. (2022). A study on the spending pattern and preferred mode of payment regarding online food ordering service. *An International Bilingual Peer Reviewed Refereed Research Journal*, 10(40), 146–151.
- Pigatto, G., Machado, J.G. de C.F., Negreti, A. dos S. & Machado, L.M. (2017). Have you chosen your request? Analysis of online food delivery companies in Brazil. *British Food Journal*, 119(3), pp.639–657. <https://doi.org/10.1108/BFJ-05-2016-0207>
- Prasetyo, Y.T., Tanto, H., Mariyanto, M., Hanjaya, C., Young, M.N., Persada, S.F., Miraja, B.A. & Redi, A.A.N.P. (2021). Factors affecting customer satisfaction and loyalty in online food delivery service during the covid-19 pandemic: its relation with open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), p.76. <https://doi.org/10.20944/preprints202102.0359.v2>
- Perumal, I., Sugumaran, R., Ayyappan, P., Jayabalan, N., Nair, S. & Selladurai, S. (2021). The effects towards quality of online food delivery services during covid-19 pandemic in

- Malaysia. *Science International*, 33(6), 429–435.
- Rahman, A., Hasan, M. & Mia, M.A. (2017). Mobile banking service quality and customer satisfaction in Bangladesh: An analysis. *The Cost and Management*, 45(2), 25-32.
- Ray, A., Dhir, A., Bala, P.K. & Kaur, P. (2019). Why do people use food delivery apps (FDA)? A uses and gratification theory perspective. *Journal of Retailing and Consumer Services*, 51(51), 221–230. <https://doi.org/10.1016/j.jretconser.2019.05.025>
- Sheryl, E. K. (2011). Customer perceptions of electronic food ordering, *Cornell Hospitality Report*, 11(10), 6-15.
- Shodiq, A.F., Hidayatullah, S. & Ardianto, Y.T. (2018). Influence of design, information quality and customer services website on customer satisfaction. *International Journal of Scientific & Engineering Research*, 9(12), 746–750.
- Sinha, A.P., Srivastava, P., Asthana, A.K., Srivastava, S.K. & K. Nag, A. (2022). Customer satisfaction and loyalty for online food services provider in Jharkhand state - an empirical study. *International Journal of Customer Relationship Marketing and Management*, 13(1), 1-23. <https://doi.org/10.4018/IJCRMM.289204>
- Song, Y. E., Jeon, S. H. & Jeon, M. S. (2017). The effect of mobile food delivery application usage factors on customer satisfaction and intention to reuse. *Culinary Science & Hospitality Research*, 23(1), 37–47. <https://doi.org/10.20878/cshr.2017.23.1.005005005>
- Suhartanto, D., Helmi Ali, M., Tan, K.H., Sjahroeddin, F. & Kusdiby, L. (2018). Loyalty toward online food delivery service: the role of e-service quality and food quality. *Journal of Foodservice Business Research*, 22(1), 81–97. <https://doi.org/10.1080/15378020.2018.1546076>
- Sultan, M. U., & Uddin, M. N. (2011). Consumers' attitude towards online shopping: factors influencing Gotland consumers to shop. Master Thesis in Business Administration.
- Tan, H. & Kim, V.W.E. (2021). Examining the factors that Influence consumer satisfaction with online food delivery in Klang Valley, Malaysia. *The Journal of Management Theory and Practice (JMTP)*, 88-95. <https://doi.org/10.37231/jmtp.2021.2.2.115>
- Troise, C., O'Driscoll, A., Tani, M., & Prisco, A. (2020). Online food delivery services and behavioural intention – a test of an integrated TAM and TPB framework. *British Food Journal*, 123(2), 664-683. <https://doi.org/10.1108/BFJ-05-2020-0418>
- Wang, W. & Lai, Y. (2014). Examining the adoption of KMS in organizations from an integrated perspective of technology, individual, and organization. *Computers in Human Behavior*, 38 (1), 55–67. <https://doi.org/10.1016/j.chb.2014.05.013>
- Yeo, V. C. S., Goh, S.K., & Rezaei, S. (2017). Consumer experiences, attitude and behavioural intention toward online food delivery (OFD) services. *Journal of Retailing and Consumer Services*, 35, 150–162. <https://doi.org/10.1016/j.jretconser.2016.12.013>
- Yoopetch, C., Siriphan, P. & Chirapanda, S. (2022). Effects of Application Satisfaction, Promotions, Ease of Payment and Convenience on Intention to Repurchase Food Online. *Journal of Hunan University (Natural Sciences)*, 49(5), 70-79. <https://doi.org/10.55463/issn.1674-2974.49.5.9>
- Zeithaml, V.A., Parasuraman, A. & Malhotra, A. (2002). Service quality delivery through web sites: a critical review of extant knowledge. *Journal of the Academy of Marketing Science*, 30(4), 362–375. <https://doi.org/10.1177/009207002236911>
- Zhong, Y., Oh, S. & Moon, H.C. (2021). Service transformation under industry 4.0: investigating acceptance of facial recognition payment through an extended technology acceptance model. *Technology in Society*, 64, 101515. <https://doi.org/10.1016/j.techsoc.2020.101515>