



The Factors Affecting the Decision to Use Food Delivery Applications in Bangkok

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Abstract

This study combines exploratory research and quantitative research which aimed to determine the factors affecting the decision to use food delivery applications in Bangkok, consisting of personal factors, customer behavior regarding the use of food delivery applications, marketing mix factors, food delivery application service perceptions and acceptance. The researcher collected data using online questionnaires from 400 samples that have used food delivery applications in Bangkok, which were obtained by accidental sampling and analyzed by the multinomial logit model with four dependent variables: GrabFood (Reference Application), LINE MAN, foodpanda, and Gojek. The results, which were divided into three cases (LINE MAN, foodpanda, and Gojek), revealed that the factors affecting the decision to use food delivery applications in Bangkok at the statistical significance level of 0.10 were: 1) generation, status, income, discounts in the application, type of restaurant, and marketing mix in terms of the process for LINE MAN; 2) gender, status, income, frequency of using service, saving time in traveling, type of food, type of restaurant, and marketing mix in terms of physical evidence for foodpanda; and 3) status, payment method, time running the application, and marketing mix in terms of price for Gojek. According to this research, the entrepreneurs were able to apply the research findings to develop the applications and formulate strategies for consumer satisfaction.

Keywords: 1) Decision 2) Food Delivery Application 3) Multinomial Logit Model

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Introduction

The world has now fully entered the digital age. For reasons of convenience and speed, the internet has become an increasingly important part of daily life. In Thailand, Thai people used the internet for an average of 10 hours and 22 minutes per person in 2019, a 17-minute increase from the previous year, with online food delivery services being the most significantly changing internet usage activity, accounting for 15.1 percent. Moreover, it was discovered that Thai people have shifted more activities to the online system, such as booking hotel accommodations, communicating, paying for goods and services, and ordering food. In 2019, 79.5 percent of Thai people used online food ordering services, compared to 20.5 percent offline (Electronic Transaction Development Agency, 2020, pp. 42-44), while in 2018, the proportion of using online food ordering services was 69.1 percent, compared to 30.9 percent offline (Sedtheetorn, 2019, p. 1), reflecting the growing popularity of food delivery.

According to the growing popularity of food delivery, reflecting the ever-increasing market value of the food delivery business an average of 10 percent per year during 2014-2018, which is higher than the overall average restaurant business growth of only 3-4 percent per year and is expected to continue to grow. The market value of food delivery in Thailand is expected to reach 45.9 billion baht in 2022 by Euromonitor (Sedtheetorn, 2019, pp. 7-8), with competition from food delivery applications getting more and more involved in driving the food delivery business to continue to

expand. (Kasikorn Research Center, 2019)

Today's competition in the food delivery application market is intense because new entrepreneurs see an opportunity to profit in the food delivery market, which is steadily increasing, whereas existing entrepreneurs would like to maintain their own market share and aim to gain more market share because the greater the market share, the greater the chance of earning profits. As a result, the existing entrepreneurs have organized promotions to encourage consumers to use the food delivery application frequently. Furthermore, the situation of the COVID-19 virus epidemic and the government's measures to close businesses or temporarily limit business services, including leaving restaurants with only take-out channels and delivery to accommodation via applications, which has become an important channel for both restaurant operators and consumers, has raised awareness among the new entrepreneurs seeking to enter the market and existing entrepreneurs. As a result, competition in the food delivery application market has become more intense. (Musikacharoen, 2020) Although the situation with the COVID-19 epidemic has improved and the government has relaxed measures, the restaurant can now reopen as usual. However, use of the food delivery application is still higher than before the COVID-19 virus outbreak because consumers are accustomed to using the service, and because competition encourages the use of services from food delivery application operators.

Considering the food delivery application market by area, it was found that Bangkok has four major operators, including GrabFood,



LINEMAN, Foodpanda and Gojek (Office of Trade Competition Commission, 2020, p. 2), which cover all areas in just one province. In addition, Bangkok is the province with the most restaurants (71,207), is urbanized, has a fast-paced lifestyle and requires convenience. As a result, the entry of the food delivery application perfectly responds to the needs of Bangkok residents. Moreover, when compared to other regions of Thailand, it was discovered that Bangkok had the highest rate of online food ordering (Electronic Transaction Development Agency, 2020, p. 43).

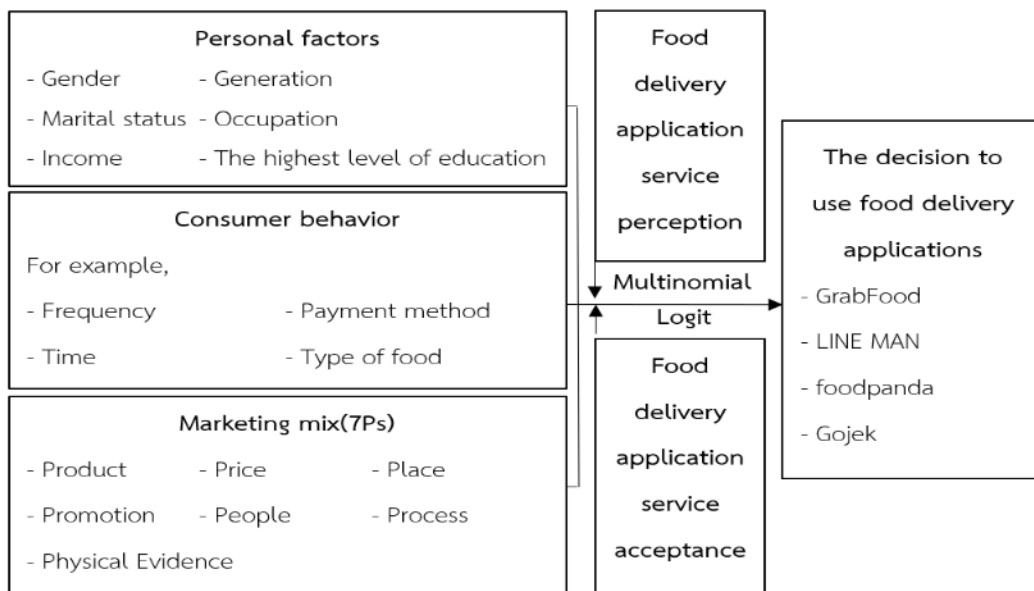
The four major food delivery application operators in the market have a significant economic market share, with GrabFood accounting for 54 percent of the market and one competitor app accounting for 21 percent (Bangkok Bank, 2020). As a result, small entrepreneurs who are already in business and new entrepreneurs who decide to enter the market are unable to generate sufficient profits and

are unable to compete with the market's four major operators. Although there are opportunities to compete, there are also obstacles in this regard. Therefore, the researcher has conducted a research study on the topic of the factors affecting the decision to use food delivery applications in Bangkok. The results of the research will benefit both existing food delivery application operators who are already in the market and new ones who want to compete in the market in terms of improving and developing applications to respond to the demands of consumers in order to help increase their competitiveness.

Objectives

The objective of this study is to determine the factors affecting the decision to use the food delivery application in Bangkok.

Conceptual Framework



Picture No. 1 Conceptual Framework

Related Concept and Theories

Personal factors

Personal factors such as age, gender, family size, family status, income, occupation, and education are commonly used as market segmentation criteria to help determine an effective target market. Furthermore, personal factor variables are easier to measure than other variables (Serirat, 2007, pp. 57-59)

Consumer behavior

Consumer behavior theory is the study of how consumers make purchasing decisions for goods and services to meet their needs and satisfy their satisfaction on a limited budget. These behaviors can be used by operators to predict how and when consumers will buy goods and services, as well as develop strategies (Gray, 2019).

Marketing mix (7Ps)

A "marketing mix" is a set of strategies or marketing activities that are created in response to consumer needs and clearly position goods and services in consumers' minds. In the sector, there are seven factors to consider: product factor, price factor, place factor, promotion factor, people factor, process factor, and physical evidence factor (Oxford College of Marketing, 2020).

Unified Theory of Acceptance and Use of Technology: UTAUT2

This theory describes the methods and behaviors of individuals and organizations accepting the use of technology by studying behaviors driven by behavioral intention, the factors influencing behavioral intention and/or behavioral use. It is made up of seven major components: Performance Expectancy (PE),

Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Price Value (PV), and Habit (H), as well as three complementary variables: Gender, Age, and Experience. The additional variables produced new correlations that influence behavioral intention and/or behavioral use (Chaveesuk and Vongjaturapat, 2013).

Logistic Regression Analysis

Logistic regression analysis is a statistical analysis technique used to find the relationship between independent and dependent variables, for which the dependent variable is a qualitative variable (Kaiyawan, 2012, pp. 2-7).

Logistic regression analysis is classified into two types:

1. Binary logistic regression analysis is used for dependent variables that can be classified into two groups (Dichotomous Variables) with two values, 0 and 1, such as group with events and group without events.

2. Multinomial logistic regression analysis is used for dependent variables that can be classified into more than 2 groups (Polychotomous Variable), such as groups with high, medium, and low service standards.

The objective of logistic regression analysis is to study which independent variables could describe the dependent variable and then use the calculated coefficients to create a logistic regression equation in order to predict the likelihood of the occurrence of dependent variables or interesting events in the future.

Conditions of preliminary analysis

1. The dependent variable is a discrete qualitative variable. In the case of binary

logistic regression analysis, two values are determined. In the case of multinomial logistic regression analysis, this is determined by the number of dependent variable groups.

2. Independent variables can be quantitative or qualitative. The independent variables' data characteristics must be on the interval scale or ratio scale, and if the variables are qualitative, they must be converted to a dummy variable (Dichotomous Variable) with values of 0 and 1.

3. The error value is either zero or uncorrelated.

4. There are no correlation or multicollinearity issues with independent variables.

Logistic regression equation

1. In Binary logistic regression analysis, the dependent variable (y) can only have two values: a group with events (y = 1) or a group without events (y = 0). As a result, the relationship between the independent variable (x) and the dependent variable (y) is not linear but has a curve similar to the S (Sigmoidal function) as shown in Picture No. 2 (Javatpoint, n.d.).

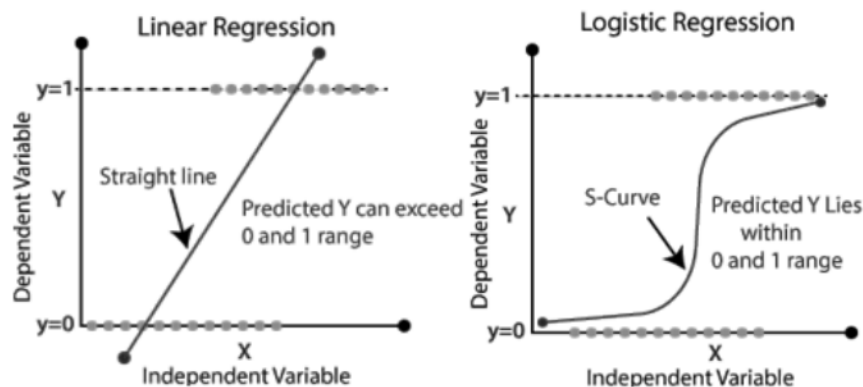
The Binary logistic regression analysis equation can be shown in linear form of logit term as follows:

$$\ln\left(\frac{P_y}{1-P_y}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n$$

2. In Multinomial logistic regression analysis, the dependent variable (y) has more than two values. The relationship between the independent variable (x) and the dependent variable (y) is a pairwise comparison with the base group, with the coefficient of the base variable equal to 0 as a reference variable in comparison to other groups. The number of comparative pairs or equations can be derived from the number of dependent variables (y) minus one. For example, in the case of a model with three dependent variables (y), namely A, B, and C, and with C as the base group, two logistic regression analysis equations are obtained in logit terms as follows:

$$\ln\left(\frac{P_{\text{Group A}}}{P_{\text{Group C}}}\right) = \beta_{A0} + \beta_{A1} X_1 + \beta_{A2} X_2 + \dots + \beta_{An} X_n$$

$$\ln\left(\frac{P_{\text{Group B}}}{P_{\text{Group C}}}\right) = \beta_{B0} + \beta_{B1} X_1 + \beta_{B2} X_2 + \dots + \beta_{Bn} X_n$$



Picture No. 2 Linear regression and Logistic regression

Verifying the suitability of the logistic regression equation

There are two popular methods for verifying the suitability of the logistic regression equations:

1. Feasibility Consideration (Likelihood Ratio Chi-square): This is based on a value less than zero, -2LL (-2 Log Likelihood). If the value is close to zero, the equation is appropriate. (If the value is zero, the equation is perfect.)

2. Consideration of predictive ability (Correctly Classified): The ability to predict is based on the proportion of correct predictions versus actual data.

Marginal Effect

The marginal effect is the measure of the effect of the change of each independent variable (x) on how much the likelihood of an event of interest is to occur for the dependent variable (y) while the other factors remain constant.

It is more important to consider the marginal effect than the regression coefficient when determining how a change in the independent variable (x) affects the dependent variable (y). Since the logistic regression equation is not a linear equation, the regression coefficient cannot be used to measure the effect. As a result, the marginal effect is used as a representative. The equation for calculating the marginal effect can be shown as follows:

$$\frac{\partial P_y}{\partial x_i} = \beta_i (P_y)(1-P_y)$$

It shows that when the independent variable (x_i) changes by one unit, the likelihood of an event of interest changes more or less, depending on the variable's coefficient (β_i) and

the degree of probability or chance of an event of interest (P_y), which is typically calculated as the mean of a set of independent variables (x). (Bodhisundara, 2018, p.21)

Methods

Population and sample

The population and sample are people who have used the food delivery application in Bangkok. Since the exact population is unknown, the Cochran formula (Cochran, 1977) at a 95% confidence level was used to determine the sample size. According to the calculations, the sample size was approximately 400 and the sampling was non-probability sampling, with the samples selected by haphazard or accidental sampling.

Research instrument

The research instrument is a questionnaire, which was developed in accordance with the conceptual framework and objectives of the study to collect data on decision-making behavior for using the food delivery application service in Bangkok. The questionnaire is divided into seven sections as follows:

Section 1: The questionnaire to verify whether or not respondents had used the food delivery application in Bangkok.

Section 2: The questionnaire about the respondents' personal factors

Section 3: The questionnaire about the decision-making behavior for using the food delivery application service in Bangkok

Section 4: The questionnaire about the level of importance of marketing mix factors in the decision to use the Food Delivery application in Bangkok, including product, price, place,



promotion, people, process and physical evidence, with a rating scale format divided into 5 levels according to the Likert Rating Scale

Section 5: The questionnaire with ten closed-ended questions about respondents' perceptions of using the food delivery application

Section 6: The questionnaire about the level of acceptance of the food delivery application, including acceptance of the application's convenience of use, acceptance of the application's performance, and acceptance of the application's security/reliability, with a rating scale format divided into 5 levels according to the Likert Rating Scale

Section 7: The questionnaire with opened-ended question about additional suggestions

Quality check of the research instrument

The questionnaire's reliability was tested by distributing it to 40 people who used the food delivery application and then analyzing the data collected from the questionnaire to determine its reliability by calculating Cronbach's Alpha Coefficient to test the uniformity of all research scales using the STATA statistical program. Cronbach's Alpha Coefficient values greater than 0.70 in each category were discovered to indicate that the questionnaire has an acceptable level of reliability.

Information and scope of research

The analysis of the factors affecting the decision to use food delivery applications in Bangkok is a quantitative research in the form of a survey. The data to be analyzed was primary data collected from surveys of 400 people who used the food delivery app in

Bangkok between January and February of 2021.

Data analysis

The factors affecting the decision to use food delivery applications in Bangkok were analyzed using a multinomial logit model, a regression analysis with discrete qualitative dependent variables that can be transformed into four values: GrabFood, LINE MAN, foodpanda, and Gojek. While independent variables are defined in a conceptual framework, which is based on personal factors, consumer behavior theory, marketing mix theory (7Ps) and unified theory of acceptance and use of technology (UTAUT2).

In addition, GrabFood was assigned to be a reference application. Thus, three multinomial logit models can be displayed as follows:

Model 1 : LINE MAN vs. GrabFood

$$\ln \left(\frac{P_{\text{LINEMAN}}}{P_{\text{GrabFood}}} \right) = \beta_{0L} + \beta_{1L} \text{Gender} + \sum_{Li} \beta_{2Li} \text{Generation}_i + \sum_{Lj} \beta_{3Lj} \text{Status}_j + \beta_{4L} \text{Occ} + \sum_{Lk} \beta_{5Lk} \text{Income}_k + \sum_{Li} \beta_{6Li} \text{Frequency}_i + \beta_{7L} \text{Obj1} + \beta_{8L} \text{Obj2} + \beta_{9L} \text{Payment} + \sum_{Lm} \beta_{10Lm} \text{Food}_m + \beta_{11L} \text{Restaurant} + \beta_{12L} \text{Time} + \beta_{13L} \text{Product} + \beta_{14L} \text{Price} + \beta_{15L} \text{Place} + \beta_{16L} \text{Promotion} + \beta_{17L} \text{People} + \beta_{18L} \text{Process} + \beta_{19L} \text{Physical} + \beta_{20L} \text{Perception} + \beta_{21L} \text{Acceptance} + \epsilon_n$$

Model 2 : foodpanda vs. GrabFood

$$\ln \left(\frac{P_{\text{Foodpanda}}}{P_{\text{GrabFood}}} \right) = \beta_{0F} + \beta_{1F} \text{Gender} + \sum_{Fi} \beta_{2Fi} \text{Generation}_i + \sum_{Fj} \beta_{3Fj} \text{Status}_j + \beta_{4F} \text{Occ} + \sum_{Fk} \beta_{5Fk} \text{Income}_k + \sum_{Fi} \beta_{6Fi} \text{Frequency}_i + \beta_{7F} \text{Obj1} + \beta_{8F} \text{Obj2} + \beta_{9F} \text{Payment} + \sum_{Fm} \beta_{10Fm} \text{Food}_m + \beta_{11F} \text{Restaurant} + \beta_{12F} \text{Time} + \beta_{13F} \text{Product} + \beta_{14F} \text{Price} + \beta_{15F} \text{Place} + \beta_{16F} \text{Promotion} + \beta_{17F} \text{People} + \beta_{18F} \text{Process} + \beta_{19F} \text{Physical} + \beta_{20F} \text{Perception} + \beta_{21F} \text{Acceptance} + \epsilon_n$$

Model 3: Gojek vs. GrabFood

$$\ln\left(\frac{P_{Gojek}}{P_{GrabFood}}\right) = \beta_{0G} + \beta_{1G} \text{Gender} + \sum_{Gi} \beta_{2Gi} \text{Generation}_i + \sum_{Gj} \beta_{3Gj} \text{Status}_j + \beta_{4G} \text{Occ} + \sum_{Gk} \beta_{5Gk} \text{Income}_k + \sum_{G1} \beta_{6G1} \text{Frequency}_1 + \beta_{7G} \text{Obj1} + \beta_{8G} \text{Obj2} + \beta_{9G} \text{Payment} + \sum_{Gm} \beta_{10Gm} \text{Food}_m + \beta_{11G} \text{Restaurant} + \beta_{12G} \text{Time} + \beta_{13G} \text{Product} + \beta_{14G} \text{Price} + \beta_{15G} \text{Place} + \beta_{16G} \text{Promotion} + \beta_{17G} \text{People} + \beta_{18G} \text{Process} + \beta_{19G} \text{Physical} + \beta_{20G} \text{Perception} + \beta_{21G} \text{Acceptance} + \epsilon_n$$

The variables used in the study of factors affecting the decision to use food delivery applications in Bangkok were defined as follows:

Table No. 1 Description of variables

Variable	Description	Note
P	Prob (Y=1) The probability that a respondent will use that food delivery application	
Y	Deciding to use food delivery application including GrabFood, LINE MAN, foodpanda, and Gojek	
Gender	Gender	= 1, female 0, male
Generation _i	Generation i = 1,2,3	(Base Group = Generation Y or born between 1980 and 1997) Generation ₁ = 1, Generation Z or born after 1997 0, otherwise Generation ₂ = 1, Generation X or born between 1965 and 1979 0, otherwise Generation ₃ = 1, Baby Boomer or born between 1946 and 1964 0, otherwise
Status _j	Marital status j = 1,2	(Base Group = single) Status ₁ = 1, married 0, otherwise Status ₂ = 1, widowed/divorced 0, otherwise
Occ	Occupation	Occ = 1, private company worker = 0, otherwise



Variable	Description	Note
Income _k k = 1,2	Income	(Base Group = not more than 15,000 baht) Income ₁ = 1, 15,001–60,000 baht 0, otherwise Income ₂ = 1, 60,001 baht or more 0, otherwise
Frequency _l l = 1,2	Frequency of using the food delivery application	(Base Group = less than 1-2 times per month) Frequency ₁ = 1, 1-4 times per month 0, otherwise Frequency ₂ = 1, more than 4 times per month 0, otherwise
Obj1	The objective of using the food ordering service through the food delivery application is to save time traveling.	According to the 1–5 level of opinion
Obj2	The objective of using the food ordering service through the food delivery application is to take advantage of the discount in the application.	According to the 1–5 level of opinion
Payment	Payment method	= 1, cash 0, non-cash
Food _m m = 1,2	Type of food	(Base Group = food) Food ₁ = 1, dessert 0, otherwise Food ₂ = 1, beverage 0, otherwise
Restaurant	Type of restaurant	= 1, well-known brand restaurant 0, local brand restaurant
Time	Time interval for using the service	= 1, 6.01 to 18.00 0, 18.01 to 6.00
Product	The total average of marketing mix in a product category	According to the 1–5 level of importance
Price	The total average of marketing mix in a price category	According to the 1–5 level of importance
Place	The total average of marketing mix in a place category	According to the 1–5 level of importance
Promotion	The total average of marketing mix in a promotion category	According to the 1–5 level of importance

Variable	Description	Note
People	The total average of marketing mix in a people category	According to the 1–5 level of importance
Process	The total average of marketing mix in a process category	According to the 1–5 level of importance
Physical	The total average of marketing mix in a physical category	According to the 1–5 level of importance
Perception	The overall perception score for the food delivery application service	= 1, if the overall perception score is between 5 and 10 points 0, if the overall perception score is between 0 and 4 points
Acceptance	Acceptance of the application's convenience of use	According to the 1–5 level of opinion
ϵ_n	Error term n = 1,2,3	ϵ_1 is the LINE MAN model's error term ϵ_2 is the foodpanda model's error term ϵ_3 is the Gojek model's error term

Results

Based on a study of 400 people who had used the food delivery application in Bangkok, the preliminary data of the sample can be shown as follows: Personal factors 1) Gender: 30.50% male and 69.50% female 2) Generation: 27.75% Generation Z, 51.75% Generation Y, 13.25% Generation X and 7.25% Baby Boomer 3) Marital status: 78.75% single, 19.00% married and 2.25% widowed/ divorced 4) Occupation: 41.25% private company worker and 58.75% non-private company worker 5) Income: 28.75% not more than 15,000 baht, 51.00% 15,001-60,000 baht and 60,001 baht or more Behavioral factors 1) Frequency of using the food delivery application: 14.00% less than 1-2 times per month, 49.50% 1-4 times

per month and 36.50% more than 4 times per month 2) Payment method: 62.25% cash and 37.75% non-cash 3) Type of food: 83.00% food, 7.25% dessert and 9.75% beverage 4) Type of restaurant: 47.00% local brand restaurant and 53.00% well-known brand restaurant 5) Time interval for using the service: 73.75% 06.01-18.00 and 26.25% 18.01-06.00 6) The most frequently used food delivery application: 57.00% GrabFood, 23.00% LINE MAN, 17.25% foodpanda and 2.75% Gojek

The following are the results of an analysis of the factors affecting the decision to use food delivery applications in Bangkok using a multinomial logit model:



Table No. 2 The results of the multinomial logit model analysis

Variable	LINE MAN		foodpanda		Gojek	
	Marginal Effect (dy/dx)	Z-Stat	Marginal Effect (dy/dx)	Z-Stat	Marginal Effect (dy/dx)	Z-Stat
Gender (Female)	0.0205	-0.15	-0.1073*	-2.47	0.0002	0.51
Generation						
Generation Y	(Base Group)					
Generation Z	0.1587*	1.73	0.0098	0.61	-0.0003	-0.52
Generation X	-0.1423*	-2.09	-0.0181	-0.56	0.0003	0.34
Baby Boomer	-0.1611*	-1.92	-0.0601	-0.98	-0.0009	-0.02
Marital status						
Single	(Base Group)					
Married	0.1833*	2.78	0.0894*	1.87	-0.0002	-0.32
Widowed/Divorced	-0.0300	0.39	0.3211*	1.69	0.0065*	1.97
Occupation (Private company worker)	-0.0103	-0.41	-0.0455	-1.05	-0.0002	-0.73
Income						
≤ 15,000 baht	(Base Group)					
15,001–60,000 baht	0.1754*	1.73	-0.0962	-1.04	-0.0003	-0.52
≥ 60,001 baht or more	0.3010*	2.03	-0.1578*	-2.15	-0.0001	-0.13
Frequency						
< 1–2 times/month	(Base Group)					
1–4 times/month	0.0691	0.88	-0.0178	-0.12	-0.0003	-0.90
≥ 4 times/month	0.0434	0.20	-0.1064*	-1.91	-0.00005	-0.22
Objective of using service						
to save time traveling	-0.0219	-0.07	0.0736*	2.12	-0.0002	-0.91
to take advantage of the discount in the application	-0.0631*	-2.16	0.0376	1.24	0.0001	0.93
Payment (cash)	0.0701	1.35	-0.0180	-0.15	0.0004*	1.80
Type of food						
Food	(Base Group)					
Dessert	-0.0048	0.61	0.1984*	2.28	-0.0008	-0.02
Beverage	-0.0366	0.28	0.2149*	2.61	0.0009	1.42

Variable	LINE MAN		foodpanda		Gojek	
	Marginal Effect (dy/dx)	Z-Stat	Marginal Effect (dy/dx)	Z-Stat	Marginal Effect (dy/dx)	Z-Stat
Type of restaurant (well-known brand)	-0.0516*	-1.70	-0.1075*	-2.99	0.00004	-0.13
Time interval for using the service (06.01-18.00)	-0.0595	-1.25	-0.0249	-0.86	-0.0015*	-2.53
Marketing mix (7Ps)						
The total average in a product category	0.0223	0.54	0.0286	0.72	0.00004	0.23
The total average in a price category	-0.0247	-0.53	0.0006	-0.10	0.0008*	1.89
The total average in a place category	-0.0697	-0.98	0.0347	0.44	0.0002	0.54
The total average in a promotion category	0.0789	1.55	-0.0100	0.10	-0.0001	-0.17
The total average in a people category	-0.0405	-0.62	0.0127	0.12	-0.0004	-1.46
The total average in a process category	0.1217*	1.72	-0.0430	-0.45	-0.0001	-0.24
The total average in a physical evidence category	-0.0273	-0.92	-0.0665*	-1.81	-0.0001	-0.60
Food delivery application service perception						
The overall score	-0.1142	-0.87	0.0936	1.27	0.0005	0.01
Food delivery application service acceptance						
Convenience of use	-0.0374	-0.82	0.0091	0.07	0.0003	1.09
LR Chi2 = 136.86 Prob > chi2 = 0.0001 Overall Percentage Correct = 61.25%						

Note: 1) A statistically significant level of 0.10 is denoted by an asterisk (*).

2) GrabFood is identified as a reference application in the model.

According to the study results in Table No. 2, the LR Chi-Square = 136.86 and Prob Chi2 = 0.0001, implying that the overall model was able to explain the factors affecting the decision to use food delivery applications in Bangkok with a statistical significance at the 0.10 level. In addition, when considering Overall Percentage Correct = 61.25 percent, it can

be explained that this model can predict the decision to use food delivery applications in Bangkok in four cases, including GrabFood, LINE MAN, Foodpanda, and Gojek, which correctly accounted for 61.25 percent.

According to the results of the multinomial logit model estimation, it was found that the factors that could be explained as



affecting the decision to use the food delivery application in Bangkok have a statistically significant level of 0.10. They can be divided into 3 cases as follows:

Case 1: LINEMAN vs. GrabFood

Positive impact factors include Generation Z, married status, income 15,001 - 60,000 baht, 60,001 baht or more and marketing mix factors in a process category. Whereas, negative impact factors include Generation X, Baby Boomer, objective of using service to take advantage of the discount in the application and well-known brand restaurant.

Case 2: Foodpanda vs. GrabFood

Positive impact factors include married status, widowed/divorced status, objective of using service to save time traveling, dessert and beverage. Whereas, negative impact factors include female, income 60,001 baht or more, frequency of using service more than 4 times per month, well-known brand restaurant marketing mix factors in a physical evidence category.

Case 3: Gojek vs. GrabFood

Positive impact factors include widowed/divorced status, cash payment method and marketing mix factors in a price category. Whereas, negative impact factors include time interval for using the service, 06.01-18.00.

Conclusion and Discussion

The study discovered that the majority of 400 samples who had used the food delivery application in Bangkok were female, Generation Y, single, private company employees, making an income of 15,001–60,000 baht, using the service 1-4 times a month, paying in

cash, preferring to order food, most commonly ordering food from famous brand restaurants, using the service between 06.01 and 18.00, and using the GrabFood application most frequently.

According to an estimable multinomial logit model, it can be used to discuss the results in conjunction with the marginal effect, which allows us to identify the magnitude of the effect caused by various factors. The key findings from the study are as follows:

1) In the case of comparing applications between LINEMAN and GrabFood, it was found that generation affects the decision to use the LINEMAN application in Bangkok at a 0.10 statistical significance level. Users in Generation Z are 15.87 percent more likely to use the LINEMAN application than users in Generation Y. In Generation X and Baby Boomers, the probability of using LINEMAN is 14.23 percent and 16.11 percent less than those in Generation Y, respectively. This is due to the fact that the younger generation has greater access to technology than the older generation. According to the concept of generations and behavioral characteristics, Generation Z users are more likely than other age groups to use the food delivery app. It is said that Generation Z people were born with a well-rounded upbringing during a time of modern and widespread technology, allowing them to use technology and enjoy convenience.

2) In the case of comparing applications between LINEMAN and GrabFood, it was found that the objective of using the food ordering service through the food delivery application affects the decision to use the

LINEMAN application in Bangkok at a 0.10 statistical significance level. Users who agree to the objective of using the discount in the application are less likely to use the service. This reflects the fact that the discount in the LINEMAN application builds less of a motivation to use the service, which is consistent with Natruja Phongsupat's study (Phongsupat, 2018, p. 86), which discovered that the majority of the sample's opinion level on the reasons for choosing food application services was classified by application. In terms of frequent use of the app due to attractive promotions, both LINEMAN and GrabFood averaged at the agreed level. However, the number of samples who agree that they use the app frequently because of appealing promotions is higher among GrabFood regular users than among LINE MAN regular users.

3) In the case of comparing applications between Foodpanda and GrabFood, it was found that income affects the decision to use the Foodpanda application in Bangkok at a 0.10 statistical significance level. Users with an income of 60,001 baht or more are 15.78 percent less likely to use the foodpanda application than users with an income of less than 15,000 baht. This contrasts with Potchara Suthanathan's study (Suthanathan, 2014, pp. 63-64), which discovered that income was not correlated with the first 3G mobile service operators that come to mind (AIS, DTAC, True-move H and etc.).

4) In the case of comparing applications between Foodpanda and GrabFood, it was found that the marketing mix in a physical evidence category affects the decision to use

the Foodpanda application in Bangkok at a 0.10 statistical significance level. Users who attend to the application's aesthetics, food illustrations, and news updates have less probability of using the service. This reflects the fact that foodpanda has decorated the application and food illustrations in a way that does not appeal to users, as well as a lack of consistency in updating various information. This is consistent with the study by Walittha Kieniam and Surasvadee Rajkulchai (2019, p. 1409), which discovered that the marketing mix in a physical evidence category influences the online food ordering behavior of consumers in Bangkok.

5) In the case of comparing applications between Gojek and GrabFood, it was found that payment method affects the decision to use the Gojek application in Bangkok at a 0.10 statistical significance level. Users who prefer cash payments are 0.40 percent more likely than users who prefer other payment methods to use Gojek. Because cash on delivery will help build confidence and trust in merchants who sell products or services to consumers through online channels. This is consistent with Pimpumpaka Buntanapeerat's study (Buntanapeerat, 2017, p. 63), which discovered that payment method factors affect the decisions to use food delivery service.

6) In the case of comparing applications between Gojek and GrabFood, it was found that the marketing mix in a price category affects the decision to use the Gojek application in Bangkok at a 0.10 statistical significance level. Users who value the suitability of food prices, delivery rates and price clarity have a higher probability of using the service. This



reflects Gojek's affordable delivery charges, reasonable food prices, and clearly displayed prices, which is consistent with Natruja Phongsupat's study (Phongsupat, 2018, p. 111), which discovered that the price factor positively affects attitudes in choosing food application services.

Suggestions

General suggestions

1. Older consumers are less likely to use the food delivery application. Entrepreneurs should find ways to communicate with consumers in order to get a better understanding and acceptance of the use of the food delivery application service in order to expand their customer base, ultimately leading to the trial and re-use of the service.

2. The study's findings revealed the factors affecting the decision to use food delivery applications in Bangkok, including those affecting the strengths of each application and which factors determine which applications outperform GrabFood as a reference application. When considering the marketing mix, it was discovered that when comparing LINE MAN, Foodpanda, Gojek, and GrabFood in pairs, the negative impact factor (Marginal Effect is less than zero) indicates that GrabFood has superior strength, whereas the positive effect factor (Marginal Effect greater than zero) means the opposite. As a result, entrepreneurs can use the study's findings to develop strategies based on applications with outstanding abilities in that field as a role model. At a statistical significance level of 0.10, the following factors can be explained as affecting the

decision to use food delivery applications in Bangkok:

- 1) In the case of comparing between LINEMAN and GrabFood in terms of marketing mix factors in a process category, it was discovered to be a positive impact factor, indicating that LINEMAN has process strengths over GrabFood. Therefore, entrepreneurs who would like to develop their process factors should consider LINE MAN as a role model.

- 2) In the case of comparing between foodpanda and GrabFood in terms of marketing mix factors in a physical evidence category, it was discovered to be a negative impact factor, indicating that GrabFood has physical evidence strength over foodpanda. Therefore, entrepreneurs who would like to develop their physical evidence factors should consider GrabFood as a role model.

- 3) In the case of comparing between Gojek and GrabFood in terms of marketing mix factors in a price category, it was discovered to be a positive impact factor, indicating that Gojek has price strength over GrabFood. Therefore, entrepreneurs who would like to develop their price factors should consider Gojek as a role model.

Suggestions for future research

1. Consider emerging applications such as Robinhood in analytics to make the study results more accurate and precise.

2. Extend the study area to other provinces, and then compare the results of the study with the results of the study in Bangkok to consider whether they are similar or different for the benefits of strategy formulation.

3. Consider conducting additional data studies using qualitative research methods with data collected from all stakeholders, including consumers, entrepreneurs, academics, and government representatives, to ensure that the data analyzed is more accurate and reliable.

4. The environmental friendliness factor should be taken into account. A study

performed by Chanchira Chatrawanit and Prasobchai Pasunon (Chatrawanitch and Pasunon, 2020, p. 105) found that environmental friendliness was the most important factor affecting food purchasing decisions compared to other factors: food safety, service quality and marketing promotion.

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