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Exploring the Nexus of Entrepreneurship, Sustainability, and Digital Innovation: Understanding Factors Influencing International Students' Behavioural Intentions towards Online Food Delivery Apps in Post-COVID Bangkok

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Abstract

Purpose: The purpose of this study is to analyze the significant influence of performance expectancy, effort expectancy, social influence, and behavioral intention toward online food delivery applications. **Design/Methodology/Approach**: The researcher employed primary and secondary data collection methods to analyze factors influencing behavioral intentions toward using online food delivery applications. The data was collected among 398 respondents studying at a Thai university located in Bangkok. This research used theoretical frameworks from previous studies to construct a new conceptual framework. **Findings**: This research is intended to investigate factors influencing behavioral intentions to use online food delivery applications. This research indicated that performance expectancy, effort expectancy, and social influence have a significant influence on behavioral intention toward using online food delivery applications. Moreover, behavioral intention is also directly influenced by using online food delivery applications. **Research Limitations/Implications**: The limitations of the research revealed several factors influencing online food delivery applications used by individual international students in Bangkok. The scope of this study focused only on the intentions of international students who are studying in Bangkok. Moreover, this research focused on the international students in Bangkok, so it might not apply to different nations. However, personal preference factors would have different consideration points toward their decision to use online food delivery applications.

Keywords: Performance Expectancy, Effort Expectancy, Social Influence, Behavioral Intention, Use Delivery Application Behavior

JEL Classification Code: M16, M31, M14, M19

1. Introduction

This study aims to explore the relevant factors that affect the behavioral intentions of international students in Bangkok to use online food delivery apps after COVID-19. In today's development context, more consumers are choosing to adopt a more convenient lifestyle, and the rise of online food delivery applications has confirmed the changes in people's

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lifestyles. After COVID-19, online food delivery apps continued to grow, reflecting recognition and love for their performance and functionality. Choose food to dine on and enjoy delicious food without leaving home, entering consumers' lifestyles.

In almost ten years, more consumers have been willing to choose online food ordering and takeout services, benefiting from their convenience and speed. This is largely due to the popularity of mobile phones and apps, which have contributed to the development of the food delivery industry and its popularity around the world (Roh & Park, 2018). The growth rate of online delivery systems is 9.3% per year. Klein (2019) predicts that the market size of online delivery systems will approach US$134.49 billion by 2023. This can also be proven by the fact that more research investigators this year have focused on studying consumers' perceptions, attitudes, and usage of food delivery apps (Abed, 2023; Allah Pitchay et al., 2022; Lee et al., 2019; Palau-Saumell et al., 2019; Puriwat & Tripopsakul, 2021; Roh & Park, 2018). It is worth mentioning that the 2019 coronavirus disease (COVID-19) pandemic has played a role in changing the operating model of the food service industry, directly or indirectly promoting the new trend of maintaining social distance in food consumption (Kim et al., 2021).

In recent years, the number of people participating in the digital industry has been increasing rapidly due to the increased use of technology. The changes in the food service industry are evident. The rise and use of food delivery applications have undoubtedly opened up a new competitive situation in the highly competitive food market. We see food service companies increasingly relying on technology as a source of information, a marketing tool, and a medium of use. The use of online food delivery applications has become an integral part of the food industry in today's world. Food delivery mobile applications are more popular because they make life more convenient. The Bangkok food delivery market also shows widespread use of online food delivery applications. The main players are Grab, Panda Food, Lineman, and Shopee Food, as well as other software. We aim to explore the relevant factors that influence the behavioral intention of international students in Bangkok to use online food delivery applications, focusing on the consumer usage behavior of these apps.

1.1 Problem statements

The global Internet usage rate is growing rapidly, which has effectively catalyzed the transformation of consumers from the traditional consumption environment and marketing environment to a consumption form that is more suitable for the development of the Internet in today's era (Troise et al., 2020). Since the Internet penetration in Thailand has become wider and wider, Thailand's Internet penetration rate has also shown a steady and rapid upward trend. Behind this, we found that to provide convenience and save cost and time, many consumers like to search for information through the Internet and will choose to order online food via an application.

Currently, the rise of mobile food delivery programs is in line with consumer habits. Consumers can simply use their smartphones to download and use mobile applications for online food delivery. These applications' function is to browse the menu contents of various restaurants online, add preferred foods to the bill, and purchase them directly. A new type of channel without any actual contact or interaction with the restaurant (Dirsehan & Cankat, 2021). In addition, those platforms have been anticipated to steadily increase over the past few years during COVID-19. The market's total value amounted to 26 billion baht in 2017 (Jitsoonthornchaikul, 2022).

Therefore, the utilization of online food delivery applications in Thailand is still in a positive state and steadily increasing after COVID-19. Online food delivery applications should be in line with consumer usage preferences and actively study influencing factors. Taking a sample of international students in Bangkok as an example, we actively explore the factors that influence the behavior of this group of

consumers during use. This study aims to identify the factors that influence the behavioral intention of international students in Bangkok to use online food delivery. This information will guide the development and use of food delivery software in the post-pandemic period, further demonstrating the industry's booming development. As a result, it aims to investigate the factors influencing the behavioral intention to use online food delivery applications among international students in Bangkok after COVID-19. This study employed a questionnaire survey as a methodology to test the hypotheses.

1.2 Objectives of study

(1) To investigate the impact of performance expectancy on the behavioral intention to use online food delivery applications among international students in Bangkok.

(2) To examine the effect of effort expectancy on the behavioral intention to use online food delivery applications among international students in Bangkok.

(3) To explore the influence of social influence on the behavioral intention to use online food delivery applications among international students in Bangkok.

(4) To assess the relationship between behavioral intention and the actual usage of food delivery applications among international students in Bangkok.

1.3 Research questions

(1) Does performance expectancy influence the behavioral intention to use online food delivery applications among international students in Bangkok after COVID-19?

(2) Does the effect of effort expectancy on the behavioral intention to use online food delivery applications among international students in Bangkok after COVID-19?

(3) Does social influence impact the behavioral intention to use online food delivery applications among international students in Bangkok after COVID-19?

(4) Is there a significant relationship between behavioral intention and the actual usage of food delivery applications among international students in Bangkok after COVID-19?

1.4 Significance of the study

The rapid expansion of internet-based food delivery services has captured the attention of consumers. The proliferation of delivery platforms catering to both restaurants and customers exemplifies this trend. From January 2019 to January 2020, Google search results for online meal delivery keywords tripled, indicating a significant surge in demand (Thailand, 2020). Whether attributed to internet growth or the rise in takeaway transactions, this reflects a gradual increase in consumers' usage of online meal delivery apps and market demand. Consumer preferences have a significant impact on food delivery, driven by their intention to order online. Smartphone-based food delivery is on the rise. Consumers can shop online and have items delivered to their homes without leaving their premises. This convenience mirrors consumer behavior patterns (Jitsoonthornchaikul, 2022). Notable delivery platforms in Thailand include Grab, Panda Food, Lineman, Shopee Food, Robinhood, and Gokoo. Consumers, accustomed to purchasing food online through apps or websites, expect a seamless dining experience from restaurants. As smartphone apps gain popularity on internet platforms, restaurant meals are delivered to homes, and customer preferences for online dining are gaining global attention (Hirschberg et al., 2016). This study explores how international students in Bangkok perceive internet-based meal delivery. It offers insights and survey findings on the determinants of online dining to assist related sectors in understanding consumers' intentions to use online meal delivery apps.

During the COVID-19 outbreak, most nations advised citizens to stay indoors and avoid social contact. Businesses relied on technology to communicate with customers during this period. Even after the pandemic, people continued to utilize online food delivery apps, indicating ongoing market needs. Therefore, this study investigates the factors influencing consumers' post-pandemic usage of online food delivery. It can help foreign students in Bangkok explore and advance online meal delivery. This research can assist catering firms and online meal delivery apps in evaluating consumer behavior throughout their usage. Given the diverse needs of clients in the service sector, understanding the industry's pros and cons is crucial to enabling timely updates and improvements to meet target needs effectively. Thus, this study can inform future research on international students' behavioral intentions in Bangkok when using online food delivery apps, including performance expectancy, effort expectancy, social influence, behavioral intention, and other pertinent factors. After COVID-19, international students in Bangkok utilized online meal delivery apps. This study delves into the reasons behind this behavior. The findings may aid the Internet food delivery industry in developing marketing strategies and boosting consumer usage and investment post-pandemic.

2. Literature Review

2.1 Performance expectancy and Behavioral intention

Performance expectancy refers to the degree of use of technologies that will assist customers in enhancing or improving their job performance (Venkatesh et al., 2003). Davis (1989) relates it to the perceived usefulness of Total Activity Management (TAM). While many have concentrated on functional performance, various studies have shown that the enjoyable aspects of using technology are significant. These aspects are expected to be experienced through the joy of communicating with others via mobile shopping services or engaging with the diverse functions and features of mobile shopping services (Yang, 2010).

Performance expectancy is considered the strong predictive factor for behavioral intention (Lee et al., 2019; Venkatesh et al., 2003), particularly in online food delivery applications (Abed, 2023; Lee et al., 2019; Ramos, 2022). Customers are more likely to use new technologies if they consider them useful, as they increase productivity and help accomplish tasks more quickly in their daily lives (Abed, 2023; Dowpiset & Nuangjamnong, 2021). Previous studies have determined positive results regarding the relationship between Performance expectancy and Behavioral intention using online food ordering applications after COVID-19 (Abed, 2023; Puriwat & Tripopsakul, 2021). Therefore, this hypothesis was developed.

***Hypothesis 1 (H1)**: There is a significant influence of performance expectancy effect on behavioral intention throughout using food delivery application behavior.*

2.2 Effort expectancy and Behavioral intention

Effort expectancy is defined as "the degree of convenience experienced by using technologies" (Venkatesh et al., 2003; Wang et al., 2022). It is related to the perceived ease of use in TAM (Davis, 1989). It is expected to play a significant role during the initial stages of adoption when customers believe that using the technology is free of effort. However, it will become nonsignificant at a later stage (Davis, 1989).

Effort expectancy is a significant predictive factor for customer's intention to continue using Web-based learning, food delivery applications, and mobile application (Chiu & Wang, 2008; Kang, 2014; Okumus et al., 2018; Ramos, 2022; Nuangjamnong &

Maj, 2022). When users don't find new technologies difficult to use or understand and when users don't need to put effort into learning technologies, users tend to have an intention to adopt those technologies (Curtis et al., 2010). Previous studies have found that Effort expectancy significantly impacts behavioral intention on using online food ordering applications after COVID-19 in Thailand (Puriwat & Tripopsakul, 2021). Therefore, this hypothesis was developed.

***Hypothesis 2 (H2)**: There is a significant influence of effort expectancy effect on behavioral intention throughout using food delivery application behavior.*

2.3 Social influence and Behavioral intention

Social influence is defined as "the degree to which a customer perceives the opinions of other people in social situations to shape their behavior when using technologies" (Ajzen, 1991; Venkatesh et al., 2003; Wang et al., 2022). However, TAM (Davis, 1989) did not include any factor related to social influence. Customers' decisions to use technologies or purchase products may include their behaviors, attitudes, beliefs, or other opinions from individuals who have similar experiences, roles, and interests, or someone essential, such as family members, friends, colleagues, and supervisors (Gunawan et al., 2023).

Social influence is a positive predictor that affects customer intention to use mobile advertising, mobile payment, mobile shopping, mobile application, and new technologies (Abed, 2023; Palau-Saumell et al., 2019; Venkatesh et al., 2012; Yang, 2007; Yang, 2010; Zhu et al., 2017) However, in terms of online food ordering applications, previous studies have shown the positive effects on behavioral intention resulting from the adoption of new technologies influenced by family, close friends, colleagues or other important individuals during COVID-19 (Allah Pitchay et al., 2022; Puriwat & Tripopsakul, 2021). Accordingly, the following hypothesis was formulated.

***Hypothesis 3 (H3)**: There is a significant influence of social influence effect on behavioral intention throughout using food delivery application behavior.*

2. 4 Behavioral intention and using food delivery application behavior

Behavioral intention measures the customer's probability of wanting to engage in a specific behavior in the future and is commonly used to forecast or explain actual behavior (Venkatesh et al., 2003; Wang et al., 2022). In addition, the researchers defined BI as "the intensity of a person's spontaneous plan to engage in a certain behavior" (Harrison et al., 1997). Moreover, intentions reflect the level of effort people are willing to exert and the level of exertion they intend to put forth in order to perform the behavior (Ajzen, 1991). It has been argued that an individual's intentions to continue to use the technology platform could be similar to a customer's repurchasing (Bhattacherjee & Lin, 2015). The repurchasing intention of the customer is influenced by the degree to which the perceived performance matches their first expectations (Bhattacherjee, 2001).

Behavioral intention is a strong predictor and directly effect on using technology behavior (Venkatesh et al., 2003), such as using online food delivery application and mobile banking, researchers have found a positive and significant effect of behavioral intention on using food delivery applications and mobile banking behavior after Covid-19 (Puriwat & Tripopsakul, 2021; Purwanto & Loisa, 2020; Shukla & Pandey, 2023).

Using food delivery application behavior is defined as the positive interest in using online food delivery applications (Venkatesh et al., 2003). According to the researcher, three types of factors influence human

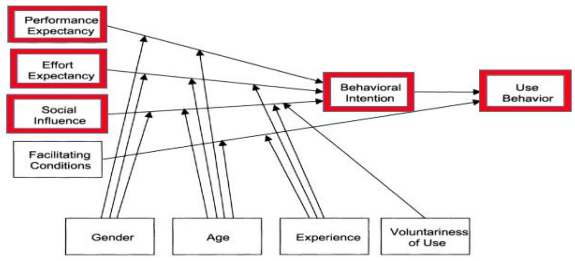
behavior: behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 1991). A behavioral belief refers to "an individual's feeling about the outcomes or consequences of a specific behavior," which leads to a positive or negative attitude toward the behavior, such as a positive interest in using online food delivery applications (Ajzen, 1991). Therefore, the following hypothesis was developed.

***Hypothesis 4 (H4)**: There is a significant influence of behavioral intention toward using food delivery application behavior.*

2.5 Theoretical frameworks

The theoretical framework from The Unified Theory of Acceptance and Use of Technology (UTAUT) was formulated with four constructs that are considered significant core determinants for adopting new technologies: Performance expectancy, Effort expectancy, Social influence, and Facilitating conditions. While Performance expectancy, Effort expectancy, and Social influence impact behavioral intention, Facilitating conditions influence usage behavior (Venkatesh et al., 2003) as shown in Figure 1.

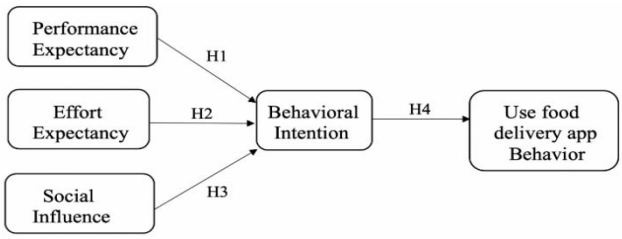
Figure 1. *The Unified Theory of Acceptance and Use of Technology (UTAUT)*



2.6 Conceptual framework

The conceptual framework of this study was based on the theoretical framework presented in Figure 2 and employing three variables comprising Performance Expectancy, Effort Expectancy, and Social Influence to determine behavioral intention and the use of food delivery application behavior. The last independent variable is the influence of behavioral intention toward using food delivery application behavior. The conceptual framework determined the Factors influencing in behavioral intention on using online food delivery application among international students in Bangkok after COVID-19 as displayed in the figure below:

Figure 2. *Factor influencing behavioral intention on using online food delivery application among international students in Bangkok after Covid-19*



Source: Constructed by author

3. Research Methods and Materials

3.1 Research design

The aim of this study was to identify the factors influencing the behavioral intention to use online food delivery applications among international students. These factors include performance expectancy, effort expectancy, social influence, behavioral intention, and usage behavior of food delivery applications. Furthermore, this research seeks to assess the level of effectiveness of online food delivery applications through the evaluation of behavioral intention among international students in Bangkok. To achieve these objectives, Cronbach's Alpha, simple linear regression, multiple linear regression, quantitative research, and descriptive statistics methods were employed to analyze each variable.

The questionnaire comprised three sections, totaling 27 questions. These questions covered five

variables from the research conceptual framework, three screening questions, 17 questions pertaining to the measured variables, and seven questions concerning demographic aspects.

Initially, techniques for assessing questionnaire reliability were implemented, utilizing Cronbach's Alpha to scrutinize any confounded or ambiguous measurement items. A pilot test involving a sample of 50 respondents was conducted to evaluate the reliability of the measured variables and the comprehensibility of the content. Additionally, simple linear regression (SLR) was utilized to examine the influence of behavioral intention on the usage behavior of food delivery applications. Subsequently, multiple linear regression (MLR) was employed to analyze the impact of performance expectancy, effort expectancy, and social influence on behavioral intention. Furthermore, secondary data were incorporated into this study, sourced from reputable articles, journals, books, and previous research endeavors.

3.2 Sampling Plan

3.2.1 Target Population

In this research, the target population is international students who studying in Bangkok and use online delivery applications after the COVID-19 situation. In the first semester of the academic year 2021, the total number of international students was 36,060 people. The number of Chinese students studying in Thai universities is the highest, totaling 21,906 people, followed by students from Myanmar, totaling 4,046 people (MHESI, 2021).

3.2.2. Sample Size

Due to the limitation of time and effort to collect all of the population data, the researchers used an estimated sample size by applying the Krejcie and Morgan determining sample size table (Krejcie & Morgan, 1970). The sample size in this study was 398 respondents who are international students studying in Bangkok after the COVID-19 situation. Based on the total of 36,060 international students studying in Thai universities, this table suggests a suitable sample size of 384 people.

3.2.3 Sampling Procedure

The researchers decided to utilize a non-probability sampling method by employing the convenience sampling technique due to time constraints. This approach was chosen for its practicality, efficiency in quickly gathering data, and low cost within the available time-frame.

3.3 Research Instrument

A questionnaire was employed as a research instrument to assess the significant factors and the relationships between the research variables. The researchers distributed the questionnaire online to the target samples. The questionnaire is divided into three parts. The first section consists of screening questions that will particularly target respondents who are international students in Bangkok and still use online delivery application after COVID-19. The second section includes questions on the demographic information of respondents. The last section comprises questions for dependent and independent variables, containing a total of 17 scale items.

3.4 Validity and Reliability

3.4.1 Content validity (IOC)

The researcher used the Item Objective Congruence (IOC) index to evaluate the content validity of each question in the questionnaire, aligning with the research objectives. One expert provided comments on the questions to ascertain content validity. The resulting IOC value was 1, indicating appropriateness, all questions were considered applicable for distribution to respondents.

3.4.2 Reliability Test (Pilot Test)

To assess the reliability of the questionnaire's variables, the researcher employed Cronbach's alpha. A pilot test involving 50 participants was conducted for this purpose. Cronbach's alpha evaluates the reliability of a measure by comparing the degree of shared variance or covariance among its constituent items to the total variance (Collins, 2007). The results are reported in Table 3.1.

Table 3.1 *Reliability Test of Five Variables (n=50)*

Variables	Cronbach's Alpha	Strength of Association	No. of items
Performance Expectancy (PE)	0.782	Acceptable	4
Effort Expectancy (EE)	0.908	Excellent	3
Social Influence (SI)	0.780	Acceptable	3
Behavioral Intention (BI)	0.922	Excellent	3
Using food delivery application behavior (UB)	0.792	Acceptable	4

4. Findings

4.1 Descriptive Analysis of Screening Data

In the questionnaire that the researcher distributed to target respondents individually in February 2024, 405 respondents took the questionnaire, participating and 7 respondents were eliminated. Therefore, 398 eligible respondents will be used for data analysis. The questions asked for screening conditions are International students, ever use online food delivery application, and whether they choose to continue to use food delivery apps after COVID-19.

Table 4.1 shows the frequency distribution and percentage of demographic information from a sample size of 398 respondents as follows:

International student: According to the number of total respondents 405 respondents including all international students. The percentage is 100%.

Ever use online food delivery apps: The majority of 405 respondents all have used online food delivery application. The percentage is 100%.

Continue to use food delivery apps after COVID-19: This survey includes 398 respondents calculated to 98.27 % who would like to continue to use food delivery applications after COVID-19, and 7 respondents calculated to 1.73% chose not to continue to use food delivery application.

Table 4.1 *The frequency distribution and percentage in sample size of 405*

Screening Factors	Frequency	Percent
International student		
Yes	405	100
No	0	0
Ever use online food delivery apps		
Yes	405	100
No	0	0
Continue to use food delivery apps after COVID-19	398 7	98.27

Yes	0	1.73
No		0
Total	**398**	**100**

4.2 Descriptive Analysis of Demographic Data

The questions about demographic information from 398 eligible respondents were analyzed on such as gender, income, nationality, online food delivery ordering frequency, the name of the application used, spending on using the application, and types of ordering. The demographic information in the part of the descriptive analysis to categorize the character of target respondents.

Table 4.2 shows the frequency distribution and percentage of demographic information from a sample size of 398 respondents as follows:

Gender: The total respondents 398 respondents including Male 115 respondents or 28.9%, Female 282 respondents or 70.9%, and not specified 1 respondent or 0.3% of all respondents.

Income: The majority of 398 target respondents separated to respondents who have income more than 100,000 THB calculated to 1% or 4 respondents, followed by 47 respondents who have an income lower than 20,000 THB calculated to 11.8%, 13 respondents who have income between 80,001-100,000 THB calculated to 3.3%, 106 respondents who have income between 50,001-80,000THB calculated to 26.6%, 228 respondents who have income between 20,001-50,000 THB calculated to 57.3% of all target respondents as the sequence.

Nationality: The respondents of all 398 include 218 Chinese citizen respondents calculated to 54.8 %, 8 France citizen or 2%, 54 Myanmar citizen or 13.6%, 27 Singapore citizen or 6.8%, 58 Vietnam citizen, or 14.6%, includes 8 others or 8.3% of 398 respondents.

Online apps frequency per month: According to the survey, the frequency of respondents who use online food delivery apps are ranked as; the majority is the first rank 161 respondents or 40.5%, use 2-3 times per month, the second rank is 99 respondents or 24.9% use less than 3-4 times per month, the third rank is 43 respondents or 10.8% use 5-6 times per month, the minority respondents with 12 respondents or 3% use online food delivery apps almost every day.

Delivery application: Among the 398 target respondents, the number of respondents who use Grab is 223 accounting for 56%, Lineman is 92 accounting for 23.1%, Shopee food is 48 accounting for 12.1% and Foodpanda is 35 accounting for 8.8%.

Spending: **The number** of respondents who consumed less than 1,000 THB accounted for 12.3% or 49 respondents. The majority of respondents consumed between 1,001- 3,000 THB, which accounted for 45.7% or 182 respondents. 30.7% of respondents or 122 spend between 3,001-5,000 THB. As a percentage of 10.1 or 40 respondents who spend between 5,001- 10,000 of all target respondents. A minority of the respondents who consumed less than 10,000 THB accounted for 1.3% or 5 respondents.

Type of food: The majority of respondents who chose to order Chinese food accounted for 65.3% or 260 respondents. Followed by 398 respondents who chose to order Italy food, which accounted for 9.5% or 38 respondents. Of all target respondents, 24.4% of respondents, or 97 would like to choose Thai food. A percentage of 1 or 0.3% of respondents who chose French all target respondents. A minority of the respondents chose others like the coffee category for 0.5% or 2 respondents.

***Table 4.2**. The frequency distribution and percentage in a sample size of 398*

Demographic Factors	**Frequency**	**Percent**
Gender		
Male	115	28.9

Female	282	70.9
Not specified	1	0.3
Total	**398**	**100**
Income Per Month		
Lower than 20,000 Baht	47	11.8
20,001 – 50,000 Baht	228	57.3
50,001 – 80,000 Baht	106	26.6
80,001 – 100,000 Baht	13	3.3
More than 100,000 Baht	4	1
Total	**398**	**100**
Nationality		
China	218	54.8
France	8	2
Myanmar	54	13.6
Singapore	27	6.8
Vietnam	58	14.6
None of above	33	8.3
Total	**398**	**100**
Ordering frequency per month		
Once per week	43	10.8
Two to three times a week	161	40.5
Three or four times a week	99	24.9
Five to six times a week	27	6.8
Almost everyday	12	3
Total	**398**	**100**
Delivery application		
Grab	223	56
Lineman	92	23.1
Shopee food	48	12.1
Foodpanda	35	8.8
Total	**398**	**100**
Spending		
Lower than 1,000 Baht	49	12.3
1,001 -3,000 Baht	182	45.7
3,001 -5,000 Baht	122	30.7
5,001-1,000 Baht	40	10.1
More than 10,000 Baht	5	**1.3**
Total	**398**	**100**
Type of food		
Italy food	38	9.5
Chinese food	260	65.3
Thai food	97	24.4
Others (French)	1	0.3
Others (Coffee)	2	0.5
Total	**398**	**100**

4.3 Mean and Standard Deviation for Descriptive Analysis

This section provides a summary of the mean and standard deviation for each variable. The following grade point averages are from (Sözen & Guven, 2019) and the criteria for Interpreting Mean Scores are displayed below:

Mean score	Interpretation
4.21 – 5.00	Strongly agree
3.41 – 4.20	Agree
2.61 – 3.20	Neutral
1.81 – 2.60	Disagree
1.00 – 1.80	Strongly disagree

The result analysis represented 398 respondents and 0 missing respondents for variables Performance expectancy, Effort expectancy, Social influence, Behavioral intention, and using food delivery application behavior described in 4.3.1-4.3.5.

4.3.1 Mean and standard deviation of Performance expectancy

Table 4. 3 indicated that the highest mean of performance expectancy was " I believe that using online food delivery application will help me find tasty food." which equals 3.92. Conversely, the lowest mean was "Using online food delivery application allows to achieve the purchasing of food more quickly." which equals 3. 75. Furthermore, the highest standard deviation was "I believe that online food delivery application is useful for my daily life." which is equal to 1.15. Nevertheless, the lowest was "I believe that using online food delivery application will help me find tasty food." which equals 0.90.

Table 4.3 *The result of Mean and Standard Deviation of Performance expectancy*

	Mean	S.D.	Interpretation
PE1: I believe that online food delivery application are useful for my daily life.	3.76	1.15	Agree
PE2: I believe that using an online food delivery application will help me search for food more quickly.	3.76	1.12	Agree
PE3: I believe that using an online food delivery application will help me find tasty food.	3.92	0.90	Agree
PE4: I believe that using online food delivery application allows me to achieve the purchasing of food more quickly.	3.75	1.06	Agree
Performance expectancy	3.80	0. 86 8	Agree

4. 3. 2 Mean and standard deviation of Effort expectancy

Table 4.4 indicated that the highest mean of effort expectancy was " I believe that the application feature is user friendly." which equals 3. 87. However, the lowest meaning was " I believe that it's not difficult for me to become skillful at using online food delivery application." which equals 3. 63. According to the standard deviation, the highest was " I believe that it's not difficult for me to become skillful at using online food delivery application." which equals 1. 12. Inversely, the lowest was " I believe that the application feature is user friendly." which equals 1.02.

Table 4.4 *The result of Mean and Standard Deviation of Effort expectancy*

	Mean	S.D.	Interpretation
EE1: I believe that learning how to use the online food delivery application is easy.	3.84	1.10	Agree
EE2: I believe that it's not difficult for me to become skillful at using online food delivery application.	3.63	1.12	Agree
EE3: I believe that the application feature is user-friendly.	3.87	1.02	Agree
Effort expectancy	3.78	0.944	Agree

4. 3. 3 Mean and standard deviation of Social influence

Table 4.5 shows that the highest mean of social influence was " I believe that many international students use online food delivery application." which equals 3.95. Meanwhile, the lowest meaning was " I believe that international students prefer to use online food delivery application to purchase food than traditional ones." which equals 3.82. For the standard deviation, the highest was " I believe that many international students use online food delivery application." which equals 1.11. On the other side, the lowest was "People who influence my behavior think that I should use online food delivery application for ordering the food." which equals 1.09.

Table 4.5 *The result of Mean and Standard Deviation of Social influence*

	Mean	S.D.	Interpretation
SI1: People who influence my behavior think that I should use online food delivery application for ordering the food.	3.85	1.09	Agree
SI2: I believe that many international students use online food delivery application.	3.95	1.11	Agree
SI3: I believe that international students prefer to use online food delivery application to purchase food than traditional ones.	3.82	1.10	Agree
Social influence	3.87	0.906	Agree

4.3.4 Mean and standard deviation of Behavioral intention

Table 4.6 exhibited that the highest mean of behavioral intention was " I intend to continue using online food delivery application after covid- 19 pandemic." which equals 3.67. In contrast, the lowest mean was " I believe that I have sufficient reasons to use an online food app." which equals 3.48. For the standard deviation, the highest was " I believe that I have sufficient reasons to use an online food app." which equals 1.11. On the contrary, the lowest was "I intend to use online food delivery application in the near future." which equals 1.02.

Table 4.6 *The result of Mean and Standard Deviation of Behavioral intention*

	Mean	S.D.	Interpretation
BI1: I intend to use online food delivery application in the near future.	3.50	1.02	Agree
BI2: I intend to continue using online food delivery application after covid-19 pandemic.	3.67	1.06	Agree
BI3: I believe that I have sufficient reasons to use an online food app.	3.48	1.11	Agree
Behavioral intention	3.55	0.874	Agree

4.3.5 Mean and standard deviation of Using food delivery application behavior

Table 4.7 displayed that the highest mean of using online food delivery application was "Using online food delivery application is beneficial." which equals 4.38. However, the lowest meaning was "Using online food delivery application is wise." which equals 3.85. For the standard deviation, the highest was "Using online food delivery application is a good idea." which equals 1.06. Meanwhile, the lowest was "Using online food delivery application is beneficial." which equals 0.777.

Table 4.7 *The result of Mean and Standard Deviation of Using food delivery application behavior*

	Mean	S.D.	Interpretation
UB1: Using an online food delivery application would be a pleasant experience.	4.01	0.939	Agree

UB2: Using an online food delivery application is a good idea.	3.88	1.06	Agree
UB3: Using an online food delivery application is wise.	3.85	0.874	Agree
UB4: Using online food delivery application is beneficial.	4.38	0.777	Strongly agree
Using food delivery application behavior	4.03	0.708	Agree

4.4 Hypothesis Testing Results

To analyze hypothesis testing results, the researchers used linear regression as a statistical method to analyze the significant influence between variables such as the significant influence of performance expectancy, effort expectancy, and social influence effect on behavioral intention throughout using food delivery application behavior and significant influence of behavioral intention toward using food delivery application behavior. The researchers used simple linear regression analysis with R-square to assess the proportion of variance in the dependent variable according to the independent variable. Moreover, the researchers also used multiple linear regression as a statistical analysis method to assess the level of multiple factors that influence behavioral intention to detect multicollinearity.

By using the variance inflation factor (VIF) tools, Multicollinearity is considered to be present when the VIF exceeds a threshold typically set between 5 to 10 which indicates a high degree of linear correlation among explanatory variables in a multiple regression model that can lead to inaccurate results in regression analyses (Kim, 2019).

4.4.1 Result of Multiple Linear Regression of H1, H2, H3

Statistical Hypothesis

H_0: There is no significant influence of performance expectancy (H1), effort expectancy (H2), and social influence (H3) effect on behavioral intention throughout using food delivery application behavior.

H_a: There is a significant influence of performance expectancy (H1), effort expectancy (H2), and social influence (H3) effect on behavioral intention throughout using food delivery application behavior.

The casual relationship between performance expectancy (H1), effort expectancy (H2), social influence (H3), and behavioral intention was analyzed using multiple linear regression. The result of the analysis is shown in Table 4.8, behavioral intention toward using food delivery application behavior for 49.7% at a 95% confidence level as shown by an R square value of 0.497. H1, H2, and H3 were all null hypotheses rejected because the p-values were less than 0.05 for every independent variable. As a result, it can be concluded that there is a significant influence of performance expectancy (H1), effort expectancy (H2), and social influence (H3) effect on behavioral intention throughout using food delivery application behavior. Effort expectancy has the most influence among the three variables, showing an unstandardized coefficient of 0.360. Performance expectancy and Social influence have the unstandardized coefficient of 0.223 and 0.170, respectively, which indicates that Performance expectancy has a superior influence than Social influence over behavioral intention toward using food delivery application behavior.

In addition, the result from the value of variance inflation factor (VIF) of performance expectancy, effort expectancy, and social influence were 1.92, 2.58, and 2.6 respectively. Since VIF is less than 5, meaning that there was no multicollinearity problem.

Table 4.8 Multiple Linear Regression Analysis Summary for H1, H2, and H3

Variables	B	SE B	β	t	p	VIF	Null Hypothesis
H1: Performance expectancy	0.223	0.0499	0.222	4.47	< 0.001*	1.92	Rejected H_0
H2: Effort expectancy	0.360	0.0532	0.389	6.76	< 0.001*	2.58	Rejected H_0
H3: Social influence	0.170	0.0556	0.176	3.06	0.002*	2.60	Rejected H_0

Note. $R^2 = 0.497$, $R = 0.705$, Adjusted $R^2 = 0.493$, $*p < 0.05$. *Dependent Variable = Behavioral Intention.*

B: Unstandardized coefficients B | SE B: the standard error for the unstandardized beta | β: the standardized beta | t : t-value | p: p-value | VIF: Variance Inflation Facto

4.4.2 Result of Simple Linear Regression of H4

Statistical Hypothesis

H_0: There is no significant influence of behavioral intention toward using food delivery application behavior.

H_a: There is a significant influence of behavioral intention toward using food delivery application behavior.

The simple Linear Regression (SLR) is studied and tested H4 - *Behavioral intention positively influences using food delivery online behavior*. Table 4.9 shows the result of R square was 0.00988 means, 0.0988% of using food delivery application behavior can be explained by behavioral intention. At a significant level of 0.05 where the p-value of the variable is less than 0.05 (P-value = 0.047), As a result, it can be concluded that there is a significant influence of behavioral intention toward using food delivery application behavior with an unstandardized coefficient at −0.0806. In addition, the result from the value of variance inflation factor (VIF) of behavioral intention was 1.00. Since VIF is less than 5, meaning that there was no multicollinearity problem.

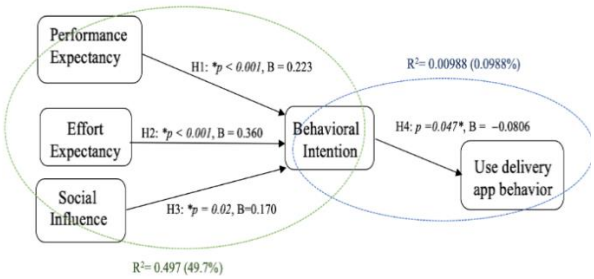
Table 4.9: Simple Linear Regression Analysis Summary for H4

Variables	B	SE B	β	t	p	VIF	Null Hypothesis
H4: Behavioral intention	−0.0806	0.0405	−0.0994	−1.99	0.047*	1.00	Rejected H_0

Note. $R^2 = 0.00988$, $R = 0.0994$, Adjusted $R^2 = 0.00738$, $*p < 0.05$. *Dependent Variable = Using food delivery application behavior.*

B: Unstandardized coefficients B | SE B: the standard error for the unstandardized beta | β: the standardized beta | t : t-value | p: p-value | VIF: Variance Inflation Factor

Figure 4.1: The result of the structural model



Source: *Constructed by the author*.

5. Conclusions

5.1 Summary of Findings

The study aimed to analyze the factors influencing the behavioral intention to use online food delivery applications among international students in Bangkok post-COVID-19. Four research questions were formulated to address this objective:

(1) Does performance expectation significantly influence behavioral intention regarding the use of food delivery applications?

(2) Does effort expectation significantly influence behavioral intention concerning the use of food delivery applications?

(3) Does social influence significantly influence behavioral intention regarding the use of food delivery applications?

(4) Does behavioral intention significantly influence the actual usage of food delivery applications?

A quantitative research approach was adopted, utilizing data collected from international students studying in Thai universities during the first semester of the academic year 2021. The sample size was determined to be 384 respondents based on Krejcie and Morgan's (1970) sample size table, employing a non-probability convenience sampling method. However, 405 respondents participated, of which 398 were deemed suitable for questionnaire administration after eliminating 7 responses.

Closed-ended questions were utilized in the questionnaire design. Prior to distribution, the validity and reliability of the questionnaire were ensured through the Index of item-objective congruence (IOC) and Cronbach's Alpha reliability test, respectively. The internal consistency, frequency, mean, and standard deviation were analyzed to evaluate the data, with simple linear regression and multiple linear regression employed to test the hypotheses among the variables.

Demographic analysis revealed that the majority of respondents were female (70.9%), with an average monthly income between 20,001 – 50,000 Baht (57.3%). Additionally, a majority of respondents were of Chinese nationality (54.8%), with the highest frequency of online food ordering occurring 2-3 times per month (40.5%), predominantly through the Grab platform (56.0%).

From the survey instrument, it was found that the mean and standard deviation of the variable "Using food delivery application behavior" had the highest mean among others, followed by social influence, performance expectancy, and effort expectancy, with behavioral intention having the lowest mean.

Hypothesis testing revealed that all independent variables had a significance level of less than 0.05, leading to the rejection of the null hypothesis. Therefore, performance expectancy, effort expectancy, and social influence significantly influence behavioral intention regarding the use of food delivery applications, while behavioral intention significantly influences the actual usage of these applications. The results of the hypothesis testing are summarized in Table 5.1.

***Table 5.1**: Summary of the hypotheses testing results*

Statement of Hypothesis	p-value	Decision results
H1: There is a significant influence of performance expectancy effect on behavioral intention throughout using food delivery application behavior.	< 0.001*	Rejected H_0
H2: There is a significant influence of effort expectancy effect on behavioral intention throughout using food delivery application behavior.	< 0.001*	Rejected H_0
H3: There is a significant influence of social influence effect on behavioral intention throughout using food delivery application behavior.	0.002*	Rejected H_0
H4: There is a significant influence of behavioral intention toward using food delivery application behavior.	0.047*	Rejected H_0

In table 5.2, it shows the ranking of the significance of the independent variables that influence behavioral intention. The results show that effort expectancy is the highest influence independent variable on behavioral intention with an unstandardized coefficient of 0.360. The second ranked is performance expectancy with an unstandardized coefficient of 0.223, and followed by social influence with an unstandardized coefficient of 0.170.

***Table 5.2**: Summary strengths of influence factors of each independent variable*

Independent variable	Rank	Dependent variable	Unstandardized Coefficient (B)
Effort expectancy (EE)	1st	Behavioral intention (BI)	0.360
Performance Expectancy (PE)	2nd		0.223
Social influence (SI)	3rd		0.170
Behavioral intention (BI)	-	Using food delivery application behavior (UB)	-0.0806

5.2 Discussion and Conclusion

The hypothesis testing conducted in this study revealed significant influences of performance expectancy, effort expectancy, and social influence on behavioral intention toward using food delivery applications. Additionally, it was found that behavioral intention significantly impacts the actual usage of food delivery applications.

Performance Expectancy and Behavioral Intention

A significant relationship was observed between performance expectancy and behavioral intention ($p < 0.001$). These results corroborate previous research findings that performance expectancy strongly influences behavioral intention to adopt online food ordering applications post-COVID-19 in Thailand (Puriwat & Tripopsakul, 2021). Descriptive analysis indicated a mean score of 3.80 for performance expectancy, with the item "I believe that using online food delivery application allows me to achieve the purchasing of food more quickly" scoring the lowest at 3.75, indicating below-average agreement. Similarly, in Saudi Arabia, performance expectancy has been identified as an influential factor in adopting online food ordering applications post-COVID-19 (Abed, 2023).

Effort Expectancy and Behavioral Intention

A significant relationship was established between effort expectancy and behavioral intention ($p < 0.001$). This finding is consistent with previous research indicating that effort expectancy strongly

influences behavioral intention to adopt online food ordering applications post-COVID-19 (Abed, 2023). Effort expectancy emerged as the highest influence independent variable on behavioral intention, with a mean score of 3.78. However, the item "I believe that it's not difficult for me to become skillful at using online food delivery application" scored the lowest at 3.63, indicating below-average agreement. Moreover, these questions exhibited the highest standard deviation of 1.12, indicating widely dispersed opinions among respondents.

Social Influence and Behavioral Intention

A moderately significant relationship was found between social influence and behavioral intention (p = 0.002). These findings align with previous research indicating that social influence strongly influences behavioral intention to adopt online food ordering applications post-COVID-19 in Thailand (Puriwat & Tripopsakul, 2021). Descriptive analysis revealed a mean score of 3.87 for social influence, with the item "I believe that international students prefer to use online food delivery application to purchase food than traditional one" scoring the lowest at 3.82, indicating below-average agreement. Similarly, in Saudi Arabia, social influence has been identified as a significant factor influencing the adoption of online food ordering applications post-COVID-19 (Abed, 2023).

Behavioral Intention and Using Food Delivery Application Behavior

A weakly significant relationship was observed between behavioral intention and the actual usage of food delivery applications (p = 0.047). This is consistent with previous research indicating that behavioral intention influences the adoption of online food ordering applications post-COVID-19 in Thailand (Puriwat & Tripopsakul, 2021). However, the negative unstandardized coefficient (-0.0806) suggests that a decrease in the value of behavioral intention leads to an increase in the usage of food delivery applications. This discrepancy may be attributed to confusion in the wording of the questions and respondents' misunderstandings. Descriptive analysis revealed a mean score of 3.55 for behavioral intention, with the item "I believe that I have sufficient reasons to use an online food app" scoring the lowest at 3.48, indicating below-average agreement. Additionally, these questions exhibited the highest standard deviation of 1.11, indicating widely dispersed opinions among respondents. Overall, this suggests that respondents have only slightly sufficient reasons to use online food applications.

5.3 Recommendations Based on Findings

The researcher provides recommendations that underscore the significant relationships among the research hypotheses concerning the intentions of international students in Bangkok to use online food delivery applications. Initially, the conclusion section highlights the considerable impact of performance expectancy, effort expectancy, and social influence on behavioral intention toward using online food delivery applications. Among these variables, effort expectancy emerges as the strongest influencer on behavioral intention.

Firstly, the direct impact of the COVID-19 pandemic on the food delivery business is discussed. In 2021, Thailand witnessed a substantial shift in consumer behavior towards online food distribution due to pandemic-related restrictions, resulting in a surge in demand for meal delivery services. Although the industry has gradually recovered from the pandemic's impact, it remains highly competitive. Effort expectancy is identified as the most influential variable affecting behavioral intention toward using

online food delivery applications, surpassing performance expectancy and social influence.

Hence, food delivery services, including food delivery apps, should prioritize efforts to enhance user experience, simplicity, and overall convenience inherent in the operational framework of their platforms. Users are more likely to engage with and adopt these apps when they perceive ease of use, simplicity, and convenience. Performance expectancy also plays a crucial role in influencing user intent, emphasizing the importance of app functionality, efficiency, and consistency with user preferences. Furthermore, social influence, driven by opinions, suggestions, and experiences shared within social circles, significantly influences users' intent to interact with food delivery apps.

Based on the summarized intensity of the influencing factors for each variable, efforts should be focused on improving performance expectancy, particularly in enhancing the purchasing experience via the application. Additionally, strategies to strengthen social influence could involve building relationships with the international student community.

As the main question of the study revolves around the impact of the COVID-19 pandemic on meal delivery apps for international students' usage intent, it is crucial for food delivery apps in Thailand to adapt their strategies to post-pandemic conditions. This could involve optimizing user interface experiences, streamlining the order process, expanding menu options, and providing personalized recommendations to enhance user experience and improve order conversion rates.

The combination of performance expectations, effort expectations, and social impact strategies provides a competitive advantage. Continuous improvement and innovation, along with gathering user feedback, are essential for maintaining user satisfaction and loyalty. Diversifying payment options, offering regular discounts, rewards programs, and ensuring robust security measures are also recommended to enhance user trust and engagement.

Given the ranking of the influence of each variable, effort expectancy emerges as a key factor influencing behavioral intention to use online food delivery applications. Therefore, food delivery services should prioritize efforts to enhance user experience and convenience as part of their post-pandemic recovery strategies. Additionally, efforts to maintain user engagement and address the discrepancy between behavioral intention and actual usage should be continued to ensure sustained user participation.

5.4 Limitations of the study

According to the researcher's investigation of the limitations of the study, several limitations of factors affecting the online food delivery application using intention of international students in Bangkok were revealed. First of all, the scope of this study is limited to the intention of using online food delivery applications among international students in Bangkok and does not involve the intention of international students other than tourists in Bangkok. In addition, this study focused on international student intentions, and therefore, the findings may not be equivalent to the behavioral parameters of other consumers using other online services among applications. Therefore, the behavioral preferences or types of applications used by different consumer groups in a certain city or country will cause them to consider different issues when deciding to use online food delivery.

5.5 Further Studies

Continuing with the analysis of the hypothesis test results on Behavioral intention in the context of online food delivery applications, the non-significant influence of the researcher prompts a reevaluation of potential factors impacting user behavior. Future

studies should delve into the intricate interplay of various variables such as user experience design, platform features, and the quality of service provided by online food delivery applications. Understanding the nuanced dynamics between these elements could offer deeper insights into what truly drives users' behavioral intentions within this rapidly evolving digital landscape.

Moreover, exploring the role of external factors, such as cultural influences, socioeconomic backgrounds, and technological advancements, can contribute to a more comprehensive understanding of user behavior. These external factors may exert subtle yet significant effects on the decision-making process of consumers when engaging with online food delivery applications (Cheng et al., 2024). Investigating these elements could enhance our ability to predict and explain users' intentions in the future.

Additionally, future research endeavors could employ advanced methodologies, such as machine learning algorithms and big data analytical, to analyze vast datasets generated by online food delivery platforms. This approach can provide a more granular and dynamic view of user behavior, allowing for the identification of patterns, trends, and anomalies that may not be apparent through traditional statistical methods (Alalwan et al., 2018).

Furthermore, longitudinal studies could be undertaken to track the evolution of user behaviors over time, considering the ever-changing landscape of technology and consumer preferences. Long-term observations can uncover trends that may emerge as users adapt to new features, technologies, or societal changes, offering valuable insights into the sustainability and adaptability of online food delivery applications (Curry, 2024).

In conclusion, the non-significant influence of the researcher on Behavioral intention underscores the need for a multidimensional approach in future studies. By exploring diverse factors, leveraging advanced methodologies, and conducting longitudinal analyses, researchers can gain a more nuanced understanding of user behavior in the context of online food delivery applications. This knowledge is crucial for industry stakeholders, policymakers, and designers to enhance the user experience and ensure the long-term success of these digital platforms.

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