FACTORS AFFECTING THE USE OF ORGANIC PRODUCTS WITH MOBILE APPLICATION: THE CASE OF THAI CONSUMERS

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ABSTRACT

The general population has grown more conscious and concerns related to their food and health, organic consumption has been accelerated globally, including Thailand. In addition, with the advance technological development and in purchasing behavior, consumers are reforming their buying activities from offline channels to online channels. Evidently, people refashioned their habit of buying at physical stores onto groceries shopping through electronic mobile devices. Therefore, the objective of this research is to investigate factors that affect the intention to use a mobile application that can connect farmers directly to Thai consumers. The goal of this study is to identify which features in a mobile application that matter from a consumer point of view. In order to develop this research, a quantitative survey is used to gather data from Thai respondents that are interested in organic products and own a smartphone. A total of 119 respondents can be used in finding the factors that affect organic mobile application. The SPSS program was implemented to analyze data from survey questions and operate factor analysis as well as multiple regression analysis. Reliability, Traceability, and Hygiene Standard are the three components found in factor analysis. Nevertheless, through multiple regression analysis, only Traceability is the only factor that affects the respondents' intention to use this mobile application.

KEY WORDS: Organic / Organic Food / Organic Food in Thailand / E-commerce / Mobile Application

43 pages

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CHAPTER I
INTRODUCTION

1.1 Background

Thailand is a heaven for using pesticide on vegetables people consume in daily life. More than half of vegetables and fruits include at least one pesticide in the farming process (Mordor Intelligence., n.d.). Almost half of vegetables and fruits sold in supermarkets found residues with illegal pesticides (Wangree Fresh, 2021).

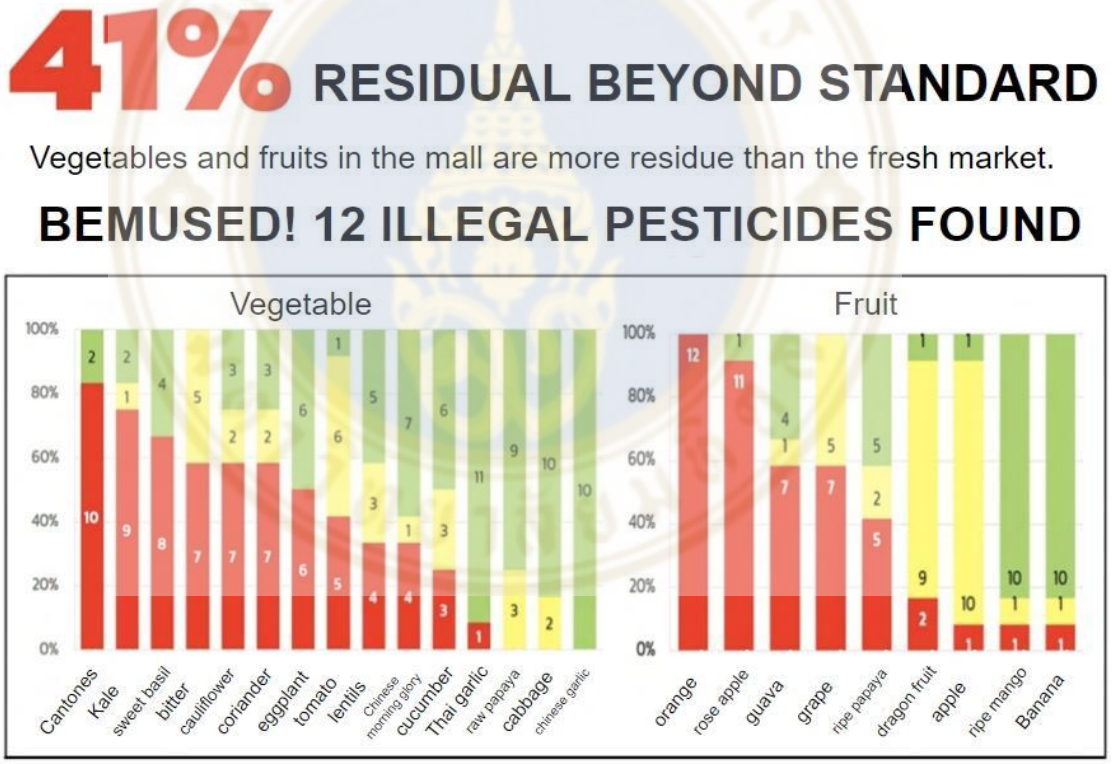

Figure 1: A report shows pesticide found in vegetables and fruits sold in supermarket

Unfortunately, Thai people are facing the risk without any law and regulations to control the use of pesticides. The affiliation with foods that contaminate pesticide can be a cause of death. Many studies indicate an exposure with pesticides is

associated with a higher chance of obtaining cancer (Thorpe, n.d.). This has raised the awareness that cancer is the main cause of death for the Thai population (Vatanasapt et al., 2002). However, studies show organic food is the option that can help prevent people from cancer. A significant number of more than half a million women in the United Kingdom have a lesser chance to be diagnosed with cancer when consuming organic foods regularly for a long period of time (Bradbury et al., 2014). Hence, raising the awareness of chemical free food could possibly reduce death.

Although the agricultural sector is one of Thailand's greatest strengths with the reputation of well-known organic farming, the country has been too compromising about the use of pesticide. Thailand has established itself as a worldwide hotspot for Organic farming without a serious control of standardization. According to Vandergeest (2009), since the mid-1980s, the NGOs and activists located in Thailand have been operating in the means of alternative agriculture production. Local government faculties and NGOs in collusion, have established fresh markets in several provinces that favors organic products, which are frequently "certified" by the market operators. Many communities had established organic fertilizer clubs; organic farming has grown in popularity, and some locals were looking into ways to reintroduce heirloom rice varieties. The government had provided numerous mega projects, to assist sustainable organic farming or self-sufficient farming. These projects also include employing hundreds of farmers to provide local knowledge centers and perform training to thousands of others in sustainable organic farming practices. However, the current regulations do not state any punishments if the farmers do not comply with organic farming standards. Therefore, it is not always reliable when certain brands claim to be organic.

Regarding the current ways of purchasing organic products, online channels may be a good option for consumers because of the information and convenience provided. Still, the current purchasing channels do not provide enough information to check whether the products are really organic or not. Since the current purchasing channels do not facilitate enough protection, the utilization mobile application can become a key player in preventing cancer. People can buy things more easily with e-commerce. Yet, when it comes to edible products, it may not be the best option to determine whether or not they are truly organic. E-commerce has grown at an

exponential rate as the by-product of the internet age (Carter et al., 2000). People are modifying their purchase habits to steer away from selecting items at the front counter and toward buying them online, both through websites and mobile applications. One of those goods experiencing this shift in purchasing behavior is gourmet goods. Today's producers must excel to establish a connection with their audience. The outdated tactics of selling products are fading away gradually. According to Småros et al. (2000) and Anckar et al. (2002), establishing e-grocery is the crucial thing to create value added service. Due to the risk of losing market share and falling behind the competition, several food sector suppliers have been forced to alter their business models.

On the other side, buyers gain from this strategy in numerous ways as vendors move their supply to online platforms (Bakos, 1998). Consumers can now interact with suppliers more than ever by scanning QR codes on their product (Menon, 2020). As more people become aware of the importance of consuming nutritious food with a safe origin, they will become more concerned with the methods used by farmers to grow their crops. Enabling connections to diverse sources to provide interest-based comparisons among customers. The buyer may now compare their products with multiple suppliers to discover the best option with the touch of a finger. Thus, making an interesting app and providing the right information to consumers is necessary.

1.2 Statement of problem

People today run the risk of purchasing pesticide-contaminated produce, which can result in cancer. The answer is to buy organic products, but how can we tell if they are truly organic? Although there is no way to completely verify them, using technology today may help to lessen the risk. With benefits gained from organic consumption, technological advancement, and consumer behavior toward the internet era, organic products and mobile applications together should be promoted. By adopting the technology, mobile applications in this case, consumers now achieved a more convenient than ever in their purchasing process. Mobile applications allow vast variety and comparison on a single platform through mobile devices (Arogundade et al., n.d.) and (Kim, 2021). Moreover, mobile applications minimize direct contact in circumstances of pandemic. Reducing the spread of diseases occurs from social

meetings. However, the current mobile applications that allow consumers to purchase products do not provide enough information to distinguish each supplier. Happyfresh, Aow Shopping, and Freshket are the examples of existing mobile applications that run their businesses in Thailand. In this case, their fresh foods are not equipped with information about the production standards.

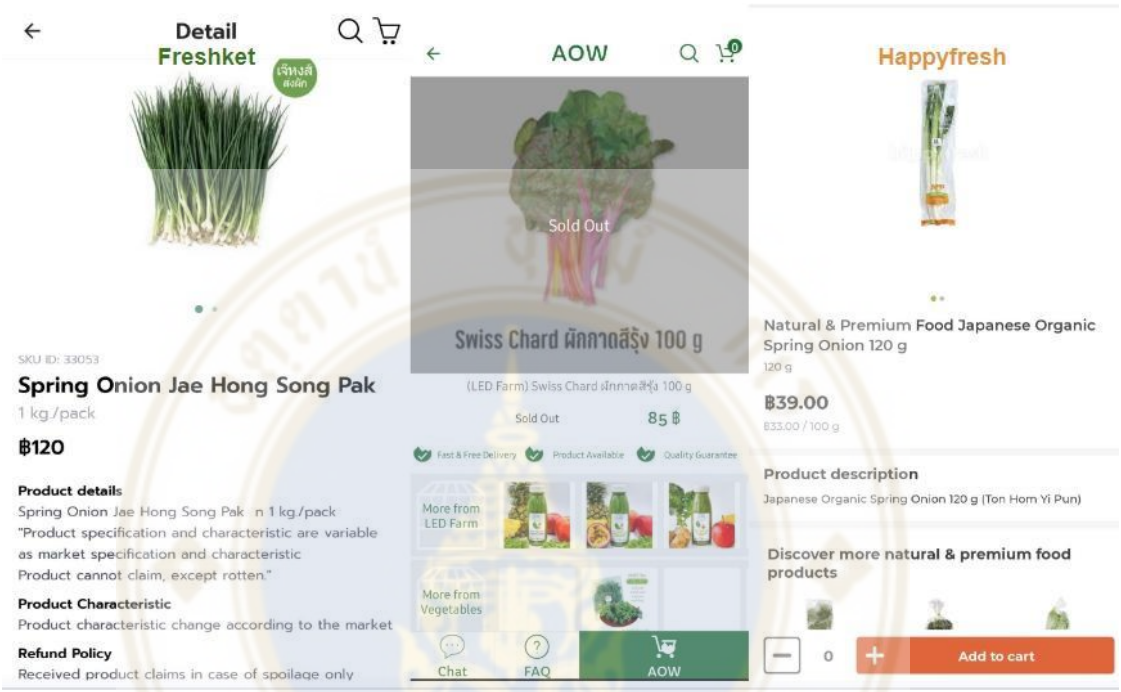

Figure 2: Product details of Freshket, Aow Shopping, and Happyfresh

On condition that people should be able to access the information when their organic products contain less toxicities that are harmful to humans (Good Food Is Good Medicine, 2019; Hurtado et al., 2017). A mobile application that considers the data to enhance connection between organic farmers and consumers should be promoted. Allowing consumers to have a better chance to connect to varied farmers directly with a diversity of choices. Furthermore, a variety of features could be equipped in a single application to grant consumers the feats to track farmers' certification, traceability, and other production standards. Therefore, with current technology and the benefits, organic goods and e-commerce should be encouraged. People could gain from organic products consumption.

1.3 The motivation for research

Knowing how difficult it is to obtain a secure organic product, being a part of cultivation to promote food standards is one way in helping the society. Since the current channel of purchases does not contain key information to distinguish organic food quality, more study could be done to help encourage further development.

One of the mega trends that was found during research was Growing demands for organic food products (Manson, 2022). In further, organic consumption is now proved to be popular among Europeans as well spreading throughout the globe. Thailand is one of the countries where organic consumption has recorded a rise in the demand, especially in groceries. The conclusion on the demand for organic products has been partially validated by the knowledge gained from the classes taken for Master's degree in general management at CMMU. Learning through Strategic Management, a class that taught students how to look for a megatrend for a long term and a short time impact for a company to prepare its strategic planning. Students learn to study and research for a megatrend that will create a significant impact to consumption and transformation of demand.

Later, continuing to study the organic food consumption in which the topic was brought about in the course called New Product Positioning. The class was about how to do quantitative research by collecting sample data and analyzing it through a program called SPSS. During the course, technology for usability with organic food purchase was analyzed. Research on the intention to buy from an application that could foster demand for organic food was conducted. The product was a mobile application where people can connect directly with farmers of in-house organic products in Bangkok. However, most of the research questions were in the area of asking the respondent's perception toward organic products with less questions asking the respondent about the technology. Hence, the finding was more likely about how people perceive organic products. The research was conducted through a quantitative method. With a fair amount of sample size, and the conclusion through mathematical finding. With SPSS, the data was converting intangible standpoint to a more reasonable resolution. The finding has stated that the intention to buy organic products through the app is significant. Therefore, further development on this subject would foster the promotion of organic food consumption.

1.4 Research objectives

To make it easier for Thai consumers to find ways to buy the healthiest organic products for themselves and to increase the likelihood that farmers will improve their practices by becoming more aware of the demand for reliable organic products. This research will be about the key factors that affect the use of a mobile application that can connect farmers who produce in-house organic products. This study could help a better understanding about what would make people use an application to buy organic products. Therefore, the objectives of this research are as follow:

- To study the intention to use of organic products with mobile application
- To examine factors that influence the use of organic products with mobile application
- To increase the likelihood that farmers as a whole will improve their practices by making consumers aware of the need for authentic organic goods.

1.5 Value of the research

This academic research concerns the character that affects the consumer desire toward utilizing the application that enhances their purchase intention of organic products. The study will guide the finding of perceptions and demands from the users in organic mobile applications. Moreover, the practical implication in this study is about the customer's need for the features that are important to their decision making in purchasing organic products. Additionally, this research could lead to an improvising of future mobile application development that can be used in the real market. In the future, the research may contribute to raising the standard of farming as a whole by increasing consumer awareness of the need for more real organic products that are healthier for them.

CHAPTER II
LITERATURE REVIEW

2.1 Organic

Growing of plants and animals for consumption by not using artificial chemicals in the growing process (Cambridge Dictionary, n.d.). Related to generating or involving in food production using plant or animal feed or fertilizer without the use of chemically prepared fertilizers, growth stimulants, antibiotics, or pesticides (Merriam-Webster, n.d.). Referring to or belonging to a class of chemical compounds that previously consisted exclusively of those found in or generated from plants or animals, but today encompasses all other carbon compounds (Dictionary.com, n.d.).

2.2 Organic food

Organic food appears to be healthier than conventional food due to increased levels of bioactive chemicals such as polyphenols, vitamin C, carotenoids, and n-3 PUFA, which may have a role in the occurrence of metabolic illnesses (Hurtado et al., 2017). Furthermore, organic food contains less Cadmium and other harmful compounds such as pesticides, which are linked to gut microbiota dysbiosis, immune-related illnesses, and toxicity in humans. According to Good Food Is Good Medicine (2019), with antibiotic exposure and pesticide; the consequence of rising pesticide exposure. This includes an increased chance of ADHD and autism, as well as lower cognitive abilities, learning capacity, and memory in the young demographic. Furthermore, pesticide exposure in pregnant women has a negative impact on their children's IQ and neurobehavioral development, not to mention that gray matter in children is thinner the more pesticides their mothers take. According to Le-Anh & Nguyen-To (2020), food safety concerns have a beneficial influence on people's attitudes about organic food. Furthermore, the findings show that understanding and perceived value of organic food have a significant influence on attitudes toward organic food. These two criteria have

not been thoroughly investigated in prior studies on organic food consumption. Perceived value, which is crucial in service marketing, is also relevant in studies of organic food consumption. Additionally, perceived value and attitude toward organic food have a beneficial impact on organic food purchase intention.

According to Janssen and Hamm (2014), the study shows that there are concerns about the label certificated in Germany which related to consumer preferences, the results from the research show that the consumers' trust about organic food should be given by both governmental and private organic labels. A study examined the need of traceability for organic food by using the survey of 361 sample groups for organic milk consumers in China (Wu et al., 2021), the result shows that the quality of traceability data has a positive relationship to the intention to purchase the organic food. According to Vidyavathi, Ganesh and Prasanna (2020), the research about how to develop the mobile application for organic farming in India, the result shows that the mobile application is helpful for the consumer to find the nearby shops which provide the organic food that they need. A research that studied consumers' perception toward organic food in China (Xie et al., 2015), they found out that reliability is the key factor to raise the purchasing habits in the organic food sector.

2.3 Organic food in Thailand

According to Chonsiripong (2018), the findings from the personal profiles of 270 Thai respondents revealed that most of the respondents were females between the ages of 21 and 30. The majority of them worked as corporate employees earning less than 20,000 THB per month and obtained a bachelor's degree. Furthermore, in the previous three months of the survey deployment, more than 60% of all respondents had consumed organic foods with consumption occurring once a month. The findings revealed that subjective standards had the greatest effect on customers' organic food purchasing decisions in Bangkok, followed by health consciousness. In contrast, organic food purchasing decisions in Bangkok were unaffected by food safety, environmental concerns, animal welfare, or local provenance. According to Nuttavuthisit & Thøgersen (2015), when asked how Thai consumers determine whether they can trust a product, participants said they look at the box and the retail outlet. They stated that if these

additional indications appear to be quality and genuine, they will trust the maker or store. They cited contemporary retail outlets and produce in suitable containers as good sources of organic food, as opposed to those accessible in traditional wet markets. In addition, they would entrust the name and overall image of relevant stakeholders in many circumstances. For instance, anything linked to the Royal Project would be deemed safe and naturally called organic. Many interviewees mentioned cancer prevention as a rationale for buying organic food, and a prevalent response was that we are surrounded by harmful influences in our daily lives. As a result, the respondents would like to identify safer choices, if feasible. Many participants cited the necessity to nurture one's family or being taken care of by one's guardians as reasons for seeking healthier eating alternatives. The rise in customer interest in organic food items has been ascribed to a growing need for food free of pesticides and chemical residues, among other factors. Organic shoppers in Chiang Mai province are often older and more educated (Sangkumchaliang & Huang, 2012). The study attempts to describe the current scenario regarding Northern Thai consumers' attitudes about organic foods. The primary reasons for purchasing organic products are health and environmental concerns, as well as favor for local or small farmers. Furthermore, consumer knowledge was identified as a significant hurdle to the growth of organic foods. The most effective approach to expand their market share could be offering variety and availability of organic products. As well, enhancing consumer's knowledge about organic labeling and trust is another way to increase organic products' consumption. According to Kantamaturapoj & Marshall (2020), a result from their study advises Thai merchants to give more accessible and trustworthy information regarding the control system and the authenticity of organic food in order to build confidence and improve customer expectation of benefit.

2.4 E-commerce

The business through the internet of buying and selling products and services (Cambridge University Press, n.d.). According to TechTarget (2020), e-commerce as known as electronic commerce is the buying and selling of goods and services. E-commerce also includes the transfer of payments or information through an

electronic network referred to as the internet. These transactions might occur during the transaction of business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C), or consumer-to-business (C2B). Businesses and individuals that buy or sell goods and services through the Internet have implications for e-commerce (Investopedia, 2003). Performed in a diversity of market categories, e-commerce may be undertaken through personal computers, tablets, smartphones, and other smart devices.

2.5 Mobile application

A program or software that operates on mobile phones and smartphones (Cambridge University Press, n.d.). According to Techopedia (2011), a type of software that is developed to perform on mobile devices like a smartphone or tablet is referred to as a mobile application or an app. Customers frequently utilize mobile applications to get services that are equivalent to those offered on PCs. Apps are frequently small, stand-alone pieces of software with limited functionality. An app, a web app, an online app, an iPhone app, or a smartphone app are all terms used to describe a mobile program. A type of program designed to run on a mobile device such as a smartphone or tablet computer is referred to as a mobile application or a mobile app (Mroczkowska, 2021). Even though apps are often small software units with limited capability, they are capable of offering high-quality experiences and services to clients. In contrast to desktop programs, mobile apps deviate from integrated software systems. Instead, each smartphone app has its own unique and limited set of features.

2.6 Mobile application and organic food

According to Arogundade et al. (n.d.), a smartphone application can provide organic farmers with an e-commerce platform, allowing them to operate their companies more effectively. It enables organic producers to form a cluster around themselves and gain the benefits of economies of scale. Digitalization is critical in traditional companies, benefiting both local organic food merchants and customers' shopping experiences (Kim, 2021). Finally, both customers and sellers are delighted with

GREEN, an organic food ecommerce website and mobile application. For online food shopping selections, the results demonstrate that practically everyone believes that the platform/social media they use provides the greatest service and is simple to use (Wiradinata et al., 2022). Furthermore, payment methods that are commonly used might influence purchase decisions, because during the Covid-19 outbreak, many people made cashless payments and believed that the payment options supplied were extremely useful in the payment procedure.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Methodology

In this study, a measurement was taken to look at the variables influencing consumers' intention to use a mobile application to buy organic products online. Six constructs are developed for the hypothesis to pursue the factors that affect the intention to use an organic mobile application. Accordingly, the study must look at the relationships and impacts of recommendation features, mobile application purchasing, traceability, reliability, certification, and hygiene standard toward the respondents.

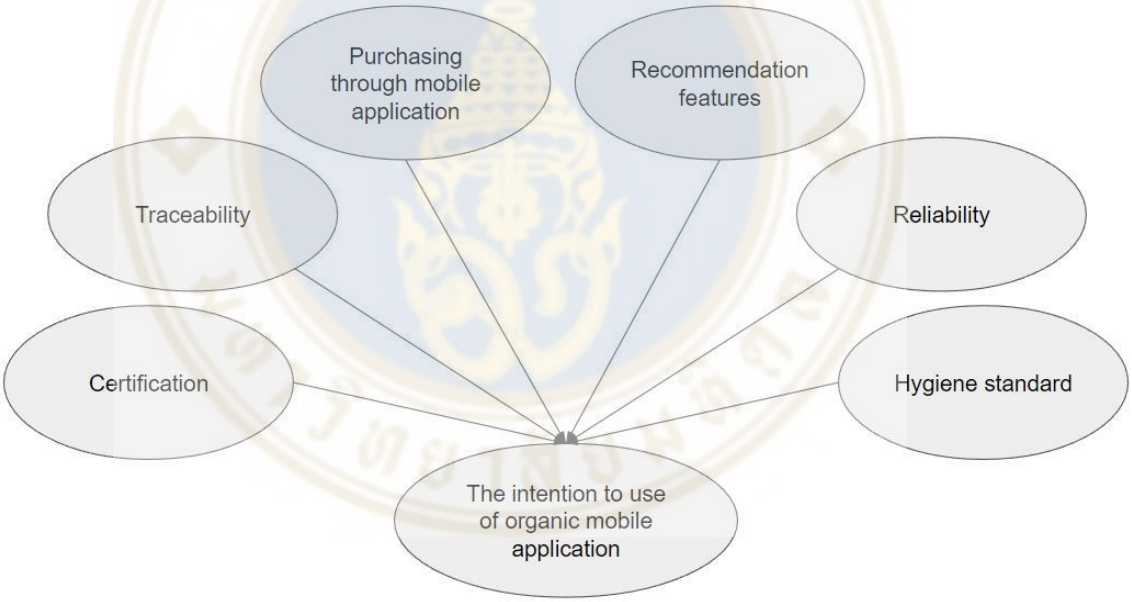

Figure 3.1: Factors affecting the intention to use of organic mobile application

3.2 Data collection

This study is being done using a quantitative approach. A quantitative research approach collects data from a large number of samples and then analyzes the findings from the population under study. In order to gather data, the author used a Google Form to run a survey, with a minimum need of 100 responders. Facebook, Line,

and Instagram were the social media platforms used for the dissemination of the questionnaires. Moreover, to encourage interest among individuals who fill out the questionnaires, a reward of 15 Kale vegetables was also offered and will be given randomly for those who submit their information for the delivery. Between July 16 and July 20, 2022, the survey was conducted in Thailand to gather information for this research.

3.3 Survey questions

Surveys were designed to gauge respondents' levels of opinion about recommendation features, mobile application purchasing, traceability, reliability, certification, and hygiene standard. In order to examine six factors, respondents must rate their degree of agreement with each item between strongly disagree, disagree, agree, and strongly agree. The questionnaire also examines respondent's intention to use the mobile application that can connect the consumer directly to organic farmers. To further analyze the target segment, questions asked about demographics were deployed. The surveys gather demographic data from respondents' age range, gender, income, occupation, and educational level. The survey's questionnaire had five sections, these include the introduction of the survey, screening question, specific question and the intention to use the mobile application, demographic questions, and the destination of delivery for receiving a reward. A total of 46 questions were asked to acquire information needed for analysis.

3.3.1 Introduction

The usability of introduction in this survey is to explain the respondents about the survey backgrounds such as the research backgrounds, the research objectives, and product description.

3.3.2 Screening question

This section is used to screen out respondents whose characteristics are not suitable in the analysis. In this research, only people who are interested in purchasing organic products and those who own a smartphone are included in usable samples.

Respondents who answered no in either one the questions will not be included in the analysis.

3.3.3 Specific question and the intention to use.

To measure respondents' perception toward questions extracted from the research objectives, respondents are rating their opinion from strongly disagree, disagree, agree, and strongly agree. Specific question consists of 6 constructs developed in the hypothesis, see figure 3.1. These questions are asked randomly to reduce bias when respondents fill up their answers through the surveys. Subsequently, the "**intention to use** "question is asked after specific questions to measure the respondents' interest toward using the mobile application.

3.3.4 Demographic question

This section is used to collect respondents' demographic data in order to further frame the research findings and understand the acquisition of the outcomes. Demographic questions consist of gender, age range, occupancy, income range, and education background.

3.3.5 Destination to receive the prize

Respondents were asked to fill out the destination of delivery. Information requested were the recipient's name, phone call, and address. For those who are inconvenient to provide information, they can skip this part.

3.4 Analysis method

To analyze the factors, SPSS is used to change the intangible viewpoint to a more logical resolution. The software is used to compare and analyze the findings of a number of constructs that contain questionnaires deployed in a survey. In this study, two analyses will be used to diagnose the samples collected in which they are factor analysis and multiple regression analysis.

3.4.1 Factor analysis

Factor analysis is a technique for condensing a large collection of variables into a smaller number of components. It is used in this procedure to determine the biggest common variance among all the variables. In other words, a method of assessing a big quantity of data by taking into account all of the numerous factors that impact it and how they interact with one another (Cambridge University Press, n.d.). Furthermore, the total variance explained, the scree plot, and the rotated component matrix are the three components in factor analysis that are the focus of this study. Later on, the study will assess the components that represent the target groups' intention to use in order to explain their findings.

3.4.2 Multiple Regression Analysis

Multiple regression is a linear regression model extension that allows for the prediction of systems with multiple independent variables (Built In, 2021). Linear regression can only predict outcomes that fall within the range of the training data set. Most notably, linear regression can only be used on data sets with a single dependent and independent variable. We utilize multiple regressions when we want to forecast the value of one variable based on the values of two or more other variables (Lund Research Ltd, n.d.). Dependent variable is referred to the variable we wished to forecast. Whereas, independent variables refer to factors that are used to predict the value of the dependent variable.

CHAPTER IV
RESEARCH FINDINGS

The quantitative approach of a Google form survey was chosen for this study. Consequently, there are 139 samples available to determine the variables influencing consumers' intention to use a mobile application to buy organic products online. However, there are only 119 respondents or 85% of total respondents that can benefit from this research since they are interested in organic products and own a smartphone. This research will aid in defining the sample's behavior. Once all the information is gathered, the study will be able to determine which kind of variables will help enable the employment of the organic mobile application from the consumer point of view.

From the research, there are 119 samples where 62 females, 55 males, and 2 others. The majority is female with the percentage of 52.1 followed by male with the percentage of 46.2. Where the percentage of others is only 1.7%.

Table 4.1: Proportion of respondents' gender

Could you please tell me your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	62	52.1	52.1	52.1
	male	55	46.2	46.2	98.3
	other	2	1.7	1.7	100.0
	Total	119	100.0	100.0	

There are 4 ranges of the respondents' age. 26-30 years old is the majority for this research with the number of 64 participants. In the other word, there are 53.8% who are between 26-30 years old from the overall participants. 26.9% are people with more than 40 years old. 12.6% are between 31-40 years old. Where 6.7% of the respondents aged between 20-25 years old.

Table 4.2: Proportion of respondents' age range

Could you please tell me what your age is?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	> 40	32	26.9	26.9	26.9
	31 - 40	15	12.6	12.6	39.5
	26 - 30	64	53.8	53.8	93.3
	20 - 25	8	6.7	6.7	100.0
	Total	119	100.0	100.0	

Most of the respondents have personal income between 40,001 - 60,000 Baht per month with 27.7% of the overall sample. Where 25.2% monthly personal income between 20,001 - 40,000 Bath. Following by, 23.5% who have a monthly personal income more than 80,000 Baht. Where monthly personal income between 60,001 - 80,000 Baht is 19.3% of the respondents. The lowest personal income which is 20,000 Baht or less is 4.2% of the respondents.

Table 4.3: Proportion of respondents' income range

Please indicate your monthly personal income?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More than 80,000 Baht	28	23.5	23.5	23.5
	60,001 - 80,000 Baht	23	19.3	19.3	42.9
	40,001 - 60,000 Baht	33	27.7	27.7	70.6
	20,001 - 40,000 Baht	30	25.2	25.2	95.8
	20,000 Baht or less	5	4.2	4.2	100.0
	Total	119	100.0	100.0	

The educational backgrounds are doctoral degree, master degree, bachelor degree, high school, and others. Most of the respondents have achieved a bachelor degree with the percentage of 55.5. The respondents who have an education background of master degree are 40.3%. Where the doctoral degree is 2.5% of the sample. High school and others are 0.8% from the respondents.

Table 4.4: Proportion of respondents' education background

Please indicate your education background?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Doctoral Degree	3	2.5	2.5	2.5
	Master Degree	48	40.3	40.3	42.9
	Bachelor Degree	66	55.5	55.5	98.3
	High School	1	.8	.8	99.2
	Others	1	.8	.8	100.0
	Total	119	100.0	100.0	

There are various types of occupancy for the respondents to choose which are an employee, self-employed, student, homemaker, and others. Most of the respondents are employees with the number of 56 people from 119 which is 47.1% of the total sample. 34.5% of the respondents are self-employed. 8.4% of them are homemakers. Where 5.9% are students and 4.2% are others.

Table 4.5: Proportion of respondents' occupation

Please indicate your occupation? (If more than one choices suited you, please choose the main one.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	An employee	56	47.1	47.1	47.1
	Self-employed	41	34.5	34.5	81.5
	Student	7	5.9	5.9	87.4
	Homemaker	10	8.4	8.4	95.8
	Others	5	4.2	4.2	100.0
	Total	119	100.0	100.0	

4.1 Factor analysis

4.1.1 Total variance explained

When analyzing the table of total variance explained, the eigenvalue is used to describe the fraction that explain the meaning of statistical findings. The eigenvalue or amount of variation in the original variables accounted for by each component is given in the Total column (Actingcolleges.org, n.d.). The percent of Variation column

displays the proportion of variance accounted for by each component to the total variance in all variables. Hence, the Cumulative % column displays the proportion that clarify the meaning of statistical findings. In this study, a total of 9 attributes with 3 constructs are finalized after reducing the attributes that are cross loading, low factor loading, and have mismatched meaning. Eventually, 76% variance explained is accumulated with the components in eigenvalues.

Table 4.1.1: Finalize version of Total Variance Explained

Total Variance Explained

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.970	44.116	44.116	2.425	26.949	26.949
2	1.689	18.772	62.888	2.299	25.543	52.491
3	1.184	13.151	76.039	2.119	23.548	76.039
4	.593	6.592	82.631			
5	.490	5.443	88.074			
6	.375	4.169	92.243			
7	.289	3.207	95.450			
8	.244	2.710	98.160			
9	.166	1.840	100.000			

Extraction Method: Principal Component Analysis.

4.1.2 Scree plot

The Scree Plot is a visualization of the eigenvalues mentioned in total variance explained (Geert, n.d.). We can see that the first 3 components have eigenvalues over 1 and consider them as the strong factors, in which they are Reliability, Traceability, and Hygiene standard respectively. Since component number 4 onwards has a dramatic drop from the strong factors, for those eigenvalues below 1, we consider them the weak factors underlie our questions.

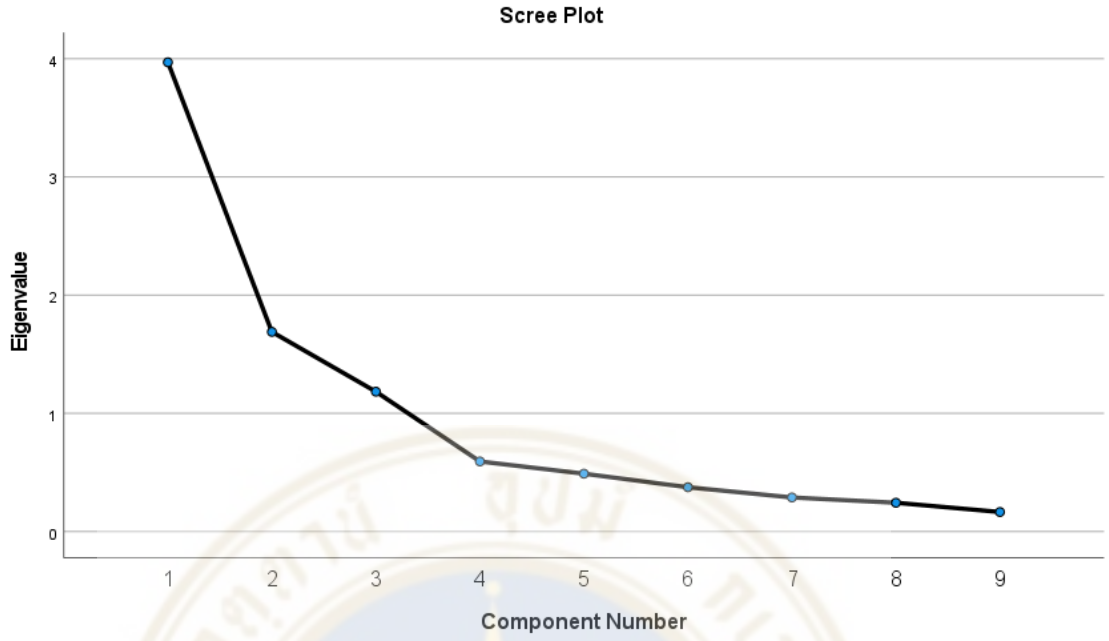

Figure 4.1.2: Finalize version of Scree Plot

4.1.3 Rotated component matrix

With 3 components and 9 attributes in the rotated component matrix, each construct is named as follows: Reliability, Traceability, Hygiene Standard.

4.1.3.1 The 1st construct "Reliability". In other words, in the construct Reliability, the respondents consider the features that show the process of finishing their organic products.

- I think a feature that shows real time production of organic product is important.
- I think a feature that shows real time packing process of organic product is important.
- I think a feature that allows 24 hours live stream of organic products' production process is important.

4.1.3.2 The 2nd construct "Traceability". In the construct Traceability, the respondents consider features that allow them to trace their organic products back to where, how, and who produced their goods.

- I think a feature that provide organic farmers' location is important
- To me knowing where my organic foods are produced is important.

- To me knowing how my organic foods are produced is important.

4.1.3.3 The 3rd construct is the “ Hygiene Standard”. The last construct Hygiene Standard implies that respondents consider features that can mark confirmations of the hygiene standard on their organic products.

- I think the application should distinguish organic farmers with or without hygiene standard in the production.
- I think the application should distinguish organic products with or without hygiene standard in the production.
- To me a feature that demonstrate hygiene standard of organic food production is important.

Table 4.1.3: Finalize version of Rotated Component Matrix

Rotated Component Matrix[a]

	Component		
	1	2	3
I think a feature that shows real time *production* of organic product is important.	.908		
I think a feature that shows real time *packing process* of organic product is important.	.849		
I think a feature that allows 24 hours live stream of organic products' production process is important.	.826		
I think a feature that provide organic farmers' location is important.		.872	
To me knowing where my organic foods are produced is important.		.847	
To me knowing how my organic foods are produced is important.		.779	
I think the application should distinguish organic *farmers* with or without hygiene standard in the production.			.874
I think the application should distinguish organic *products* with or without hygiene standard in the production.			.857
To me a feature that demonstrate hygienic standard of organic food production is important.			.693

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 4 iterations.

4.1.4 Descriptive statistics (Factor analysis)

Mean, Standard Deviation, and Analysis N are the three components in descriptive statistics. Mean demonstrates the average finding from the respondents' answer. In this case, the number is ranging from 1 to 4 in which they are Strongly

Disagree, Disagree, Agree, and Strongly Agree respectively. Standard Deviation explains the similarity among respondent's answers and questions. In other words, when standard deviation equal to zero, all of the replies are similar. In contrast, when Standard Deviation is high by its numeric value, the responses have less similarity among each other. Analysis N is equal to 119 means that there are 119 usable responses in this analysis. In these findings, we may state that the components demonstrated by respondents mostly respond with "Agree". This is when the Mean displayed a figure higher than 2.5. On the other hand, "Disagree" is rational when a figure below 2.5 is displayed in the Mean. Since all of the questions/attributes in this descriptive statistical table of the factor analysis illustrate the Means higher than 2.5, Reliability, Traceability, and Hygiene Standard can conclude to be notable in this study.

Table 4.1.4: Descriptive Statistic (Factor Analysis)

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
I think the application should distinguish organic *farmers* with or without hygiene standard in the production.	3.63	.609	119
I think the application should distinguish organic *products* with or without hygiene standard in the production.	3.69	.579	119
To me a feature that demonstrate hygienic standard of organic food production is important.	3.59	.630	119
I think a feature that shows real time *production* of organic product is important.	3.06	.826	119
I think a feature that shows real time *packing process* of organic product is important.	3.09	.854	119
I think a feature that allows 24 hours live stream of organic products' production process is important.	2.71	1.020	119
I think a feature that provide organic farmers' location is important.	3.43	.720	119
To me knowing how my organic foods are produced is important.	3.34	.762	119
To me knowing where my organic foods are produced is important.	3.36	.673	119

4.2 Multiple regression analysis

In this analysis, the “intention to use” or the question in the survey “If this organic mobile application is available next month, I would use it.” is the dependent variable. Where Reliability, Traceability, and Hygiene Standard are the three constructs cultivated from factor analysis conducted as independent variables. The study shows the

"intention to use" is applied to with the indication of 1 to 4 scoring from Strongly Disagree, Disagree, Agree, and Strongly Agree respectively.

4.2.1 Descriptive statistics (Multiple regression analysis)

Here the study can conclude that the majority of the respondents are interested in using the mobile application that connects farmers with consumers directly. The study implies Reliability, Traceability, and Hygiene Standard indicate 119 respondents "Agree" to use this organic mobile application since the Mean of intention to use is 3.26 which is more than 2.5. The standard deviation of .670 informs the responses are somewhat similar and lean toward agreed. The study can conclude that the intention to use, Reliability, Traceability, and Hygiene Standard variables are all notably in descriptive statistics.

Table 4.2.1: Descriptive Statistics (Multiple Regression Analysis)

Descriptive Statistics

	Mean	Std. Deviation	N
If this organic mobile application is available next month I would use it.	3.26	.670	119
threeReliability	2.9524	.80052	119
threeTraceability	3.3754	.63120	119
threeHygieneStandard	3.6359	.50233	119

4.2.2 Anova

In this study, Anova analysis is used to test if there is a difference between each construct. In other words, to reconfirm the difference between Reliability, Traceability, and Hygiene Standard. When the F value is higher than 1 and Sig. $<.001^{b}$ the analysis indicates each test subject is different. Since the F value shows a number of 6.535, it means Reliability, Traceability, and Hygiene Standard are not related.

Table 4.2.2: Anova analysis (Multiple Regression Analysis)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.709	3	2.570	6.535	<.001[b]
	Residual	45.216	115	.393		
	Total	52.924	118			

a. Dependent Variable: If this organic mobile application is available next month I would use it.

b. Predictors: (Constant), threeHygieneStandard, threeReliability, threeTraceability

4.2.3 Coefficients analysis

Standardized Coefficients Beta indicates the weight increase for each input of intention to use. Where the higher is the better for each variable that is significant. For each increase in Traceability by one unit, intention to use increases by .204. Where Reliability and Hygiene Standard increase the weight by .135 and .157 respectively. However, these two variables are not significant, the study failed to reconfirm the impact of Reliability and Hygiene Standard for an increase of intention to use.

Table 4.2.3: Coefficients analysis (Multiple Regression Analysis)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.433	.455		3.152	.002
	threeReliability	.113	.082	.135	1.373	.172
	threeTraceability	.217	.109	.204	1.980	.050
	threeHygieneStandard	.210	.125	.157	1.685	.095

a. Dependent Variable: If this organic mobile application is available next month I would use it.

4.3 The Conceptual Framework

Where the significant value is no more than .05, only Traceability as the dependent variable is relevant to the intention to use as the independent variable. Reliability and Hygiene Standard are the two dependent variables that have no

significant effect on the intention to use the app. In other words, people are interested in Reliability and Hygiene Standard, but these two factors do not contribute to motivating the intention to use. Only Traceability has the effect on the intention to use. Hence, the Reliability and the Hygiene standard has no weight on the “intention to use”, where respondents only concern Traceability for the intention to use this mobile application.

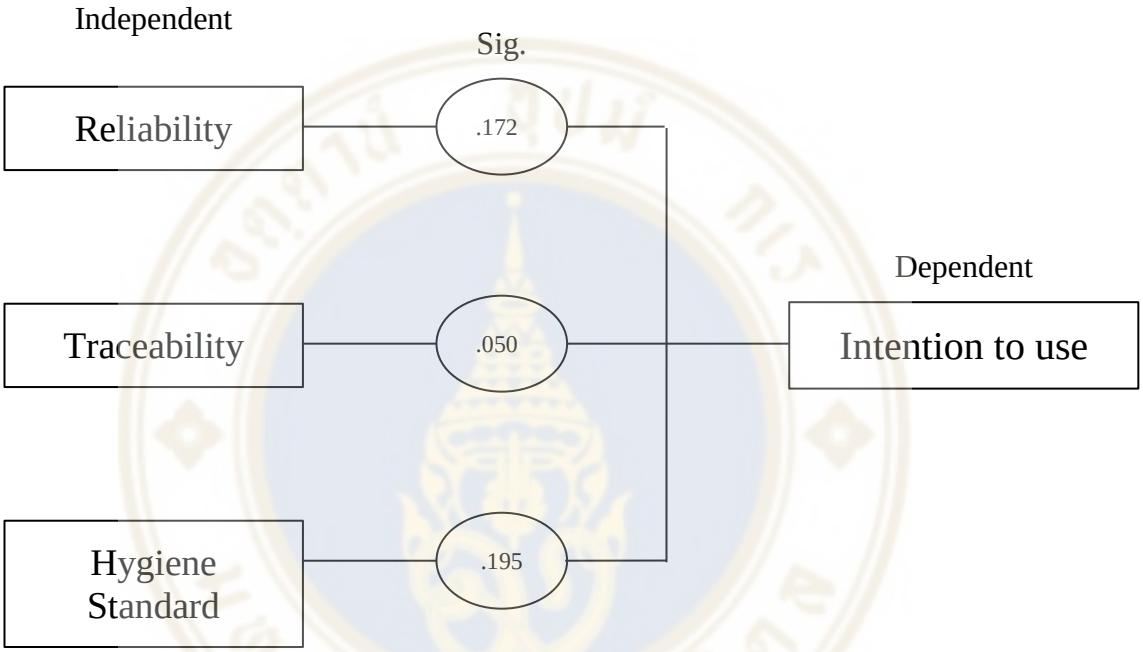

Figure 4.3: The conceptual framework for finalized factors

CHAPTER V
CONCLUSION

5.1 Conclusion

There are 119 samples, including the majority of 62 women. With the number of 64, most participants in this study were between the ages of 26 and 30. With 27.7% of the total sample, the majority of respondents have personal incomes of between 40,001 and 60,000 Baht each month. With a percentage of 55.5, most respondents have earned a bachelor's degree. With 47.1% of the sample being respondents, the majority of respondents are employees.

The findings in this research have concluded respondents are interested in using this mobile application and traceability plays a big role on the intention to use. With the help of mobile applications, people could potentially buy more organic products. Moreover, there are factors that affect the intention to use the mobile application that connects farmers with consumers directly. Three confirmed factors have reclaimed, in other words, three constructs are developed in factor analysis which are Reliability, Traceability, and Hygiene Standard. Traceability is the strongest factor influencing the intention to use this mobile application. This finding was verified by the multiple regression analysis. This means that people are concerned mostly to know where and how their products are produced, as well as knowing where to find the producer. If this mobile application provides features related to Traceability, the consumers will certainly show interest in trying the app. Whereas, Reliability and Hygiene Standard were the two variables that are less significant in multiple regression analysis. Hence, they failed to reaffirm the effect toward the intention to adopt the mobile application. In other words, the respondents are attentive to the production process and the hygiene standard of their selected products; however, the information in these aspects do not directly affect their intention to use the mobile application.

Moreover, because the study was established under organic food context, respondents expected the products to be clean and reliable. The results of this study

suggested traceability outweighed hygiene standard and reliability, this study implies that people will use the application because they want to know where their foods are coming from. Therefore, it is advised that farmers plant their crops without using pesticides.

5.2 Limitations and further research indications

Providing a mock-up application or sample video for the respondents and increasing sample size are the limitations in this research. With limited time and resources, a mock-up application or a sample video that can demonstrate about the features relevant to the study were not offered. These tools would help respondents to visualize their understanding about the questionnaires they are about to attend. Moreover, the sample size is limited. A larger sampling size should be collected since it would provide far more value in this study. More respondents may potentially offer contradictory findings.

In addition, people should have more knowledge about the importance of organic consumption. For further research, an offline information gathering should be implemented. An application should also nurture the usability of the farmers. Furthermore, the sample size was limited to only Thai nationality. Different consumers' demands could be diverse with various nationalities. Thus, further research can explore more about different nationalities. Once more, the area of the respondent is also the factor that can be considered for further research. As the countryside might be easier to find organic food from the offline store compared to the people who live in the city. Therefore, the place they live might affect the intention to use when it comes to purchasing from an online store. Likewise, besides 100% organic production, the variety of the organic food such as made with organic ingredients or 70% organic production can be explored more since different kinds of organic food might affect the result of the research. Moreover, the study should also include implications from the supplier sides. The research could study different sample groups like farmers or other dairy products such as beef. Nevertheless, researching through specific platforms like Freshket, Aow Shopping, and Happyfresh to see if there is a different result or not. The further research

could give a more precise statement about important features since these platforms already exist.

5.3 Recommendation

Since this study has successfully confirmed the relationship between organic products and the mobile application, the study shows mobile applications have a positive impact on organic purchase. Businesses related to organic farming or selling should apply mobile applications as one of their selling channels to improve the awareness of their consumers. They can attract more buyers by proving that they are pesticide-free producers. Nevertheless, if an organic mobile application is developed, it should include features that enable traceability, reliability, and hygiene standards of organic products for its users. The findings in this paper have declared the importance of providing information related to these three factors. In other words, people are likely to use the application to buy organic products if these three features are installed. Moreover, people who are more than 40 years old and income range between 20,000-40,000 are highly suitable for this mobile application. This could mean that in order to successfully demonstrate the dependability of organic products, brands should target people over 40 in their marketing campaigns. Hence, mobile applications can facilitate a better connection between organic farmers and consumers.

Government should enact laws governing organic production to standardize producers. For the related departments, regulating and controlling the use of pesticide should be enforced. Once a certain regulation has secured enough legit producers, the mobile application can help promote farmers who complied with regulations.

Lastly, there are no limits to what a mobile application can do. This organic mobile application could be used in more useful implementations. By utilizing mobile applications, people can find out if plant-based products are truly authentic or not, learn about smart vertical farming, and find out about medical-grade vegetables. Therefore, for consumers, decreasing the risk of cancer by buying from online platforms that enable information about the products' safe origin.

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APPENDICES

Questionnaires - Organic products and mobile application

I am a master's degree student at College of Management Mahidol University and currently exploring factors that affect the use of a mobile application where people can connect directly with farmers of organic products.

The scope of this 5 minutes survey is to understand which factors can influence the use of mobile application that connects with organic products.

Screening question

1. Do you have an interest in purchasing organic products?
   - Yes
   - No
2. Do you have a smartphone?
   - Yes
   - No

Specific question

1. I think a feature that allows organic farmer to create live content is important
2. I prefer to have a feature that recommend similar organic products that I am interested from different farmers
3. I think the application should distinguish organic farmers with or without hygiene standard in the production
4. I think the application should distinguish organic products with or without certificate in the production
5. To me a feature that recommend best selling organic products is important
6. If I buy organic products from the mobile application, it is possible for me to buy from the farmers without certification
7. I think a feature that recommend products that related to my interest is important
8. I prefer delivering service rather than pick up at other places
9. I think the application should distinguish organic products with or without hygiene standard in the production
10. I think the application should distinguish organic farmers with or without certificate in the production

11. Example of pictures of direct contact with organic farmers in a mobile application. Farmers can share their location of their farm for those buyer who are interested to make visit.
12. I prefer an application that allow me to contact organic farmers directly
13. I prefer cashless payment through mobile application rather than paying by cash or card up front
14. I think the application should provide a prove of hygiene standard from organic farmers.
15. I think a feature that recommend new organic products is important
16. I prefer a feature that recommend dishes that I could make with organic products I purchase
17. I think the application should be able to provide traceability of organic products
18. To me a feature that demonstrate certification of the organic famers is important to me
19. To me a feature that demonstrate certification of the organic products is important.
20. To me a feature that demonstrate hygienic standard of organic food production is important.
21. I think a feature that shows real time production of organic product is important
22. I think a feature that shows real time packing process of organic product is important
23. Example of pictures of organic e-commerce in a mobile. Buyer can pick a variety of organic products such as fruit and vegetables.
24. This mobile application should provide decent basket feature to purchase organic products
25. To me knowing when my organic foods are produced is important
26. I am more keen to purchase an organic product that has certification presented in the application.
27. I am more keen to purchase an organic product that has hygiene standard presented in the application.
28. I think a feature that allows 24 hours live stream of organic products' production process is important.

29. A mobile app that allow price comparison of organic product is important to me
30. I think a feature that provide information on the package of organic products is important.
31. I think a feature that provide organic farmers' location is important
32. To me knowing how my organic foods are produced is important
33. If I buy organic products from the mobile application, it is possible for me to buy from the farmers without hygiene standard
34. To me purchasing through mobile application is preferable than going out to a market
35. To me knowing where my organic foods are produced is important

The intention to use

36. If this organic mobile application is available next month I would use it

Demographic question

1. Could you please tell me your gender
   - Male
   - Female
   - Others
2. Could you please tell me what your age is?
   - Less than 20 years old
   - 20 - 25 years old
   - 26 - 30 years old
   - 31 - 40 years old
   - More than 40 years old
3. Please indicate your monthly personal income?
   - 20,000 Baht or less
   - 20,001 - 40,000 Baht
   - 40,001 - 60,000 Baht
   - 60,001 - 80,000 Baht
   - More than 80,000 Baht
4. Please indicate your education background?

High School

Bachelor Degree

Master Degree

Doctoral Degree

Others

5. Please indicate your occupation? If more than one choice suited you, please choose the main one.

Student

An employee

Self-employed

Homemaker

Others

You can skip a series of questions after this if you are unable to provide contact information for reward delivery.

A total of 15 Getvege City Farm organic Kale will be sent out during September 2022 by random drawing from up to 150 participants.

Destination to receive the prize

1. Destination address
2. Receiver phone number
3. Receiver name

Appendix 1

Cross-tabulation the intention to use and age ranges

If this organic mobile application is available next month I would use it. * Could you please tell me what your age is? Crosstabulation

Count

		Could you please tell me what your age is?				
		> 40	31 - 40	26 - 30	20 - 25	Total
If this organic mobile application is available next month I would use it.	strongly disagree	0	0	1	0	1
	disagree	2	2	8	0	12
	agree	15	8	35	3	61
	strongly agree	15	5	20	5	45
Total		32	15	64	8	119

Appendix 2

Cross-tabulation the intention to use and income ranges

If this organic mobile application is available next month I would use it. * Please indicate your monthly personal income? Crosstabulation

Count

		Please indicate your monthly personal income?					
		More than 80,000 Baht	60,001 - 80,000 Baht	40,001 - 60,000 Baht	20,001 - 40,000 Baht	20,000 Baht or less	Total
If this organic mobile application is available next month I would use it.	strongly disagree	1	0	0	0	0	1
	disagree	3	2	5	2	0	12
	agree	11	10	20	18	2	61
	strongly agree	13	11	8	10	3	45
Total		28	23	33	30	5	119

Appendix 3

Cross-tabulation the intention to use and education backgrounds

If this organic mobile application is available next month I would use it. * Please indicate your education background? Crosstabulation

Count

		Please indicate your education background?					
		Doctoral Degree	Master Degree	Bachelor Degree	High School	Others	Total
If this organic mobile application is available next month I would use it.	strongly disagree	0	0	1	0	0	1
	disagree	0	7	5	0	0	12
	agree	1	24	36	0	0	61
	strongly agree	2	17	24	1	1	45
Total		3	48	66	1	1	119

Appendix 4

Cross-tabulation the intention to use and genders

If this organic mobile application is available next month I would use it. * Could you please tell me your gender? Crosstabulation

Count

		Could you please tell me your gender?			
		female	male	other	Total
If this organic mobile application is available next month I would use it.	strongly disagree	0	1	0	1
	disagree	6	5	1	12
	agree	36	24	1	61
	strongly agree	20	25	0	45
Total		62	55	2	119

Appendix 5

Cross-tabulation the intention to use and occupation

If this organic mobile application is available next month I would use it. * Please indicate your occupation? (If more than one choices suited you, please choose the main one.) Crosstabulation

Count

		Please indicate your occupation? (If more than one choices suited you, please choose the main one.)					
		An employee	Self-employed	Student	Homemaker	Others	Total
If this organic mobile application is available next month I would use it.	strongly disagree	0	1	0	0	0	1
	disagree	5	5	0	2	0	12
	agree	32	19	4	4	2	61
	strongly agree	19	16	3	4	3	45
Total		56	41	7	10	5	119