

Evaluating Factors Influencing the Intention to Use Online Ordering System—A Case Study of Lunch Box Purchasing

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Abstract: Consumer behavior may change when a restaurant offers an online ordering option. This study integrates nutrition, price, calories, and customized select functions into a single ordering system platform. The objective of this research was to identify and discuss factors influencing consumer intention to use this system, such as system design and consumer behavior. Using an online lunch ordering system as an example, the technology acceptance model, purchasing habits, and other factors that could affect intentions to use the online ordering service were investigated. The results show that attitude is a major factor, with an effect measuring 0.683. User experience and perceived usefulness also influenced attitude and intention, with their indirect effects being 0.085 and 0.421. The results of this research can be applied both in the industry of restaurant and in daily life.

JEL Classifications: C80, M15, M31, M39

Keywords: Online ordering system, Technology acceptance model, Purchasing habit, Using experience, Internet

1. Introduction

The proportion who eat out regularly are increasing rapidly in Taiwan. Xu (2007) pointed out the proportion who eat out regularly have reached around 3.3 million, especially students and working adults accounting for 35.0% of them. According to a report by Xu (2012), sales revenue for such establishments rose from 344.7 to 372.1 billion NTD from 2010 to 2011.

According to surveys by FIND (2011) and Yang (2012), 78.0% and 71.0% of consumers in Taiwan use the internet to search information and to shop merchandise. Consumers have started to search food-related information , through the web browser, discover plenty of online ordering and delivery services, but rarely provide nutrition and calorie information. This would result consumers spending time to search information, which might reduce their willingness to use online ordering system(Google, 2012; Yahoo, 2012). In Korea, began to use the Internet to integrate information technology with fast food businesses before 2005, even had some pizza stores customized pizzas through online and supervised the baking and delivery process (Korea Institute for Industrial Economics and Trade, 2005; Institute for Information Industry, 2010).

Due to recent global economic conditions, health awareness among consumers in Taiwan, consumers look for affordable options and the healthiest products(Yu, 2012). Currently, many businesses provide delivery services, but such services are mainly reserved for bulk orders, Food deliveries for individuals working overtime or customized orders for small groups would be potentiality.

This research will explore the online ordering system with information (nutritional, pricing, calories) would impact consumers' willingness to use the system. The objective of research is to discover the factors influencing consumer behavior in using online ordering system.

2. Technology Acceptance Model

The Technology Acceptance Model(TAM) was developed by Davis (1989), used to explain the factors influencing consumers' acceptance of technology and to predict consumers' behavior in using technology. Afterward, Davis, Bagozzi & Warshaw (1992) modified the original TAM and proposed the technology acceptance model II (TAM2). Dishaw and Strong (1999) extended and TAM to electronic commerce, results showing that the TAM is feasible in electronic commerce (Zeng, 2010). TAM framework shown in Figure 1:

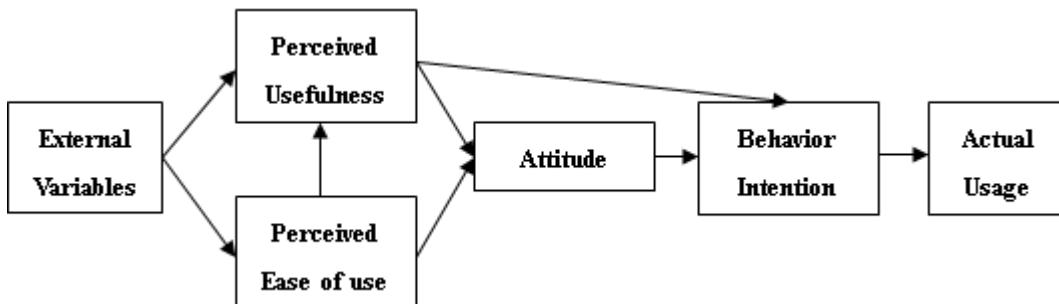


Figure 1. TAM2 framework

The perceived usefulness refers to how much benefits the user feels the technology used can bring to his work performances; perceived ease of use refers to the degree of ease that the user feels about the applied technology (Sledgianowski & Kulviwat, 2009). perceived usefulness and perceived ease of use will affect attitude, which refers to the user's subjective preference for the technology that affects behavior intention, and the possibility of the user using this technology (Taylor and Todd, 1995). From TAM2, this study made the first hypotheses such as follows:

H1: Consumers' behavior intention towards the online ordering system is affected by their attitude and perceived usefulness towards the system.

3. Purchasing Habit and Using Experience

3.1 Consumers' Online Purchasing Habit

Purchasing habit refers to consumers adopting a repetitive method of purchasing products with certain characteristics which eventually forms a specific purchasing model for products with certain types of characteristics (Mindy & Wendy, 2007), which will make consumers neglect attitude's effect for merchandise, a direct impact on behavior intention. Therefore, this research made the second hypothesis such as follows:

H2: Online purchasing habit affects their behavior intention towards the online ordering system directly.

3.2 Using Experience of Online Purchasing Platforms

Changes in consumer behavior due to use experiences in online ordering system can be explained by the utilitarian function theory proposed by Katz (1960), which mentioned that the pain or happiness of past experiences in using online ordering system would form the attitude of consumers towards the platform and in turn affect their behavior intention. Studies of Zaichkowsky (1985) and Solomon (2005) found that “involvement” affects consumers’ attitude by personal, external stimulation and past user experiences.

Therefore, past users of online ordering system would change their attitude , thus affecting their behavior intention towards the system. The third hypothesis such as follows:

H3: Using experience in online purchasing platforms will affect consumers’ behavior intention by impacting the attitude towards such systems.

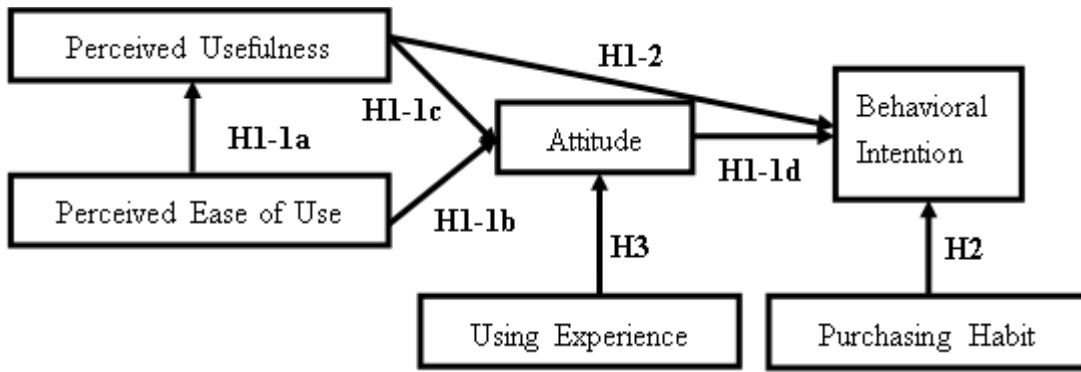
4. Methodology

4.1 The Theoretical Model and Hypothesis

This research combines TAM2, purchasing habit and using experience of the research framework, verify the factors affecting consumers' behavior intention towards the online ordering system. The research framework is shown in Figure 2, while the research hypotheses are Table 1:

Table 1. Compilation of research hypotheses

| |
|---|
| H1: Consumers’ behavior intention towards the online ordering system is affected by their attitude towards using the system H1-1: Consumers’ attitude towards using the online ordering system affects their behavior intention towards the system H1-1a: Perceived ease of use affects perceived usefulness. H1-1b: Perceived ease of use affects consumers’ attitude towards using of the online ordering system. H1-1c: Perceived usefulness affects consumers’ attitude towards using of the online ordering system. H1-1d: Attitude towards using the online ordering system affects the behavior intention. H1-2: Perceived usefulness directly affects the behavior intention towards the online ordering system. |
| H2: Online purchasing habit affects their behavior intention towards the online ordering system directly. |
| H3: Using experience of online purchasing platforms affects consumers’ attitude, and in turn their behavior intention towards the system. |

**Figure 2.** Research framework

4.2 Research Platform

Huang (2000) found guiding functions could assist consumers to receiving information, would increase willingness to use the online ordering system. Guo, Wang & Huang (2005) research showed that a Friendly interface could reduce the burden of consumers when searching information. This research used the online ordering system as an experiment platform to investigate the effect on consumers' intention to use the ordering system. Adobe Flash CS4 was used to construct the system while the design and conceptual layout of the system contents were taken in reference to the design method of Weng & Chao (2012).

Layout of the interface can be classified into different areas according to the type of food; pricing, computation of calories; nutritional values, calories, and food prices; interactive buttons. Due to Taiwanese preference for large quantities of information, providing them with the relevant information can help to reduce their sense of insecurity in terms of purchasing risk as they feel that it is a form of quality assurance (Zarkin and Anderson 1992); (Wan, 2000) Interface and operating procedures of the online ordering system are shown in Figure 3, and Figure 4:

**Figure 3.** Online ordering system (a), (b)

Figure 3(a) shows the standardized operating interface for the online ordering system, which makes use of the cursor to select and order food items as shown in the next figure. Figure 3(b) shows the selection of white rice, Sushi, and cold bamboo shoots with the cursor while the "Total" and "Calories" field show the total price and calories value respectively. The five bar below shows the nutritional values for the respective food items, calories and pricing information. The interface upon completion of ordering procedures in shown in Figure 4 below.



Figure 4. Completion of ordering procedure (a), (b)

4.3 Research sample collection

The sample was collected by questionnaire. The questionnaire was developed with the Likert five point scale and dimensions were designed by relevant literature.

5. Analysis and Interpretation

The questionnaire and hypothesis were verified through SPSS 20 and AMOS 18.

5.1 Structural Composition of Research Sample

There were totally 195 sets of questionnaires handed out to the research sample, with 6 of them eliminated after return due to invalid answers (including empty questionnaires, incomplete answers, and those with obvious answering patterns). The total number of valid questionnaires was 189 sets.

The structural composition of the research sample was as follow: 87.3% were students, 2.1% were workers, 3.2% were businessmen, 0.5% were farmers, 2.6% were civil servants, 2.1% were self employed, while other professions made up the remaining 2.1%. The student group, the highest proportion who eat out regularly, are major component of the sample.

5.2 Reliability and Validity Analysis

The analysis of reliability and validity dimensions could have been affected by the composition structure of the research sample separated the various factor dimensions into groups before analyzing them respectively for reliability and validity, in order to achieve a more stable validation of factor dimensions.

Factor analysis was first conducted for perceived usefulness(PU), perceived ease of use (PEOU), and attitude(ATT) as its principal component analysis using the maximum variation orthogonal shaft law. The factor analysis was conducted with an eigenvalue above 1., KMO was 0.958, Barlett test of Sphericity chi-square distribution value of 1971.716 with 0.000 significant value ($p < 0.005$). This implies that the questions in this research are suitable for conducting factor analysis. The observation variables are “perceived usefulness”, “perceived ease of use”, and “attitude” respectively, with factor loading values ranging between 0.521 and 0.841. The explained variance and internal consistency of “perceived usefulness” were 25.6% and 0.892 respectively; the explained variance and internal consistency of “perceived ease of use” were 25.6% and 0.908 respectively; the explained variance and internal consistency of “attitude” were 18.9% and 0.840 respectively; the accumulated variance was therefore 70.1%.

External variables were considered next: factor analysis was conducted for purchasing habit (PH) and using experience (EXP) of online purchasing platforms respectively. Factor analysis was conducted for PH using principle component analysis by applying maximum variation orthogonal shaft law with an eigenvalue of more than 1. KMO was 0.713. The Barlett test of sphericity chi-square distribution value was 259,346 with significance of 0.000 which is significant ($p<0.005$). Even though academics believed that factor analysis is only appropriate for questionnaires with KMO values above 0.8, Kaiser (1974) did not mention the value of KMO required in order for factor analysis to be appropriate. Despite being only 0.719, the KMO value in this research was already above average and at a significant level. Therefore, the questionnaire in this research was deemed appropriate for factor analysis with factor loading value between 0.524 – 0.748, explained variance of 42.9% and internal consistency of 0.722; factor analysis was conducted for EXP using principle component analysis by applying maximum variation orthogonal shaft law with an eigenvalue of more than 1. KMO was 0.871. The Barlett test of sphericity chi-square distribution value was 549,996 with significance of 0.000 which is significant ($p<0.005$). This implied that the questionnaire was appropriate for factor analysis with factor loading values between 0.612 – 0.876, explained variance of 62.2% and internal consistency of 0.884.

Finally, the analysis of the variables to be investigated is detailed: factor analysis was conducted for BI using principle component analysis by applying maximum variation orthogonal shaft law with an eigenvalue of more than 1. KMO was 0.831. The Barlett test of sphericity chi-square distribution value was 586,844 with significance of 0.000 which is significant ($p<0.005$). This implied that the questionnaire was appropriate for factor analysis with factor loading values between 0.683 – 0.774, explained variance of 71.5% and internal consistency of 0.900.

The aforementioned reliability and validity tests prove that the various questionnaire dimensions have good reliability and validity, and therefore appropriate for use of information gathering in this research.

5.3 Validation the Research Hypothesis

According to recommendation by Rong (2007), using SEM to conduct validation of the hypothesis were GFI = 0.863, AGFI = 0.823, CFI = 0.948, NFI = 0.894, RFI = 0.876, IFI = 0.949, and RMR = 0.027. If conduct SEM, the general sample size are five times the estimated number of parameters but it isn't absolutely, in this research were total 36 parameters which composed six dimensions, our sample size were 189 sets, approximation of the minimum size which required (216 sets). The hypothesis model pathway for this research is shown in Table 2:

Table 2. Hypothesis model pathway for this research

| Pathway for hypothesis model | Standard structural coefficient | t | P | Hypothesis |
|------------------------------|---------------------------------|--------|-------|------------|
| PEOU → PU | 0.926 | 10.290 | 0.000 | H1-1a |
| PU → ATT | 0.617 | 2.901 | 0.004 | H1-1c |
| PEOU → ATT | 0.266 | 1.237 | 0.216 | H1-1b |
| EXP → ATT | 0.125 | 2.070 | 0.038 | H3 |
| PU → BI | 0.208 | 0.793 | 0.428 | H1-2 |
| ATT → BI | 0.683 | 2.320 | 0.020 | H1-1d |
| PH → BI | 0.006 | 0.074 | 0.941 | H2 |

The pathways for the hypothesis model include $\text{PEOU} \rightarrow \text{PU}$, $\text{PU} \rightarrow \text{ATT}$, $\text{EXP} \rightarrow \text{ATT}$, and $\text{ATT} \rightarrow \text{BI}$, with the respective pathways achieving significance. PEOU has a significant positive effect on PU, with a standard structural coefficient of 0.926 (t value of 10.926), implying that hypothesis H1-1a is valid; PU has a significant positive effect on the ATT of the online ordering system, with a standard structural coefficient of 0.617 (t value of 2.901), implying that hypothesis H1-1c is valid; ATT of the online ordering system has a significant positive effect on the BI, with a standard structural coefficient of 0.683 (t value of 2.320), implying that the hypothesis H1-1d is valid; the 3 pathways of $\text{PEOU} \rightarrow \text{ATT}$, $\text{PU} \rightarrow \text{BI}$ and $\text{PH} \rightarrow \text{BI}$ do not have significance, implying that the hypothesis H1-1b, H1-2 and H2 are rejected.

Hypothesis H3: Users' experience for online purchasing platforms would affect the attitude, which would in turn affect the intention to use the system. Based on Lee and Chen (2012)'s direct and indirect methods of judging the effects of the different variable dimensions, the effects of the intervening variables in this research are validated. Results show that EXP has an insignificant effect on the BI pathway, but affects the ATT pathway significantly. Therefore, ATT is an intervening variable between EXP and BI, with an indirect effect of 0.085 ($0.125 \times 0.683 = 0.085$), implying that hypothesis H3 is valid. The final model validation results are shown in Figure 5:

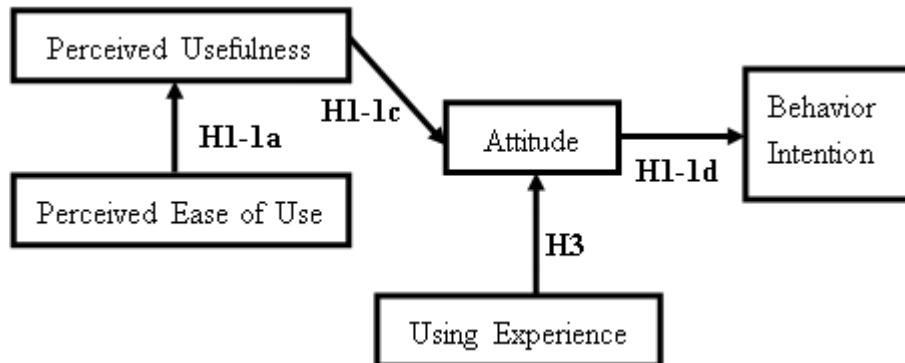


Figure 5. Model validation results

Therefore, validation analysis of the structural equation model shows that EXP and PU of the purchasing platform changed the ATT of consumers towards the system which in turn changed consumers' BI. Therefore, both EXP and the platform's functions affect the consumers' BI.

5.4 Investigation of the Research Validation

The final validation results are consistent with more than half of the pathway models under the TAM model. However, only using experience (EXP) of online ordering system amongst the external variables are consistent with the research hypothesis. Preliminary validation conclusions show that perceived usefulness (PU) and EXP can only affect behavioral intention (BI) through attitude (ATT). There are a few peculiar phenomenon in this research, which differ to the aforementioned hypothesis, such as perceived ease of use (PEOU) can only affect ATT through PU, unlike under the TAM framework where it can do so directly; PU is unable to affect BI of the online ordering system directly, and can only do so through ATT; PH is unable to affect BI.

In this research, PEOU can only affect ATT through PU, unlike under the TAM framework where it can do so directly. However, the extent of correlation between PEOU and ATT was 0.775. Examining the correlation between PEOU and PU shows the Pearson correlation value to be 0.827 which implied a

high positive correlation. This could be due to the perceived similarity between the above two dimensions for some test subjects of the questionnaire, which in turn affected the overall test results. This resulted in PEOU having to rely on PU to have an effect on ATT in this research. However, such a pathway was also included in the TAM framework. Therefore, the research result can be viewed as one consistent to the TAM framework. Moreover, the extent of effect of PEOU ON PU has reached a value of 0.926, implying that consumers of the online ordering system believe that the ease of use of a system is representative of its practical use. Therefore, it is obvious that consumers pay much attention on the ease of use of the system.

PU is unable to affect consumers' BI of the online ordering system without relying on ATT, despite the former two dimensions having a correlation coefficient of 0.766. Examining the correlation between PU and ATT shows that they have a Pearson correlation coefficient of 0.782, which implies a high and positive correlation though it is still below the co linearity threshold of > 0.8 . Therefore, consumers of the online ordering system viewed PU and ATT differently, possibly due to certain factors not discussed in this research which resulted in consumers paying more attention to the evaluation and emotive factors upon using the system, before deciding whether or not to use the system.

On the other hand, purchasing habit (PH) is unable to affect BI. The correlation value between the two dimensions was only 0.455, which implies only a medium positive correlation. This could be possibly due to the presence of other factors not discussed in this research, or could be due to the fact that PH can only affect BI through another dimension. All these resulted in the users' PH having little effect on their BO for the system. Therefore, other characteristics of the consumer had a much larger effect on BI than PH.

The peculiar phenomenon that arose in this research can be used in relevant researches on online ordering systems in the future. From the other research hypotheses that have been validated, it was discovered that ATT is the main dimension affecting BI. With respect to changing consumers' attitude for them to use the system, businesses can consider attracting consumers through studying the PEOU of the system and improving using experience (EXP) of online purchasing platforms as means to enhance BI.

Some of the validation results obtained in this research obtained might not be consistent with the research hypothesis, possibly due to certain constraints of the research materials structure, which are in turn due to the characteristics of certain groups of research sample. From another perspective, as the behavioral characteristics and objectives of the research sample vary from the overall market consumers which consist of various groups, business can advantage of this online ordering system to attract this particular group of consumers.

6. Conclusion

The hectic lifestyle of Taiwanese has led to the accumulation of unhealthy substances within the body over time, resulting in a negative impact on health. However, the rapidity in spread of medical and health information has allowed Taiwanese to obtain more health related information than before. This has resulted in more people paying attention to physical health with various health care methods adopted. Amongst them, maintaining a healthy diet becomes the easiest health care method for most Taiwanese, who have paid attention to the different aspects of a healthy diet such as energy and nutritional values of dishes. This research primarily evaluated the impact on consumers' intention to use the online system after the aforementioned elements have been incorporated. The evaluation objective was to validate whether the impact was consistent with the hypothesis proposed by the researched as stated above.

The final analysis showed that H1-1b, H1-2 and H2 were not consistent with the results initially expected in this research. H1-1a, H1-1c, H1-1d, and H3 had results that were consistent with the hypothesis, and were targeted on a more specific group of research sample. Therefore, food and beverage businesses targeting specific consumers groups in the market can take reference from these hypotheses.

Subsequently, there is a wide variety of usage for the conclusions of this research including in daily life, academically and practically, where recommendations can be made and applied.

6.1 Practical Contribution

This research used the online ordering system as an example to conduct investigation, with practical contributions mainly in the food and beverage field. The research results can be used as a reference for designing menu systems, and also used for investigation the feasibility of similar ordering systems.

6.2 Possible Directions for Extended Research

A few phenomenon's arose in the validation of the last dimension, of which future relevant researches can be based upon; the use of different theoretical frameworks for future extended academic research can also be considered, such as focusing on user experience and providing of nutritional, calories and pricing information on the online system (Yang, Wang, 2012; Lee & Chen, 2012); with the increase in sales of smart phones and tablets, future researches can be extended to include the study of using online ordering systems through smart phones, tablets and other mobile platforms.

6.3 Application in Daily Life

Besides proving an avenue to order fast food, the nutritional and calories information provided by the online system can also be used as a source of reference for female consumers on diet plans.

In addition, there is an increasing use of new technologies and mobile platforms (smart phones and tablets etc.), with the latter having internet capabilities in most spaces. A MasterCard report showed that more than 40.0% of Taiwanese engage in online purchasing activities through their smart phones (Chang, 2012). Currently, well known ice-cream eateries have rolled out their own specialized APP for downloading and created customized ice-cream favors in order to achieve promotion effects. This could be extended into customized online ordering through smart-phones (Institute for Information Industry, 2011).

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