

Examining the factors that influence the intention to reuse food delivery apps in Portugal

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Abstract: Food delivery apps (FDAs) are an innovative technology and have emerged due to the fast development of smartphones. Customers have widely used FDAs. However, it is important to know the factors that influence the reuse of these apps to further understand what keeps people to continuously use them. Thus, this study proposes to identify and examine the key factors determining customer's reuse intentions of online food delivery services in Portugal using an UTAUT2 based model and a PLS-SEM analysis. It was concluded that effort expectancy, performance expectancy, convenience and social influence have a positive impact on the intention to reuse FDAs explaining 44% of its variance. By comprehending the factors that impact the intention to reuse these apps, this dissertation advances the area of food delivery services by providing recommendations and conclusions for future research.

Keywords: food delivery app, intention to reuse, acceptance models, UTAUT2, PLS-SEM.

1. Introduction

The access to restaurants in a more modern and 21st century-like way was made possible because of FDAs (Roh & Park, 2019). Due to being easily accessible through smartphones the industry of online food delivery services is relatively recent and has been growing, especially since the beginning of the pandemic (Statista, 2021).

There are many reasons that one person can have to use online food delivery services (Zhao & Bacao, 2021; Yeo et al., 2017; Ray et al., 2019). Moreover, a study to understand the factors that influence the intention to reuse FDAs was never applied to Portugal, where the total production of food service activities have been increasing since 1995 (INE, 2021).

2. Literature Review

2.1 Background on FDAs

Ordering food with a mobile phone started to popularise in the 2000s due to the increasing popularity of mobile phones (Jackson, 2021) and nowadays there are two types of FDAs, the "aggregators" and the "new delivery" (Hirschberg et al., 2016). The aggregators display the restaurants in the application, and when a person orders from these apps, that order is sent to that restaurant and then the delivery is taken care of by the restaurant itself. On the other hand, the new delivery apps take care of all the processes meaning they send the order to the restaurant and a deliverer to pick up the meal. In this case, the person in charge of the delivery does not work for the restaurant but, on the other hand, works for the FDA (Hirschberg et al., 2016). Some of these platforms have an international presence; however, the online food

delivery service market varies across countries (Pandey et al., 2022). Thus, there are different challenges to overcome for different countries (Roh & Park, 2019).

The total revenue of FDAs has been increasing yearly (Statista, 2021). And more FDAs are being introduced in the market. FDAs have made the food market evolve, and this evolution has not yet stagnated as from time to time a new feature on this apps is enabled.

2.2 Acceptance model and their applications on FDAs

The number of studies about the factors that influence the intention to use or reuse FDAs has been increasing as these apps have become a part of many people's daily routines. Thus, the acceptance models and suggested variables used in previous studies may give timely and practical information to the accomplishment of this research. Previous studies have used TAM, UTAUT/UTAUT2, ECSS, TPV and TPB. Acceptance models have been adapted throughout the years, meaning that it has been a common practice to drop or insert new variables into the existing models.

Fred Davis developed TAM in 1986 with two goals; the first was to increase knowledge of user acceptance processes and second, TAM should serve as the theoretical foundation for a practical "user acceptance testing" technique (Davis, 1986). TAM assumes that two variables (perceived usefulness and perceived ease of use) influence the behavioural intention to use a technology. However, researchers have been adapting TAM, introducing new factors. TAM has been used alongside other models such as

TOE (Awa et al., 2010; Gangwar et al., 2015) and several studies for many technologies have used TAM to study their intentions of usage (Yang & Su, 2017; Safeena et al., 2013).

TAM was used in the development of a new acceptance model, UTAUT (Venkatesh et al., 2003). This model was developed using "the conceptual and empirical similarities" among other eight theories (Venkatesh et al., 2003). UTAUT's model had three constructs hypothesised to influence the behavioural intention (BI), namely performance expectancy (PE), effort expectancy (EE) and social influence (SI); and two constructs hypothesised to influence use behaviour, being facilitating conditions (FC) and BI. However, and focusing on the consumer's intention to use new technologies, an extended version of UTAUT was developed (Venkatesh et al., 2012). This new model, called UTAUT2, have four new factors influencing BI: hedonic motivation (HM), price value (PV), habit and FC. Moreover, BI, FC and habit were hypothesised to influence use behaviour. Both UTAUT and UTAUT2 have been widely used and adapted. For example, studies for the intention of use of restaurant service robots (Jung & Cha, 2022) and mapping apps (Gupta & Dogra, 2017) have used adapted versions of UTAUT2.

Furthermore, ECSS, TCV and TPB models were used to study the customer's intention to use FDAs. However, these models were less used than TAM and UTAUT2.

For this study, the option was to use the UTAUT2 as it was created based on previous existing models and because it was developed considering the consumers' usage intention of new technologies and so due to previous research. Also, previous research on this subject has used mostly UTAUT/UTAUT2, or TAM in other countries such as China, the USA and South Korea. Furthermore, as it was never used in Portugal for FDAs, this study contributes to this field.

Regarding the model itself, first of all, the constructs to be used are what we are looking for in this study, as PE, EE, SI, HM, PV and habit seem to relate with what FDAs offer to the public and might affect their decisions to keep using the delivery apps. This means that this study will not consider one of the original constructs of UTAUT2, which is FC. Because previous studies did not consider this construct or the ones that considered it did not find relevant influence in the intention to reuse FDAs, FC seemed to need to be more capable of explaining the intention to reuse FDAs to be used in this model. Additionally, to reinforce the model, another construct will be added. This construct will be convenience, as it was already studied in some

technologies, and it appears that convenience may be influencing the intention to reuse FDAs.

2.3 Creating the Conceptual model

2.3.1 Performance Expectancy (PE)

Performance Expectancy can be described "as the degree to which an individual believes that using a system will enhance their job performance" (Venkatesh, 2022). There are many ways a technology can be useful, so in this case, a food delivery service must help users to save time and create a feeling that their performance in several activities is being improved. Previous research found that PE is an important factor influencing the behavioural intention to use FDAs (Christino et al., 2021; Alalwan, 2020; Hong et al., 2021) and it may be influenced by other factors such as various food choices (Troise et al., 2021) and ease of use (Roh & Park, 2019). Meaning that consumers may perceive FDAs as useful because of many factors and features inherent to these apps. Reasonably, PE is highly valued by FDAs' consumers. Thus, it is crucial to know if the Portuguese perceive FDAs as useful. Hence, the following hypothesis is proposed:

H1: Performance Expectancy (PE) positively influences the Intention to Reuse FDAs.

2.3.2 Effort Expectancy (EE)

Effort Expectancy is connected to the perceived ease of use, meaning that it is the easiness allied to the usage of technology; it is defined as "the degree of ease associated with the use of the system" (Venkatesh, 2012). It is highly important in the acceptance of some technologies such as mobile health technology (Hoque & Sorwar, 2017), internet banking for the elderly (Arenas-Gaitán et al., 2015) online grocery shopping apps (Shukla & Sharma, 2018) and also digital advertising (Cho et al., 2022). For food delivery applications, it has been shown that EE positively impacts consumers' intention to reuse FDAs (Muangmee et al., 2021; Puriwat & Tripopsakul, 2021; Ramos, 2020). These means that FDAs should be practical and easy to use for everybody with easy payment methods and registration, for example (Lee et al., 2022). However, some research did not find an influence of EE on the intention to reuse FDAs (Bao & Zhu, 2021; Lee et al., 2019; Zhao & Bacao, 2020). And so, it is important to understand the influence that EE has on the intention to reuse FDAs. Thus, this study proposes the following hypothesis:

H2: Effort Expectancy (EE) positively influences the Intention to Reuse FDAs.

2.3.3 Social Influence (SI)

Social Influence (SI) is conceptualised as the influence of colleagues, friends, or family on consumers to try and use or reuse new

technologies (Venkatesh et al., 2003), such as FDAs. As more and more people keep using FDAs, it was found that SI has a positive influence on the intention to reuse online food delivery services (Kaur et al., 2021; Al Amin et al., 2021; Troise et al., 2021; Wen et al., 2022). This means that people might think that the feedback from other users is fundamental and influences their behaviour intention on reusing this technology. Nonetheless, some research found that SI did not have an impact on consumer's intention to reuse FDAs (Tandon et al., 2021; Flores & Castaño, 2020; Ray et al., 2019). Therefore, it is crucial to understand if peers' and family members' influence will weigh in the intention to reuse FDAs. So, the following hypothesis is proposed:

H3: Social Influence (SI) positively influences the Intention to Reuse FDAs.

2.3.4 Hedonic Motivation (HM)

Hedonic Motivation can be characterised as "the feeling of cheerfulness, joy and enjoyment, which are stimulated by using technology" (Venkatesh et al., 2012). Hedonism is the opposite of rationality and can be specified as "the desire to have fun and be playful" (Yeo et al., 2017). Many studies have proved the influence that hedonic motivation has on the deliberation to use or keep using online delivery services (Alalwan, 2020; Wen et al., 2022). In such wise, users will have a greater attitude towards FDAs and so increasing the intention to keep using FDAs if they perceive it as fun and pleasant. However, with the increase in the use of a particular technology, people become more experienced, and as people become more experienced, hedonic motivation plays a less important role in user behaviour (Venkatesh et al., 2012). Thence, some researchers did not find a positive influence on the intention to reuse FDAs (Christino et al., 2021; Lee et al., 2019). Nevertheless, it is vital to understand if, in the Portuguese population, HM will play a significant role in influencing consumers to reuse FDAs. So, this study proposes the following hypothesis:

H4: Hedonic Motivation (HM) positively influences the Intention to Reuse FDAs.

2.3.5 Price Value (PV)

Price Value is defined as "consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them" and when PV increases, it can influence the intention to buy anything, like a car or a house (Venkatesh et al., 2012). Moreover, to increase sales, Internet retailers use strategies that allow the customer to buy a product at a reduced price (Michalak & Jones, 2003), like sales and

promotions such as "buy one, get one free", increasing PV. Thus, it was found that PV has a significant impact on the intention to reuse FDAs (Pitchay et al., 2022; Tandon et al., 2021; Kaur et al., 2021). Despite that, some found that PV was not a key factor for the intention to reuse FDAs (Lee et al., 2019) or could only predict satisfaction (Alalwan et al., 2020). FDAs always have promotions and no delivery fees for some restaurants. Consequently, it is important to understand if consumers firmly believe that benefits from using delivery apps exist for the monetary value that they pay, influencing their decision to reuse them. Thence, the following hypothesis is proposed:

H5: Price Value (PV) positively influences the Intention to Reuse FDAs.

2.3.6 Habit

It is said that humans are "creatures of habit" (Ajzen, 2002). The more significant part of people's actions is carried out on a routine basis. And so, the more acts and operations a person can do unconsciously, the more room there is for actions that require consciousness and are not natural and innate (Aarts & Dijksterhuis, 2000). For all it is known, with a stronger habit, the stored intentions will influence behaviour (Venkatesh et al., 2012). Habit was found to be affecting PE and EE, ergo positively influencing the intention to use Mobile Library Applications (Rafique et al., 2019) and also, it was found that there is a positive association between other technologies, such as e-money (Khatimah et al., 2019). For FDAs usage, it was discovered that habit had become an essential factor regarding the intention to use (Christino et al., 2021; Alalwan A., 2020). It is, therefore, essential to see if habit has a positive effect on the intention to reuse and also if people are really using FDAs because it has become a habitual routine. Therefore, this study proposes the following hypothesis:

H6: Habit positively influences the Intention to Reuse FDAs.

2.3.7 Convenience

One of the main advantages of using FDAs is the time and effort saved. Because customers do not need to leave their location to order food a bigger sense of convenience is perceived (Ramos, 2020). Effort and time saving are the two fundamental and essential aspects that decide whether a product or service is convenient (Berry, Seiders, & Grewel, 2002). Convenience affects consumers' shopping intention on internet (To, Liao, & Lin, 2007), affects the continuous intentions to use Moodle (Hsu & Chang, 2013) and also has positive effects on the intentions of usage of mobile technology of

English learning for college students (Chang, Yan & Tseng, 2012). Moreover, convenience is positively associated with reuse intention of FDAs (Yeo et al., 2017; Ray et al., 2019; Roh & Park, 2019). Furthermore, PE is influenced by many factors. Convenience was found to have a positive impact on PE, meaning that as consumers feel that FDAs are convenient to use it makes them perceive FDAs as useful (Troise et al., 2021). So, this study will try to find the same association between Convenience and Intention to reuse and also between Convenience and Performance Expectancy, hence the following hypothesis is proposed:

H7a: Convenience positively influences the Intention to Reuse FDAs.

H7b: Convenience positively influences the Performance Expectancy of FDAs.

2.3.8 The conceptual model

Following previous research and taking into account the proposed hypothesis this study will try to understand if PE, EE, SI, HM, PV, Habit, and Convenience are positively influencing the intention to reuse FDAs. The conceptual model's initial version without the variables attached to each construct can be seen in Figure 1.

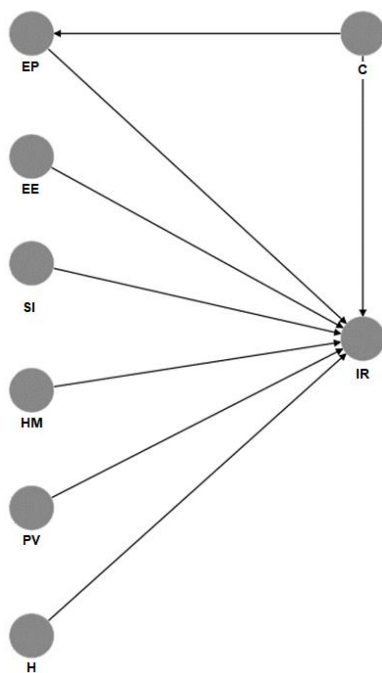


Figure 1. The proposed conceptual model

3. Methodology

3.1 Focus Group

A focus group (FG) was done at an early stage of the study with 8 people, on the 27th of August with trying to understand the main reasons and feelings towards FDAs. The focus group took about 90 minutes, and eight people formed the group, all of the attendees had used FDAs in the

past and were open to discussing this specific topic. The FG was held in order to understand whether the hypotheses proposed in this study stood to reason and whether the variables to be studied were indeed relevant. By the end of the FG, one can perceive the idea that FDAs are convenient, easy to use and useful, which helps reinforce the hypotheses proposed by this study (H1, H2 and H7a). Furthermore, it can be seen that people often look out for promotions meaning that hypothesis H5 may also be confirmed. Also, the idea that the usage of FDAs is becoming a habit is also perceived, helping to reinforce hypothesis H6.

3.2 Building the questionnaire

A questionnaire was developed based on previous studies present in the literature review (Alalwan, 2020; Christino et al., 2021; Jun et al., 2022; Lee et al., 2019; Troise et al., 2021; Yeo et al., 2017; Zhao & Bacao, 2020). The questionnaire was developed using Google Forms.

It had four sections; the first section had a brief introduction explaining the purpose of the survey and had only one question to know what technologies people were responding from. The second section was to gather personal information of the respondents, i.e., the respondents were asked about their gender, age, education level and the number of people in the household. Section 3 included questions asking the frequency of use of FDAs and how long respondents have been using FDAs, as well as the main reasons for the usage and the predilected apps. The fourth and last section of the survey had items that measured the research's constructs, which included IR, PE, EE, SI, HM, PV, Habit and Convenience; these variables can be seen in Table 1. This section's questions had a 7-point Likert scale as most of the previous studies in order to measure each variable being 1= Totally Disagree, and 7= Totally Agree. The survey was done in Portuguese. The questionnaire was sent via e-mail and WhatsApp and shared by a few friends and family and was online from the 15th of September until the 18th of September.

3.3 Data Analysis Strategy

The method adopted for the analysis is divided into two components. A preliminary data analysis is done in the beginning in order to analyse the sample and pick only legitimate answers for the subsequent studies. Additionally, the internal indicator correlations of every factor is assessed. Finally, the p-values of the proposed model are analysed. The PLS-SEM is used for the second analysis, which is broken into two

parts: the assessment of both the outer model and the inner model.

Most researchers used the SEM to examine conceptual models of FDA acceptance. Moreover, when the objective is to do exploratory research, the most appropriate method is PLS-SEM; also, PLS-SEM provides higher statistical power across all sample sizes. Thus, PLS-SEM was the method chosen for this research and the guidelines given by Hair et al. (2013) (Figure 2) were followed for the analysis. The software SmartPLS 4.0.8.3 was used.

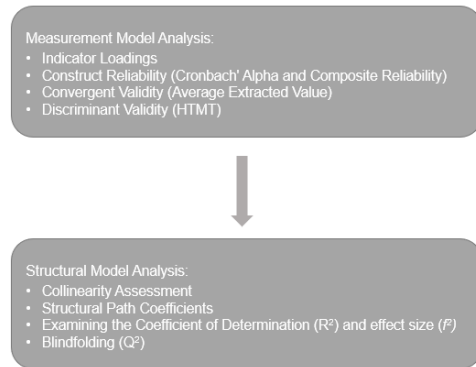


Figure 2. PLS-SEM methodology for the Inner and Outer model analysis. Adapted from Hair et al. (2013)

Finally, a multi-group analysis was done in order to know if gender, age or time of experience play a moderating role on the relationships between the predictor constructs and the exogenous constructs.

4. Analysis and Results

4.1 Preliminary Analysis

730 people replied to the questionnaire. However, 36 answers were, at the start point, considered as errors because they only used the first 3 points of the Likert scale. Also, a total of 243 people responded that they had never used FDAs. So, for data screening only 451 replies were considered. Using various methods 65 replies were found invalid. Thus, 386 replies were accounted for the analysis.

The sample was composed by 63.73% women, and 36.27% men. The majority of participants was between 18 to 23 years old (27.46%) and 50 to 59 years old (20.47%); most part of the respondents had a bachelor's degree (49.48%). And the number of people in the household was very diverse, 19.69% had three people in the household, 19.95% had two people in the household, 25.39% had four people in the household, and 28.24% had five people or more in the household. Furthermore, 38.86% of the respondents had been using FDAs for more than three years and with the majority of people used FDAs once a fortnight (20.73%). However, many respondents also use it once a week (19.95%), once a month (19.69%) and once in

two months (20.21%). The specific socio-demographic information can be seen in Table 2.

	N	Percentage
Gender		
Female	246	63.73%
Male	140	36.27%
Age		
17 or less	18	4.66%
18 to 23	106	27.46%
24 to 29	72	18.65%
30 to 39	44	11.40%
40 to 49	45	11.66%
50 to 59	79	20.47%
60 or more	22	5.70%
Educational level		
Less than Highschool	8	2.07%
Highschool Graduate	50	12.95%
Bachelor's Degree	191	49.48%
Master's Degree	122	31.61%
Doctorate Degree	6	1.55%
Others	9	2.33%
Number of people in the Household		
1	26	6.74%
2	77	19.95%
3	76	19.69%
4	98	25.39%
5+	109	28.24%
Time of Usage		
Less than a year	30	7.77%
From 1 to 2 years	82	21.24%
From 2 to 3 years	124	32.12%
For more than 3 years	150	38.86%
Frequency of food ordering		
Several times a week	31	8.03%
Once a week	77	19.95%
Once a fortnight	80	20.73%
Once a month	76	19.69%
Once in two months	78	20.21%
Once in half a year	44	11.40%

Table 2. Socio-demographic information of the valid responses

The indicators of "intention to reuse" correlated in pairs, meaning IR1 and IR2 showed high values of correlation and the same for IR3 and IR4. Thus, IR could be evaluated whether with IR1 and IR2 or with IR3 and IR4. The indicators with the highest correlation were IR1 and IR2. Hence, it was decided to keep them to the evaluation of the model. No other construct had a problem with the internal correlation. In bootstrap there were three factors (HM, H and PV) with p-values greater than 0.10. This means that these factors were not statistically significant and thus, from the highest to the lowest were removed one by one. Therefore, these results reject hypothesis H4, H5, and H6, respectively. This means that for the PLS-SEM analysis a simpler model was used as seen in Figure 3.

PLS-SEM Analysis

I Measurement model Analysis

For the indicator loadings values greater than 0.708 are recommended. As a rule of thumb, values higher than 0.60 are still acceptable, and only values below 0.40 must be rejected without an evaluation (Hair et al., 2013). There were some loadings between 0.40 and 0.60, meaning some indicators might have been removed in the following steps when assessing the construct's reliability and validity.

To assess the internal consistency reliability both Cronbach's alpha and composite reliability (CR) were calculated. For this model every value of

Cronbach's alpha and CR was above 0.708. This means that the constructs are reliable as no value was lower than 0.708.

For convergent validity the average variance extracted (AVE) of every construct is examined. The value of AVE must be higher than 0.50 so that the construct is valid because this value or above suggests that the construct explains half or more of the variance in its reflected indicators on average (Hair et al., 2013). After assessing every construct's AVE, PE was highlighted for having an AVE lower than 0.50, and although it was a value near 0.50, it was still not acceptable. Thus, one indicator had to be removed and then the AVE would be examined. As PE4 had a loading clearly lower than the other variables and was lower than 0.708, it was removed. By removing PE4, the AVE of PE becomes 0.530, and that means that it is acceptable. Thence, all AVE values are acceptable.

Finally, the criterion used to assess the discriminant validity was the most recommended, the HTMT (Hair et al., 2013). For consistent discriminant validity, the values for HTMT cannot exceed 0.90. the model had discriminant validity as no value was higher than 0.90, and if a more conservative value (0.85) served as a limit, then the model would still be considered valid. The results from the measurement model analysis are displayed in tables 3 and 4.

	Cronbach's alpha	Composite reliability	AVE
C	0.766	0.826	0.534
EE	0.837	0.864	0.582
IR	0.786	0.811	0.663
PE	0.771	0.774	0.530

Table 3. Construct's reliability and convergent validity

	C	EE	IR	PE	SI
C					
EE	0.390				
IR	0.526	0.473			
PE	0.587	0.251	0.538		
SI	0.424	0.308	0.453	0.522	

Table 4. HTMT matrix

II Structural model Analysis

The changes made in the measurement model analysis are considered for this analysis. Thus, the model to be examined does not consider the indicator PE4. The first step is to assess for collinearity among the predictor constructs. In this study, the method used was the VIF. With higher VIF values, higher level of collinearity, and if VIF is 5 or greater, there is critical collinearity among the constructs. All VIF values were below 1.831, meaning that there was no collinearity between the exogenous constructs. Thus, no construct had to be removed meaning

the model would not have any more changes. The final model results can be seen in Figure 3.

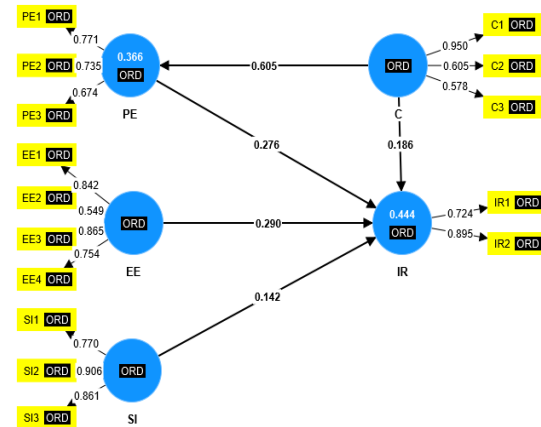


Figure 3. Final model with PLS results

The path coefficients were assessed for their statistical significance. All path coefficients were found to be statistically significant as all p-values were lower than 0.05; moreover, all t-values were higher than 1.96.

Regarding the factors influencing the intention to reuse FDAs; PE has a β -value of 0.276, which is quite relevant; moreover, it is even significant to a significance level of 1% as the p-value is lower than 0.01 and the t-value is greater than 1.96. The same can be said of EE with a very similar path coefficient (0.290) and being statistically significant also at a 1% significance level (p-value=0.000 and t-value=4.405). Furthermore, SI was also found to be relevant with a β -value equal to 0.142, although lower than the past two constructs, but still relevant. SI reflected the lowest t-value (1.995) and the highest p-value (0.046); nonetheless, these values show the statistical significance of this construct. At last, convenience had similar results as SI in the path coefficient of C->IR; even so, it was confirmed that it was relevant as the b-value was equal to 0.186 and significant with a p-value lower than 0.05 and t-value higher than 1.96. The association between convenience and PE showed the highest path coefficient with a value of 0.605 which means that it is highly relevant. Additionally, the path coefficient showed relevance at a significance level of 1%, as the p-value was equal to 0.000.

Thus, hypotheses H1, H2, H3, H7a and H7b are respectively not rejected. Table 5 shows the results for the assessment of the path coefficients.

Hypothesis	Relations	β -value	S.D	t-value	p-value	Decisions
H1	PE -> IR	0.276	0.093	2.959	0.003	Supported
H2	EE -> IR	0.290	0.066	4.405	0.000	Supported
H3	SI -> IR	0.142	0.071	1.995	0.046	Supported
H7a	C -> IR	0.186	0.092	2.019	0.044	Supported
H7b	C -> PE	0.605	0.049	12.403	0.000	Supported

Table 5. Values for the assessment of path coefficients

The results show that the constructs PE, EE, SI, and Convenience account for 44.4% of the variance of the construct IR, which means that the R^2 for that construct is 0.444, and the adjusted R^2 is 0.438; these values indicate a moderate predictive power, according to Hair et al. (2013) which is positive and thus let us conclude that PE, EE, SI and Convenience have a positive influence on the intention to reuse FDAs. However, PE and EE are more significant the SI and Convenience.

Also, Convenience explains 36.6% of the variance of PE as the R^2 is equal to 0.366. The adjusted R^2 is 0.364; these values indicate a predictive power between moderate and weak; however, it is a good value, bearing in mind that only one construct explains the endogenous construct. The values of effect size (f^2) must be higher than 0.02 in order to conclude that the predictor construct has influence on the endogenous construct. Values higher than 0.02 indicate low effect size, whereas values between 0.15 and 0.35 indicate moderate effect size. Thus, Convenience and SI have a lower influence on IR than EE and PE. However, convenience has strong influence on PE.

The blindfolding approach yields the Q^2 value, which determines whether or not the model has predictive potential. The Q^2 for IR was 0.276 and for PE was a slightly lower (0.226). This means that IR and PE have adequate predictive relevance; although IR has higher predictive relevance than PE, this was expected as IR has four predictor constructs, and PE only has one.

III Multi-group analysis

The results for the multi-group analysis show that neither gender nor age play a moderating role on the relationships between the constructs because none of the differences between groups were statistically relevant as seen in table 6 and 7. Moreover time of experience could not be analysed as it did not have sufficient invariance.

	β -value (Female)	β -value (Male)	β diff.	2.5%	97.5%	p-value
C → IR	0.121	0.294	-0.173	-0.350	0.398	0.347
C → PE	0.646	0.533	0.113	-0.186	0.203	0.264
EE → IR	0.330	0.189	0.141	-0.267	0.255	0.295
PE → IR	0.334	0.186	0.148	-0.417	0.391	0.481
SI → IR	0.150	0.138	0.012	-0.297	0.310	0.947

Table 6. PLS-MGA results for gender

	β -value (<29)	β -value (>29)	β diff.	2.5%	97.5%	p-value
C → IR	0.221	0.167	0.054	-0.345	0.367	0.778
C → PE	0.620	0.586	0.033	-0.194	0.178	0.740
EE → IR	0.175	0.428	-0.253	-0.265	0.251	0.058
PE → IR	0.391	0.165	0.226	-0.364	0.366	0.246
SI → IR	0.099	0.139	-0.040	-0.268	0.278	0.776

Table 7. PLS-MGA results for age

However, for the females, IR is most affected by PE (β -value=0.334; p-value=0.004) and EE (β -value=0.330; p-value=0.000), and the path coefficients of Convenience and SI are not statistically significant with p-values equal to 0.328 and 0.105, respectively. On the other hand, for the males, IR is most affected by convenience (β -value =0.294; p-value=0.000), followed by not only EE (β -value 0.189; p-value=0.000) and PE (β -value =0.186; p-value=0.000) but also by SI (β -value=0.138; p-value=0.000). The influence of convenience on performance expectancy is more notorious in females (β -value=0.646; p-value=0.000) than in males (β -value=0.533; p-value=0.000). Also, for the age group, we can name PE as the most influential construct of IR (β -value=0.391; p-value=0.000) for the group of 29 years old or younger. The second construct that most positively affects IR is convenience (β -value=0.221; p-value=0.000), and the third is EE (β -value=0.175; p-value=0.000), it was found that although SI is statistically (p-value=0.000), the β -value, although lower than 0.100, is still sufficiently good to explain IR as the value is close to 0.100. The results are quite different for the age group older than 29 years old as EE is the construct that most positively influences IR; however, the other three constructs were not statistically significant (C's p-value=0.193; PE's p-value=0.137; SI's p-value=0.114). The values did not vary much for the association between C and PE, with a β difference equal to 0.033 and a p-value equal to 0.000 for both groups.

5. Discussion and Conclusions

Before discussing the PLS results, the IR construct was badly measured as the indicator correlations needed to be higher to accept the four variables. Thus, for this study IR was evaluated with only two variables.

Considering the analysis made; HM, Habit and PV were found not to be determinants of the intention to reuse FDAs.

For HM it goes against previous findings where HM was found to have a significant relevance on the intention to use FDAs (Alalwan et al., 2020; Wen et al., 2021; Yeo et al., 2017). However, HM having no influence on the intention to reuse had also been concluded in with previous research (Lee et al., 2019). This means that for this sample, and most probably for the Portuguese, the intention to reuse FDAs is not affected by hedonic motivation. It may be because people are already used to using it and thus, the initial enjoyment of technology is already gone. Also, for this sample, most people are still young and hence more accustomed to using new technologies, so hedonic motivation

does not play an essential role in the intention to reuse FDAs.

For the Portuguese habit has not a significant influence on the intention to reuse FDAs, it may be because people do not see the usage of FDAs as a habit, per se, although it would be expected following Alalwan et al. (2020), Lee et al. (2019) and Christino et al. (2021) discoveries. It may be because people often use FDAs when they do not have the time to prepare meals at home, when they are tired or when they are alone at home and thus, they do not feel that the usage is a habit.

It was expected to exist a positive association between price value and the intention to reuse FDAs. Nonetheless, this study's findings indicate that PV does not affect the intention to reuse FDAs; this follows earlier studies (Alalwan et al., 2020; Lee et al., 2019), meaning that for the Portuguese ordering from FDAs is not as advantageous monetarily as one might have thought. If so, then FDAs providers should increase the promotions and free delivery to increase the feeling that by using the FDAs, the benefits for the money spent are good. Thence one increases the intentions to reuse FDAs.

This study was able to explain 44.4% of the total variance in the intention to reuse FDAs other research has had similar values (Yeo et al., 2017; Pitchay et al., 2022; Bao & Zhu, 2021), and also 36.6% of the total variance in the performance expectancy of FDAs other studies had similar values to explain the variance of PE (Roh & Park, 2019; Song et al., 2021).

It was found that for the Portuguese, PE is one of the two most significant factors influencing the intention to reuse FDAs, meaning that PE is a more prominent predictor of IR because the β -value was equal to 0.276 with a p-value of 0.003. Thus, hypothesis 1: "Performance expectancy positively influences the intention to reuse FDAs" was not rejected. Previous studies found the same results (Jun et al., 2022; Hong et al., 2021; Choi, 2020). This high value may indicate that in today's fast-paced society, FDAs can be useful in everyday life as they can help users save time and increase their productivity. Thus, OFD services providers must show users through efficient advertising the many advantages of using the applications, reinforcing the idea that FDAs make users' lives "easier".

EE was also found to have a high relevance on the influence to reuse FDAs Studies such as Muangmee et al. (2021), Puriwat & Tripopsakul (2021) and Ramos (2020) also came to the same conclusions. In this study, EE was the most influential factor, with a β -value equivalent to 0.290 and a p-value of 0.000. This means that also hypothesis 2 was found to be confirmed. With this, it can be confirmed that people who perceive FDAs as easy to use will most probably

reuse them; ergo, the FDAs' developers should design the applications to make them more practical and easier to use, improving the interaction between the users and the apps. So, FDAs should be designed in a way that users feel that every time they order through the applications, it was more straightforward than the last time.

SI was found to have a significant positive impact on the intention to reuse FDAs. Previous studies have reached the same conclusion (Kaur et al., 2021; Pitchay et al., 2022; Jun et al., 2022). We can then conclude that H3: "social influence positively influences intention to reuse FDAs", has not been rejected. So, people who use FDAs may be influenced by others in order to reuse them, meaning that consumers who see their family and friends using FDAs are more likely to keep using them. This is important for the FDAs providers to know in order to them to keep their consumers. So, it is important to offer coupons to attract family or friends to use FDAs and users should be encouraged to make more reviews.

Convenience was found to have a significant and acceptable positive association with IR. Thus, H7a: "convenience positively influences intention to reuse FDAs" was not rejected. Yeo et al. (2017), Ray et al. (2019), and Roh & Park (2019) concluded the same, meaning that it goes in line with previous studies. Also, convenience was found to strongly influence performance expectancy because it had a high path coefficient (0.605) and p-value equal to 0.000. This means that H7b: "convenience positively influences performance expectancy" was also not rejected. Troise et al. (2020) confirmed this, and studies for other technologies have also come to the same conclusions (Yoon & Kim, 2007; Cho & Sagynov, 2015). People feel that using FDAs is convenient, and thus, they tend to keep using them. Also, the higher the convenience, the more useful it feels to use FDAs; with that, providers of FDAs should increase the number of cities where their services are available and have a higher number of restaurants in order for the users to order at any place, any time.

This shows that in order for FDAs to be effectively designed and developed for consumers to keep using them, developers must consider the FDAs to be easy to use and thus design the applications so that all people find it easy to use because consumers are influenced by those who are closest to them, also FDAs need to be sure that the various benefits that can be brought to consumers are evident and obvious. Furthermore, paying attention to the fact that FDAs can be used anytime, anywhere FDAs should be present in more cities and increase the number of restaurants present on the applications.

As with any other research, this study has some limitations. The first limitation is that although this study was done for the Portuguese population, it cannot be generalised for other countries, as different countries have different cultures and ways of living. With this, future research should focus on understanding the factors influencing the intention to reuse FDAs of other countries or collect data from different countries and do cross-cultural comparisons. Secondly, because only recurring consumers of FDAs are included, meaning only consumers that have used FDAs are being studied, the applicability of the results may be limited; consequently, this study is not relevant to potential clients, and thus the factors that drive to the FDA adoption may be distinct. For example, future studies may focus on the factors that influence the intention to use FDAs for the first time

At last, the multi-group analysis was made only for gender and age, thus future research should study how other socio-demographic or economic factors influence the intention to reuse FDAs.

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Variable	Source
Intention to Reuse	
IR1	If I have an opportunity, I will order food through the FDA.
IR2	I intend to continue using FDAs in the future.
IR3	I plan to continue to use FDAs frequently.
IR4	I will always try to use mobile FDAs in my daily life.
Performance Expectancy	
PE1	I find FDAs useful in my daily life.
PE2	I can save time when I use FDAs for purchasing foods.
PE3	Using FDAs increases my productivity.
PE4	Using FDAs increases my restaurants' options.
Effort Expectancy	
EE1	Learning how to use FDAs is easy.
EE2	Using an FDA would not require a lot of mental effort.
EE3	It is easy to become skilful at using FDAs.
EE4	Interaction with FDAs is clear and comprehensible.
Social Influence	
SI1	People who are important to me (e.g., family members, close friends, and colleagues) use FDAs.
SI2	People who are important to me recommend I use FDAs.
SI3	People who are important to me think it is a good idea to use FDAs.
Hedonic Motivation	
HM1	Using FDAs is fun.
HM2	Using FDAs is enjoyable.
HM3	Using FDAs is pleasant.
HM4	Using FDAs is interesting.
Price Value	
PV1	I can save money using FDAs instead of eating out.
PV2	FDAs are reasonably priced.
PV3	FDAs are good value for the money.
PV4	I am satisfied with the current prices provided by FDAs.
Habit	
H1	The use of mobile food order apps has become a habit for me.
H2	I have been using FDAs more frequently.
H3	Using mobile food order apps has become natural to me.
H4	I must use mobile food order apps.
Convenience	
C1	Using the FDA would be convenient for me.
C2	The FDA would allow me to order food any time.
C3	The FDA would allow me to order food at any place.

Table 1. Table of questionnaire with constructs, items and references.