

The effect of flow experience in the adoption of online supermarkets applying the technology acceptance model (TAM)

El efecto de la experiencia de flujo en la adopción de los supermercados en línea aplicando el modelo de aceptación de tecnología (TAM)

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Abstract

This study aims to improve the understanding of the consumer behaviour in the use of a disruptive technology such as online supermarkets. By understanding this process, we can gain further insight into consumer behaviour. Based on a sample of 651 online supermarket users, structural equations are used to empirically analyse the validity of the model. The effect of flow is identified in terms of perceived ease of use, perceived usefulness and current use of online supermarkets. The importance of this factor is demonstrated as a complement to the TAM elements that can be positively related to online advertising.

Keywords

TAM; flow; online supermarkets; online consumer behaviour; structural equation modelling

Resumen

Este estudio tiene como objetivo mejorar la comprensión del comportamiento del consumidor en el uso de una tecnología disruptiva como los supermercados en línea. Comprender este proceso permite obtener más información sobre el comportamiento del consumidor. Basándose en una muestra de 651 usuarios, se utilizan ecuaciones estructurales para analizar empíricamente la validez del modelo. El efecto del flujo se identifica en términos de facilidad de uso percibida, utilidad percibida y uso actual de supermercados en línea. La importancia de este factor se demuestra como un complemento al TAM que puede estar relacionado positivamente con la publicidad en línea.

Palabras clave

TAM; flujo; supermercados en línea; comportamiento del consumidor en línea; modelos de ecuaciones estructurales

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INTRODUCTION

The process of acceptance and use of a digital environment directly influences the behaviour of consumers in their capacities as users of virtual shopping platforms. Understanding this process helps to further elucidate consumer behaviour in terms of attitude towards online purchases and their purchase intentions on the internet (Khan and Khan, 2020; Woo and Mo, 2016; Park and Park, 2014; Chan and Chong, 2013; Grandón et al., 2010). The most widely used model of adoption behaviour on the Internet in general, and in specific virtual environments in particular, is Davis's (1989) Technology Acceptance Model (TAM). However, several investigations (Liu et al., 2009; Sánchez-Franco et al., 2007; Hsu and Lu, 2004) advocate integrating this model with other models and theories that take into account, not only utilitarian aspects such as those included in the TAM model, but also other intrinsic individual motivations such as flow, in relation to the use of technology. The results of these studies show that the models presented in this context have greater explanatory power.

Despite the fact that many researchers have followed this line of research in recent years to study the acceptance and use of different types of virtual environments, there is an evident lack of studies that present empirical evidence for specific cases. For example, to date, there is no study that has examined the adoption of online supermarkets. To address this absence in the literature, this article presents an analytical model that makes it possible to explain the acceptance and use of online supermarkets and to improve the understanding of user behaviour in their capacity as consumers of mass consumption products through online supermarkets.

The document is structured as follows. First, the TAM is presented and a brief review is provided of the literature on flow in the field of electronic commerce. Reference is also made to the research environment that combines TAM with the flow theory to explain the adoption of technological innovations applied in different fields. Next, an extension of the TAM model is proposed that considers the impact of flow in the field of online supermarkets. The set of relationships used in the proposed model is empirically tested. Finally, the main conclusions are presented.

LITERATURE REVIEW

Literature review has been conducted taking into account the Web of Science database and Scopus database.

TAM in online shopping environments

The focus of this research combines the TAM (Davis, 1989) -one of the behavioural models most used to explain the acceptance and use of new technologies- with the flow theory (Csikszentmihalyi, 1975) to explain the adoption of the online supermarkets.

The TAM explains the behaviour of an individual in relation to the acceptance of a particular technology and its use behaviour (Badenhop and Frasset, 2021; Ahamed et al., 2020; Chen et al., 2018; Agrebi and Jallais, 2015; Jung and Chung, 2015; Li and Bai, 2011; Djamasbi et al., 2010) considering the impact of certain beliefs (i.e. perceived usefulness and perceived ease of use) in terms of the attitude toward using and behavioural intention to use the technology in question. These two external factors are two of the main extrinsic motivations (beliefs) that influence the acceptance and use of technology by the individual. The two variables are positively related (that is, a user-friendly website is more likely to be perceived as useful) and both influence the individual's attitude towards the use of a given technology. Likewise, this model also shows that attitudes toward using the technology are positively correlated with behavioural intention to use, which, in turn, correlates with current system use. In this way, the individual's attitude towards the technology ends up influencing the actual use of it. The behavioural intention to use is also influenced by the perceived usefulness of the technology in question (see Figure 1).

The TAM has made a notable contribution to this field of study, but it is also limited by considering few variables as determinants of attitudes towards the use of technology. In fact, in order to understand the behaviour of online use, the analysis of additional intrinsic motivations is also suggested (e.g. Zhou, 2013; Hsu *et al.*, 2013; Cha, 2011). Similarly, the process of adopting electronic commerce is determined, not only by the utilitarian aspects considered in the TAM, which are strictly related to the results or the reward of the activity itself, but also by the intrinsic motivations for the individual user. Given the

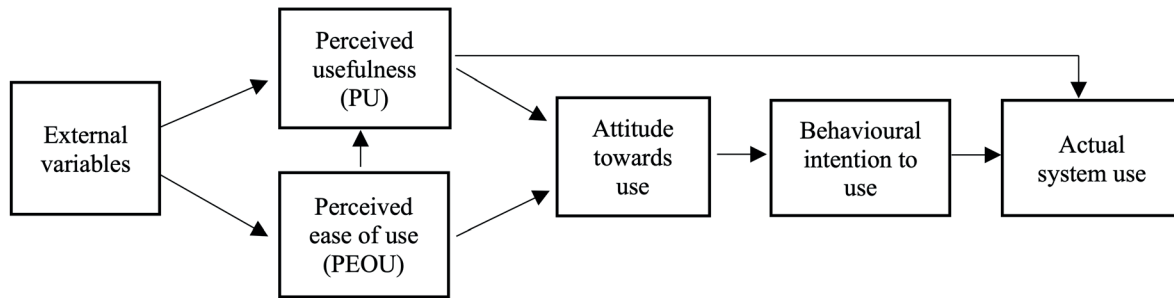


Figure 1. TAM model (Davis, 1989).

importance of this non-cognitive aspect in understanding attitudes toward using electronic commerce environments, a growing number of studies consider aspects of intrinsic motivation, among them, the experience of flow (Khan and Khan, 2020; Sharif and Nagavhi, 2020). This combined approach aims at improving the explanatory power of the models in this research context (Sánchez et al., 2007).

Flow in online shopping environments

Flow is generally compared to a state of intrinsic enjoyment and has been identified as a key intrinsic motivating factor in the acceptance and use of technology (Khan and Khan, 2020; Liu et al., 2018; Hsu et al., 2013; Kim et al., 2013). The concept of flow expresses the idea of an optimal user experience in online activities. In this context, flow induces a state in which navigation itself becomes the main reward, outperforming the possible results derived from the performance of the activity. For this reason, flow is considered an important analytical element that helps describe user-computer interaction and provides a useful means to investigate the intrinsic motivations of a user when adopting online supermarkets. When the user enjoys interacting with an online business, they are more inclined to get involved and place a higher value on online services, which has a positive influence on their behavioural intention to use a particular e-commerce environment (Chen et al., 2018; Kim et al., 2013).

During the interaction with an online shopping environment, consumers can experience states of flow (Khan and Khan, 2020; Disastra et al., 2018; Hossain et al., 2018; Hsu et al., 2017; Kim et al., 2017; Ozkara et al., 2017). Flow is an optimal state of experience in which consumers feel deeply involved in the activity they are developing and are cognitively efficient (Csikszentmihalyi, 1990). Likewise, flow facilitates the adoption of behavioural approaches manifested in longer periods of web use (Kabadayi and Gupta 2005; Van der Heijden, 2004; Koufaris, 2002) and a greater probability of revisiting (Landors et al., 2015; Kabadayi and Gupta, 2005).

Some studies have used flow as an analytical factor to explain other constructs such as fun (Hsu and Lu, 2004; Mathwick and Rigdon, 2004; Chou and Ting, 2003), involvement and immersion (Kim and Han, 2014; Hung et al., 2012; Pappachen and Manatt, 2008; Mathwick and Rigdon, 2004); enjoyment (Kim et al., 2017; Kim et al., 2013; Carlson and O'Cass, 2011; Nah et al., 2011; Chen, 2006) and cognitive absorption (Lee and Chen, 2010; Agarwal and Karahanna, 2000). Flow has also been integrated into classical theories and models to enhance its explanatory power. One of these cases is the integration of the concept of flow in the TAM (e.g. Ahmad and Abdulkarim, 2019; García-Jurado et al., 2019; Chen et al., 2018; Liu et al., 2018; Gao et al., 2016). Research that has followed this strategy concludes that flow is directly related to perceived usefulness, perceived ease of use and behavioural intention to use.

Despite recent studies that integrate flow theory into TAM to explain the motivations for using a website, there is no empirical evidence in the validation of an integrated model to address the acceptance and use of online supermarkets. Therefore, the research presented here constitutes a contribution in this field filling a gap in the literature for this specific field.

RESEARCH MODEL AND HYPOTHESES

Our model seeks to extend the literature on understanding consumer shopping experiences

online in the supermarket environment. To address this question, a theoretical model of adoption of online supermarkets is designed and validated. Specifically, the model is based on a unified proposal that combines all the variables of the TAM and an additional variable of flow.

Taking into account the specific field of online supermarkets as a technological system and the consumer as a computer user, we apply the TAM to evaluate how well it predicts the intention of consumers to use this technological platform. We also combine the TAM with the element of flow that represents an intrinsic motivation of the individual with respect to the use of technology, in order to improve the explanatory power of the proposed model.

Next, the conceptual model and the theoretical analysis of the relationship between variables are presented.

Conceptual model

Among the studies on the adoption of digital environments combining TAM and flow theory, there is no work in the field of online supermarkets. In the literature on the acceptance and use of virtual environments, it has been shown that flow is also directly and positively correlated with other variables identified in the TAM as extrinsic factors (that is, perceived usefulness and perceived ease of use) (see Chen et al., 2018; Jung and Chung, 2015; Hsu et al., 2014; Hsu et al., 2013), therefore, there is a clear opportunity to analyse these relationships in the field of online supermarkets, in order to improve the explanatory power of the proposed model.

Furthermore, we propose to model the process of acceptance and use of online supermarkets taking into account not only the relationship between flow and the intention to use online supermarkets, but also the possible relationships between flow and the other variables of the TAM.

In Figure 2 we present the complete theoretical model. It is made up of a total of 6 variables/constructions, the synthetic description of which is shown in Table 1.

Theoretical analysis of the relationship between variables

Next, we summarise and justify the relationships established in the conceptual model (see Figure 2) by means of propositions. The variables are divided into two groups: (1) relationships between flow and variables in the proposed model; and (2) relationships established between the variables in the TAM.

Relationships between flow and the variables in the proposed model

For the model presented in this study, flow is integrated into the TAM as an intrinsic motivation to examine its influence on the acceptance and use of food shopping environments through online supermarkets. Specifically, we argue that the flow state of a user is directly and positively correlated with the external factors considered in the TAM and with the attitude toward using, behavioural intention of use, and the actual use of online supermarkets.

Specifically, we argue that the flow state of a user is directly and positively correlated with the external factors considered in the TAM and with the attitude toward using, behavioural intention of use, and the actual use of online supermarkets. These studies consider flow as a state of intrinsic enjoyment and propose that experiencing states of flow while using the Internet influences the perceived usefulness and perceived ease of use of technology. That is, the individual who experiences flow in a virtual environment perceives navigation as an easier and more useful activity one who does not experience a state of flow.

To date, the literature that addresses the specific case in the field of electronic commerce has not yet empirically verified the impact of the flow status of consumers of mass consumption products through online supermarkets on the two external factors of the TAM. In this area, perceived usefulness reflects the degree to which the consumer considers that the instrumental use of the website will improve the results of the purchase and facilitate the achievement of the objectives, while the perceived ease of use refers to the consumer's perception that the instrumental use of the website to buy consumer goods is effortless. To confirm the general applicability of the relationship between flow and these external factors, we propose the following hypotheses:

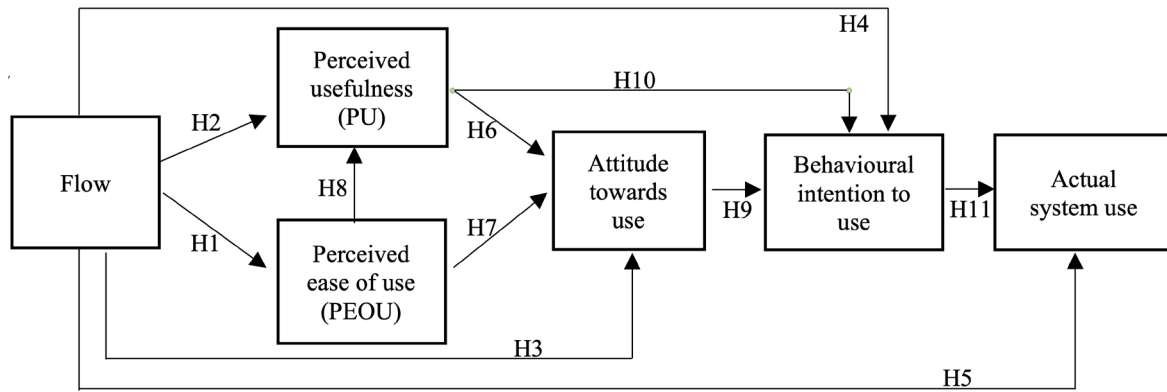


Figure 2. Flow model. Source: own elaboration from Sánchez Franco et al. (2007).

H1: The consumer flow state is directly and positively related to the perceived ease of use of online supermarkets.

H2: The consumer flow state is directly and positively related to the perceived usefulness of online supermarkets.

Some researchers who propose an extension of the TAM incorporating flow (e.g. Khan and Khan, 2020; Ahmad and Abdulkarim, 2019; Sánchez-Franco and Roldán, 2005; Moon and Kim, 2001) have observed a positive influence of the flow state on the user's attitude towards the use of an online environment. Two factors explain this relationship: first, it has been shown that affect, defined as the feeling of joy, elation, pleasure or depression, disgust, dislike or hatred associated with the particular act, has an impact on the individual's behaviour (Triandis, 1971); Second, previous research has found attitudinal consequences (e.g. satisfaction, loyalty, and intention to continue) as a result of the pleasant experience (e.g. Hsu et al., 2014; Hsu et al., 2013). Consequently, it can be understood that flow -as an experience of enjoyment- in an online context can have a positive influence on the user's attitude towards the use of online supermarkets.

In the field of online supermarkets, the concept of attitude is understood as the consumer's desire to make instrumental use of a supermarket's website to buy consumer products. To date, no empirical study of the relationship between flow and attitude toward using has been carried out in this specific area. To address this gap in the literature, the following hypothesis is proposed:

H3: the consumer's flow state is directly and positively related to the attitude toward using online supermarkets.

The behavioural intention to use the internet in general, or a particular website to buy something, is not explained solely by utilitarian factors: intrinsic motivations related to enjoyment are also at play, such as the experience of flow (e.g. Chen et al., 2018; Sánchez-Franco et al., 2007; Hsu and Lu, 2004). The influence of flow on behavioural intention to use can be established on the basis of flow theory, in which subjective positive experience is an important reason for performing the activity. If the consumer enjoys browsing, they will be more immersed and interested in interacting with the environment (Moon and Kim, 2001).

The concept of behavioural intention to use in the field of online supermarkets reflects the firm intention of the consumer to continue to use online supermarkets for mass consumption purchases. To confirm the general applicability of the relationship between flow and behavioural intention to use, we propose the following hypothesis:

H4: consumer flow status is directly and positively related to behavioural intention to use online supermarkets.

Flow, understood as an intrinsic element of enjoyment (Sánchez and Roldán, 2005) can also contribute to the current use of online supermarkets. The state of flow is considered as a catalyst for intention to use and actual use, given that users who enjoy the browsing experience are more

Construct	Description
Flow	Pleasant experience that the individual (for example, an online shopper) feels when they act with total involvement and absorption with the activity they are carrying out (for example, an online purchase) (Hung et al., 2012).
Perceived usefulness	Degree to which an individual who browses a website feels that its use will facilitate the achievement of their utilitarian or hedonic objectives (Alcántara-Pilar et al., 2015).
Perceived ease of use	Degree to which an individual who browses a website feels that its configuration reduces the effort that must be made while interacting with the website (Lee and Chen, 2010).
Attitude toward using	Learned predisposition of the individual to respond consistently favourably or unfavourably towards an object (Davis, 1989).
Behavioural intention to use	Degree of intention of an individual to use technology to carry out a specific behaviour (Davis, 1989).
Actual system use	Degree of intention of an individual to use technology to carry out a specific behaviour (Davis, 1989).

Table 1. Description of the constructs of the model. Source: own elaboration.

likely to value the use of the system more positively (Sánchez-Franco et al., 2007). Thus, we propose the following hypothesis:

H5: the flow of consumers is directly and positively related to the current use of online supermarkets.

Relationships between variables in the TAM

The validation of the TAM in the adoption of very diverse technological innovations is corroborated by many studies (e.g. Khan and Khan, 2020; García-Jurado et al, 2019; Liu et al., 2018; Hsu et al., 2013; Zhou, 2013; Hassan and Ahmed, 2007; Kim et al., 2007; Lee et al., 2007, among many others). These include studies on the acceptance and use of the internet and, more specifically, of virtual environments (e.g. Khan and Khan, 2020; Hsu et al., 2014; Hsu et al., 2013; Lee and Chen, 2010) that considers and validates some or all of the TAM variables.

The relationship of perceived usefulness and perceived ease of use with the attitude toward use of an innovation is established on the basis of the theory of reasoned action (TRA), according to which attitudes towards a specific behaviour are determined by the most significant user-sustained beliefs (e.g. Davis, 1989; Davis et al., 1989). More specifically, the influence of perceived usefulness is based on the assumption that the attitude towards a behaviour depends on the anticipated consequence of that behaviour (e.g. Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975). In turn, the influence of perceived ease of use is based on the postulation that the easier it is for a user to interact with a system, the greater the feeling of making effective and skilful use of the system (Lepper, 1987).

In order to verify this relationship in the field of online supermarkets, the following hypotheses are formulated:

H6: the perceived usefulness in the field of online supermarkets is directly and positively related to the attitude toward using.

H7: the perceived ease of use in the field of online supermarkets is directly and positively related to the attitude toward using.

The relationship between the perceived ease of use and the perceived usefulness in the innovation of a specific technology is based on the assumption that a simpler system will offer better results (e.g. Davis et al., 1989). In this case, to verify the relationship in the field of online supermarkets, the following hypothesis is proposed:

H8: the perceived ease of use in the field of online supermarkets is directly and positively related to perceived usefulness.

The attitude toward using is an affective component of the influence on the behavioural intention to use, while perceived usefulness is a cognitive component (e.g. Davis et al., 1989). These relationships have been proven in several studies on the adoption of technological innovations

(e.g. Davis et al., 1989). To examine its validity in the specific field of online supermarkets, we propose the following hypotheses:

H9: the attitude toward using online supermarkets is directly and positively related to the behavioural intention to use.

H10: the perceived usefulness in the field of online supermarkets is directly and positively related to behavioral intention to use.

Finally, the relationship between the intention to use and actual use of an environment is determined by the TAM postulate according to which the use of an innovative technology is conditioned by the behavioural intention of the user. To test the general applicability of this assumption in the field of online supermarkets, we propose the following hypothesis:

H11: the behavioral intention to use online supermarkets is directly and positively related to current use.

DATA AND METHODOLOGY

Next, we present the research methodology that we have used for this study, which combines a qualitative analysis and a quantitative analysis. We also describe the data collection procedure, the sample and the measurement instruments.

Data collection

It was considered relevant to carry out a preliminary qualitative study to obtain a more complete understanding of the research context given the absence of scientific literature on the elements related to TAM in this specific area of online supermarkets. It was considered relevant to carry out a preliminary qualitative study to obtain a more complete understanding of the research context given the absence of scientific literature on the elements related to TAM in this specific area of online supermarkets. Testimony from executives and university professors related to mass consumption and the marketing of food products online were collected. The results were used to refine the structure of each item to measure the constructs of the model and to improve the clarity of the questions.

The objective of the quantitative analysis was to obtain information on the object of study from a representative sample of the user population of online supermarket services. The consumers in the sample are part of the panel of the company SondeaSondea, which is dedicated to market research through the Internet.

An online questionnaire was used to collect the data. The final version of the questionnaire was developed after a pre-test with three users who regularly shop at online supermarkets. The online questionnaire was an appropriate choice within the context of this study, as it meant that data could be collected through the same means that consumers use to make their mass consumer purchases. This approach was also a convenient means of sending the questionnaire to the entire sample population of 7,000 digital consumers.

Sample

The final sample size of 651 consumers (selected on the basis of providing complete responses to the questionnaire) is appropriate for the research objectives (according to Hair et al., 2008) by providing a margin of error of +/- 3.8% and a significance level below 0.05. Most of the respondents are in the age group 25 to 64 years (89.56% of the consumers in the sample and 89.49% of the cases in the total population) and, in particular, in the subgroup 35 to 54 years of age (50.84% in the sample and 50.69% in the population). The proportion of men and women both in the sample and in the total population was also similar (50.7% and 49.79% women, respectively) (see Table 2).

Questionnaire measures

To measure the latent variables of the model, we used Likert-type scales, which are widely used in the literature on the adoption of virtual environments and the state of the flow in Internet use. A series of initial items is generated and adapted to the specific context in the online supermarket arena.

	Number	Percentage
Gender		
Man	321	49.30
Woman	330	50.70
Age		
18 to 24	68	10.44
25 to 34	129	19.82
35 to 44	175	26.88
45 to 54	156	23.96
55 to 64	123	18.90
Occupational status		
Self-employed professionals	87	13.4
Senior official	16	2.5
Intermediate officer	138	21.2
Technician	193	29.6
Unemployed	72	11.1
Jobless (retired, student...)	88	13.5
Other	57	8.7

Table 2. Sample details. Source: own elaboration.

Full details on the set of measurement scales used for each construct are presented in Appendix 1. All the measurement scales used are 7-point Likert-type scales, anchored in total disagreement (1) and in complete agreement (7).

ANALYSIS AND RESULTS

In this section we verify the proposed model. Following the widely accepted two-step procedure proposed by Anderson and Gerbing (1988), we first assess the reliability and validity of the measurements (i.e., the measurement model analysis) and then we assess the complete structural model (i.e., the test hypothesis). The analyzes are based on SPSS 21.0 and AMOS 21.0.

Reliability and validity of scales

Before completing the exploratory factor analysis, it is verified that the study database meets the conditions related to the sample size (see Hair et al., 2008). For all cases, the Kaiser-Meyer-Olkin indicator has values above the minimum required criteria. Bartlett's test of sphericity is also significant for each of the dimensions (p value <0.005).

An exploratory factor analysis (EFA) is used in its variant of principal components, Varimax rotation (see Netemeyer et al., 2003). Before studying the reliability of the scales, the data is verified to ensure that they are suitable for its application. For each scale, the correlation matrix is checked to ensure that all observable variables have a substantial number of correlations greater than 0.3, that the value of the Kaiser-Meyer-Olkin (KMO) sampling adequacy measure is greater than 0.5, and that the Bartlett test of sphericity confirms the existence of significant correlations between the observable variables.

Next, the dimensionality of the scales is analysed. The EFA results confirm that the number of factors extracted for each scale is only one and that the value of the explained variance is greater than 0.5 in each case. One indicator was not significant and was removed (PEOU_2).

Once the scale is refined, we proceed to assess its reliability. It is verified that each variable exceeds the minimum acceptable threshold of 0.7 for Cronbach's alpha (see Cronbach, 1970; Nunnally, 1987) and has acceptable values of item-total correlation (Bagozzi, 1981) greater than 0.3 (Nurosis, 1993).

The results of the exploratory factor analysis were validated by a confirmatory factor analysis using structural equations, which allows for stricter scale refinement.

	F	U	IU	AC	PEOU	PU
F_1	0,894					
F_2	0,919					
F_3	0,922					
UI_1		0,879				
UI_2		0,621				
IU_1			0,880			
IU_2			0,872			
IU_3			0,877			
IU_4			0,914			
AU_1				0,914		
AU_2				0,914		
AU_3				0,902		
AU_4				0,905		
PEOU_1					0,839	
PEOU_3					0,826	
PEOU_4					0,830	
PU_1						0,869
PU_2						0,855
PU_3						0,883
PU_4						0,885
PU_5						0,915
Cronbach's alpha	$\alpha=0.937$	$\alpha=0.705$	$\alpha=0.941$	$\alpha=0.953$	$\alpha=0.884$	$\alpha=0.964$
CR	0,937	0,728	0,936	0,950	0,871	0,946
AVE	0,831	0,579	0,785	0,826	0,692	0,777

Table 3. Lambda loadings and reliability. Source: own elaboration.

The fit of the analytical model was evaluated. Combined confirmatory factor analysis of all measurement scales provided satisfactory results, suggesting a good model fit ($\chi^2/d.f. = 2,745$; GFI = 0.929; RMSEA = 0.052; CFI = 0.978; TLI = 0.973; NFI = 0.966; IFI = 0.978).

We have also tested the reliability and the convergent and discriminant validity of the measurement scales considered. The convergent validity of the instruments was confirmed, as all of the standardised coefficients for the items are greater than 0.5 (with a confidence level of 0.95%) and the t-value is greater than 1.96 (Steenkamp and Van Trijp, 1991) indicating that each item shares at least 50% of its variance with its latent variable. The composite reliability (CR) and average variance extracted (AVE) were also calculated for each measurement instrument and exceed the minimum recommended values of 0.7 (Hair *et al.*, 2008) and 0.5 (Fornell, Larcker, 1981), respectively, in all cases (see Table 3).

We have also tested the reliability and the convergent and discriminant validity of the measurement scales considered. In addition, confidence intervals were used to verify the correlation between pairs of latent variables. None of the intervals obtained included a value close to unity, which shows the discriminant validity of the scales.

Structural model testing

To test the causal relationships of the structural model, we first analyse the fit measures of the global model and then examine the structural parameters. The global fit indices of the structural model are quite acceptable, but two of the relationships considered are not significant: attitude of flow and intention of flow. The non-significance of these two relationships precisely coincides with other previous research on the adoption of online environments (Esteban-Millat *et al.*, 2018) carried out in virtual training environments.

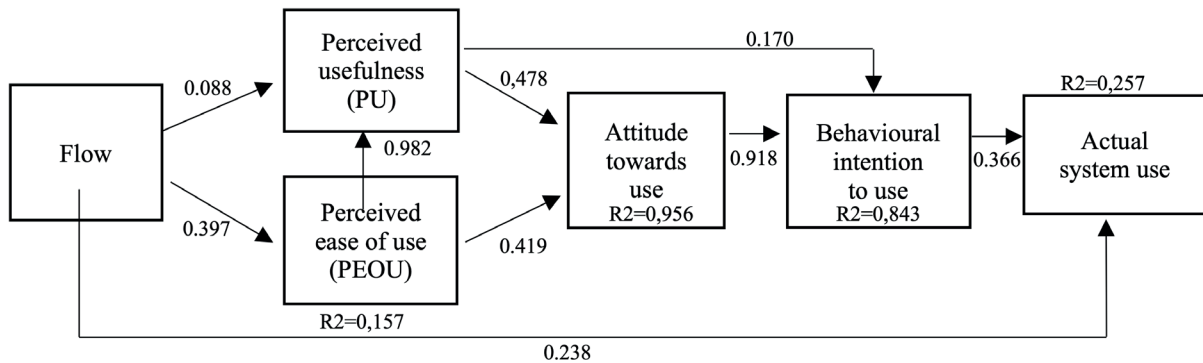


Figure 3. Final flow model. Source: own elaboration from Sánchez Franco et al. (2007).

The model was reformulated to exclude relationships between flow and attitude towards use, and between flow and behavioural intention to use. A preliminary study of the modification indices produced by the structural equations methodology (SEM) was also carried out; the results did not suggest the incorporation of any additional causal relationship. After the new specification of the model, the signs of the structural coefficients showed a positive correlation between the exogenous and endogenous variables, according to the initial proposal (see Figure 3). In addition, the correct fit of the variables is improved, which shows a better fit of the data ($\chi^2 / d.f. = 0,4335$; $GFI = 0,873$; $RMSEA = 0.072$; $CFI = 0.954$; $TLI = 0.948$; $NFI = 0.941$; $IFI = 0.954$). The squared correlation coefficient (R^2) was also calculated for each variable.

Specifically, we verify the direct influence of flow on perceived ease of use, perceived usefulness and actual use (H1, H2 and H5). We also verify the direct influence between perceived ease of use and perceived usefulness (H8). We also confirmed the correlations between perceived usefulness and attitude toward use and behavioural intention to use (H6 and H10), and between perceived ease of use and attitude toward using (H7). The results in turn show the influence of the attitude toward use on behavioural intention to use (H9) and of the intention to use on actual system use (H11). However, the results did not support our initial hypotheses that flow has a direct influence on attitude toward use and behavioural intention to use (H3 and H4).

The results of the quantitative research validate the proposed model with the complete set of variables, which allows us to verify its structure. Therefore, it is possible to model the phenomenon of acceptance and use of online supermarkets taking into account the state of the flow. Flow incorporates intrinsic motivations to adopt technology in a virtual environment, thus facilitating a more complete understanding of the phenomenon.

DISCUSSION AND CONCLUSION

Flow incorporates intrinsic motivations to adopt technology in a virtual environment, thus facilitating a more complete understanding of the phenomenon. In this context, flow refers to the intrinsic motivation of the consumer to adopt online supermarkets. Thus, the state of flow and the extrinsic motivations of a consumer, represented by TAM variables, can be used to explain their specific behaviour. In accordance with studies on the adoption of other virtual environments, we demonstrate the specific and direct relationship between the state of flow and the perceived usefulness and ease of use, as well as the relationship between flow and the current use of online supermarkets. In summary, our results underscore the usefulness of flow as an intrinsic motivational element to explain the use of online supermarkets.

However, the study should ideally be complemented by additional research to address current limitations. First, the proposed model should be modified to consider flow as a multidimensional concept, and elements related to this state should be incorporated. Furthermore, the theoretical model proposed here must be applied to other virtual environments whose acceptance and use have not been studied in sufficient detail.

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