Experience Moderation Effect On The Relationship Between Usefulness, Ease Of Use And Website Acceptance

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Abstract

The modelling of acceptance behaviour of new information technologies is of great utility to managers who need to evaluate the probability of success in the introduction of these technologies. The present study empirically tests the capacity of Fishbein and Ajzen´s Theory of Reasoned Action (TRA) (1975) and Davis´s Technology Acceptance Model (TAM) (1989) to help understand the determinants of the intention to revisit a website – ease of use and perceived usefulness – focusing on the experience moderation effect.

The findings show that a combination of both theories explains the acceptance of a website by Internet users. Furthermore, within the effect of each of the elements of TAM, the user's experience of the website plays a moderating role. In this regard, ease of use is a more important factor in determining a furure revisit to a website in the case of the less experienced users, while perceived usefulness is a more influential factor in the case of the high experience users.

Keywords

Internet user´s experience, perceived usefulness, ease of use, future intention to revisit.

1. Introducción

In recent years, the measuring of the acceptance of information systems (IS) and information technologies (IT) to assist in the design and implementation of the said systems has become a key concern for researchers and practitioners alike, considering the role they play in the achievement of competitive advantages [22]. In the virtual context, the analysis of acceptance, or intention of use, as the main objectives of the majority of web pages does not seem yet to have been given all the attention it deserves.

In this context, web page designers want to know if a given new website would gain acceptance. However, an analysis of the reasons why a system may not be used to its full potential will be the ourcome of a rigorous investigation process. Such research will also serve to identify corrective actions with a view to boosting the acceptance of a website, thus enhancing the impact of the organization.

The results of different investigations establish models of behaviour with the following basic structure of underlying concepts (fig.1):

Fig. 1: The basic concept underlying the models of user acceptance
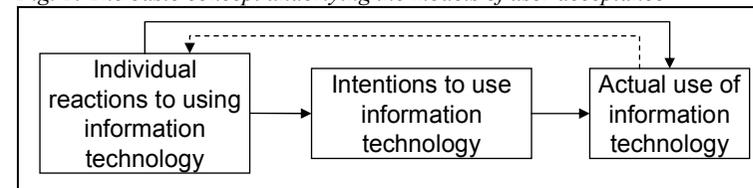
Source: [45].

The present study aims to empirically test the capacity of the Theory of Reasoned Action (TRA) by [18] and the Technology Acceptance Model (TAM) by [15] to explain the acceptance of a specific website. It focuses in particular on the experience moderation effect on the determinants of the intention to use a web page. The value of TRA and TAM in contexts influenced by the intention to adopt IT technologies has been repeatedly demonstrated, ([5], [15], [17], [22], [29]).

With this end in view, a total of 2813 Internet users provided data which enabled an explanation of the acceptance of a website based on user beliefs – ease of use and perceived usefulness – as well as the website experience moderation effect on these determinants.

Like in the above models, perceived usefulness is the main factor determining the intention of revisit whereas ease of use takes second place. Adjusting these variables may facilitate the search and purchase process for the consumer as well as improve the

consumer's attitude towards the website [35]. In this way a range of guidelines can be formulated with a view to attracting new users and keeping the current users as well as introducing strategic improvements in the organization of the website.

2. Literature review

2.1. Models of acceptance or intention of use and their principal antecedents

This section lays out the theoretical foundations of intention models and theories of behavioural decisions traditionally applied by social psychology ([5], [15], [36], [42]). Regarding these, in theoretical terms, researchers have assumed that theories of behavioural decision or intention provide a basis for the study of the adoption of information technologies ([5], [15], [17], [22], [43], [45], [46]) and e-commerce ([10], [35], [36], [37]).

More specifically, it is worth quoting here, among others, the Theory of Reasoned Action (TRA-fig.2) ([18], [20]), the Technology Acceptance Model (TAM-fig.3) (Davis et al, 1989) and the Theory of Planned Behaviour (TPB) ([1]). The models of Fishbein and Ajzen were designed to explain all human behaviours but, nevertheless, include theoretical foundations and principles which have been validated in a wide variety of contexts.

From the perspective of e-commerce, the usefulness of this kind of models lies in describing the factors conducive to the acceptance of on-line exchanges, which is useful to both academics and practitioners in their quest for a better understanding of emerging B2C exchange relations [37].

Fig. 2: Theory of Reasoned Action (TRA)
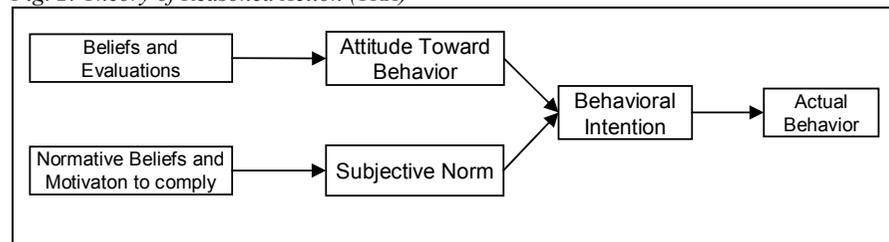
Source: [2].

Attitudes towards a behaviour are determined by the structure of beliefs and evaluations as to the consequences of performing the behaviour.

The relationship between the attitude towards a given system and the behavioural intention is both obvious and vital for this kind of models and has been both demonstrated in general terms by various authors ([2], [4], [18]) and applied to more specific contexts, such as the adoption of IT and IS ([5], [15], [17], [22], [43]), e-commerce ([35], [36], [37]), and the revisiting of a website ([10], [35]). It is self-evident that a positive attitude towards a webpage will have an effect on its present and future acceptance.

With respect to external variables, [17] argue that they exist on the bridge between internal beliefs, attitudes, intentions and individual differences, situational restrictions and managerially controllable interventions which affect behaviour. Furthermore, from the point of view of the user, these characteristics can be influenced by the end users' education and training in information systems which can, in this way, influence their acceptance [33].

Fig. 3: Technology Acceptance Model (TAM)
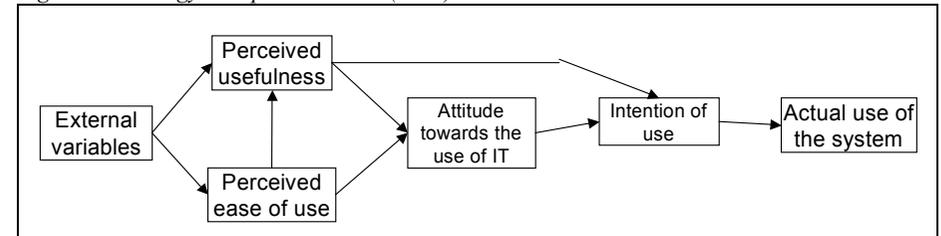
Source: [17].

With regard to the remaining antecedents of acceptance, in the Technology Acceptance Model, [15] considers the variables of ease of use and perceived usefulness when it comes to explaining the acceptance of IT systems (computers, word processors, e-mail, etc). They are considered to be determinants the users´ acceptance and have a direct impact on people's attitudes towards the use of computer technologies [15]. Specialist literature has consistently shown the key importance of perceived usefulness (e.g. [17]; [46]). This is due to the fact that the majority of the studies have tested the acceptance of systems for use at work. The motivations for whose use are clearly functional. These motivations are based on practical criteria (perceived usefulness) while the non-functional ones are associated with the search for new and pleasurable experiences (ease of use) [40].

Likewise, and as can be inferred from the study by [27], the principal motivation for the use of the Internet continues to be functional. Therefore, one would expect a considerable influence of perceived usefulness on the future intention to revisit a website.

What follows is an exposition of the terminology and the main characteristics of the two aforementioned antecedents.

Perceived usefulness

This variable indicates to the user that the system can be useful to him or her for achieving a concrete result. Perceived usefulness is defined as "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" [17: 985].

At the same time, perceived usefulness is a multi-dimensional concept related to the issues of working speed, work performance, effectiveness, easy of making work and other practical considerations.

A system with a high perceived usefulness is, in turn, one which the user believes to offer a positive "use – execution" relationship. This variable has a direct influence on the (declared) use of particular information technologies [15].

Among the principal factors which diminish the usefulness of a system, it is worth mentioning unreliability, premature obsolescence and/or high operating costs, incapacity to produce the required information or to present it in a usable format, excessive interface simplification or the "dumbing down" of the system [14: 149].

There is consistent evidence of the usefulness–attitude relationship from research in information systems and computer technologies (e.g. [17], [30]). The inclusion of that relationship is based on the consistent idea that people form intentions to perform behaviours which they believe will enhance the performance of their work over and above any positive or negative feelings evoked by the behaviour *per se* [17].

In the case of the present study, individual will form intentions relative to the webpage largely based on a cognitive evaluation of the ways in which it will widen their knowledge and efficiently satisfy the user's needs in terms of search for information.

Perceived ease of use

Research into ease of use focuses mainly on how easy it is for the user to "move about" and "understand" the proposed contents of a web page [14: 148]. And it is the ease of use that web designers normally concentrate on since it also explains the major usefulness of the IT application. In other words, it is a causal antecedent of perceived usefulness [15].

Perceived ease of use is defined as "the degree to which the prospective user expects the target system to be free of effort" [17: 985]. Two years later it was defined as "the degree to which an innovation is perceived as being difficult to use" [32: 195]. In other words, we are dealing here with a concept intimately related to the structure of the site, easily understandable functions and contents, the simplicity of use and rapidity of information search or the ease of moving and orientating oneself in the site.

Ease of use has a double impact on intention, directly and indirectly via its impact on perceived usefulness ([17], [46]).

The World Organization for Standardization has developed a new standard for website design – the *ISO/AWI 23973 Software Ergonomics for World Wide Web user interface*. The said standard encompasses the norm ISO 9241 which lies down that "the usability of information systems consists in the effectiveness, efficiency and satisfaction with which the users attain their objectives in particular environments."

The main factors which diminish the ease of use of a system are the lack of standardization of user interfaces (operating procedures, icons designating the same functions) and the complexity of use and the need for a certain degree of learning during the use of the majority of systems [14: 146-147]. However, probably the principal reason for the difficulty in the use many information systems frequently stems from the fact that they are designed in little or no contact with the prospective users of those systems.

2.2. Experience moderation effect

Experience was not included in the original TAM. In the context of the Internet, user experience was raised by [24] as one of the main factors explaining the behaviour of the individual. On the basis of experience, there are two different Internet surfing behaviours identified in the literature, called "goal-directed surfing" and "exploratory surfing" ([24], [34], [47]). One consequence of such a distinction is essential in the moderating role of experience in the electronic market client's behaviour. Authors support the claim that the more experienced users, usually, exhibit targeted behaviour while e-novices opt for the search for experiences or general exploration ([24], [34]). This points to the paramount importance of experience in the shaping of on-line behaviour.

As [44] point out, owing to the newness of the Internet, there are sectors of clients with substantial differences in the amount of experience of the Internet medium, which will play a vital role in the effectiveness of marketing. In general, the amount of experience of the electronic market has proved to exert a determining influence on users' attitudes and behaviours ([9], [45]).

As regards behaviour related to the future use of a website, experience has proved to exert a moderating influence on the impact that the determinants of the said behaviour have on the intention to revisit the website in question [26]. The reason that the authors themselves quote as an explanation for that moderating effect lies in the fact that different individuals evaluate a website from different perspectives. Those who have visited it before focus on the service, the availability of the products, etc, whereas those visiting the site for the first time concentrate, in the main, on the novelty of the site.

The arguments put forward by [26] seem to imply that those individuals with a limited amount of experience of the use of the system, i.e. a specific website, evaluate it in a more superficial manner. In other words, to go back to Davis´s TAM, in the case of users with a limited experience, ease of use will be a stronger determinant of future intention of use than in the case of users with ample experience. However, as regards the latter, the evaluation will be based on a more in-depth analysis. Consequently, the highly experienced users will use perceived usefulness in the forming of future intentions of use to a greater extent than will the inexperienced ones.

[45], having reviewed eight adoption models and suggested an empirically tested model themselves, both in cross-sectional and longitudinal studies (the Unified Theory of Acceptance and Use of Technology) (UTAUT), identify four moderators which affect effort expectancy, among them experience. This construct captures the concept of perceived ease of use by [15] and [17]. That effect is not received by performance expectancy or perceived usefulness.

On the basis of the literature reviewed above, one can conclude that there seems to be a moderating effect of user experience on the importance of ease of use and perceived usefulness as determinants of the future intention to use a website. This will be the main hypothesis of the present study.

2.3. The proposed model

Starting from the principles of TRA and TAM and the usefulness of expanding them to include the experience moderation effect, we have proposed the following model to explain and predict the ways in which individuals decide to revisit a website:

Fig. 4: Website Acceptance Model (WAM)
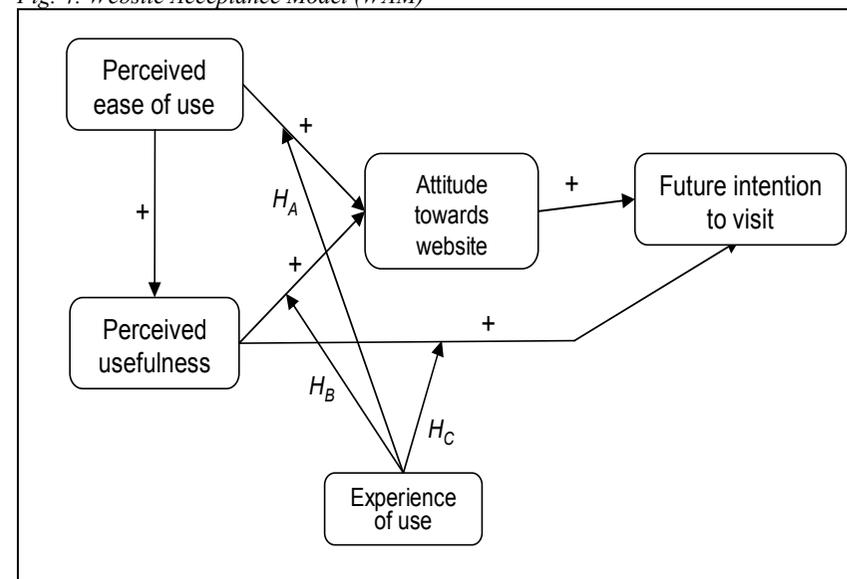
The above model throws up the following hypotheses to test:

H$_{basic}$: There exists a website experience moderation effect on the importance of ease of use and perceived usefulness as determinants of the user future intention to use a website. This moderation effect, as has been shown in the foregoing review of the literature, affects the relationships between both ease of use and perceived usefulness with website acceptance. In consequence, the structure of the hypothesis to be tested is as follows:

H$_A$: The effect of the perceived ease of use on the attitude is significantly smaller in website users possessed of high experience of the website.

H$_B$: The effect of the perceived usefulness on the attitude is significantly greater in website users possessed of high experience of the website.

H$_C$: The effect of the perceived usefulness on the intention of use is significantly greater in website users possessed of high experience of the website.

3. Methodology: sample and scales used

The collection of data was carried out by means of a web survey taken by the users of a portal dispensing free advice on health, nutrition and general well-being. The se-

lected website was PulevaSalud.com, which is an established Internet reference site with over 2,500,000 visits to date and 500,000 monthly user sessions in the year 2004. The respondents were self-selected by means of clicking on a banner placed for that purpose in the various sections of the website. Thus, during the period of availability of the survey, a total of 3,238 responses were obtained. The responses were subjected to a review in order to eliminate individuals who had responded to more than one survey and those who had submitted responses of convenience, e.g. by marking the same value for all the items. The end result was 2,813 valid cases. The technical specifications of the study are listed in the table 1.

Table 1: Technical specifications of the study

Date of field work	May – June 2004
Target population	Visitors to PulevaSalud.com
Method of sampling	Non-probabilistic: Self-selection by the respondent through banners on the Pulevasalud.com website and promotions on generic portals (e.g. msn.com).
Sample	2813
Method of data collection	Website survey with incentive

Despite self-selection being the means of gaining individuals for the survey, the sample exhibits characteristics similar to those of Internet users. In respect of the scales used (see Appendix), the Internet is essentially a means of information /communication as well as a commercial channel. Nonetheless, in the case of the website used the reference here, one can solely analyse the former of the two uses, since the website in question offers no option of e-commerce. On account of that, the scales, mainly those of usefulness and ease of use had to be adapted. The scale of ease of use is adapted from [15], [32], and, in some basic aspects, from [37] to the particular case of an informational website, whose direct objective is not that of pursuing e-commerce. The scale of perceived usefulness was also adapted to the characteristics of the subject of this study on the basis of the measurements conducted by [17], [46] and [37].

For the purposes of this study, we have chosen a specific scale of attitude ([12], [23]). [8] developed a comparison between the scale of [12], the scale of Burns (2000 in [8]) and the one they themselves had adapted to the electronic context two years earlier. The results suggest that the latter two scales possess acceptable psychometric properties even though the one proposed by [9] achieves a better Cronbach´s alpha (0.91), a more stable structure, a higher explained variance in the exploratory factor analysis

and a superiority in the internal similarity (similarity analysis). To that one has to add the adequate performance of the scale in different studies ([38]; [41]). The general picture seems to recommend the use of a LIKERT-type scale adapted by [9] on the basis of the scale of attitude towards a brand by [11].

The scale for measuring the future intention to visit a website sets out to represent the future intention of use, in this case, of the website. Since it does not afford the possibility of e-commerce, only informational content, it was decided to use the future intention of visit as an indicator of the disposition to use the website. Therefore, in order to measure the intention of visit, a LIKERT-type scale was constructed, composed of three items taken from [31] and [6].

Finally, experience is a variable which is objective and directly accessible, although it has also been viewed as a subjective perception by the client (e.g. [3], [44]). Nevertheless, experience, measured as a perception, is closer to the construct of "perceived control" established within the framework of the Theory of Planned Behaviour [1] than to the variable which we are concerned with here. [26] expresses a parallel view, considering two different constructs (experience and perceived control) so as to include both variables in their research independently of each other.

Starting from the view of experience as an objective construct, one can avail oneself of the *log data* to directly observe that experience, in particular that related to a specific website, as [39] point out. That highly recommendable standpoint is defended conceptually and empirically by [19], who tests the connection between the approximations of the experience obtained from *log data* and those proceeding from direct inquiry of the client, including the subjective perception of the client and others of a more objective nature. The author arrives at the conclusion that the main indicator of experience is the number of hours spent on-line. In accordance with these results, the number of hours of use are taken as an indicator of the individual's experience of the website.

A person's experience of the website PulevaSalud.com is readily available from the *log data* to the 15 days immediately preceding the survey. The *log data* provide one objective piece of data – the number of hours that the individual spends visiting the website in any given period. In order to relate these experience data to the responses submitted by the individuals surveyed, the users were identified by means of a permanent *cookie*.

Once the scales for measuring the variables had been established, we proceeded to assess their reliability and validity [13]. First, an analysis of the dimensionality of the different multi-item scales was carried out. Through an exploratory factor analysis (table 2) it was confirmed that, in all the cases, the scale measured exclusively one construct while being able to retain between 59 and 82 percent of the variance. In all

the cases Cronbach's alpha was above 0.6, thereby demonstrating the reliability of the scales employed.

Table 2: Exploratory factor analysis

SCALE	EFA		ALPHA
	Explained variance	Item loads	
Ease of use	59%	0.77; 0.83; 0.70	0.65
Perceived usefulness	69%	0.88; 0.88; 0.71	0.77
Attitude towards website	82%	0.93; 0.93; 0.85	0.88
Intention of use	78%	0.90; 0.83; 0.91	0.84

In general, one can assume that the different multi-item scales used in the present study are adequate for measuring the different constructs under analysis.

4. Results

In the analysis of the results, bearing in mind that the proposed model constitutes a set of different but interdependent multiple regression equations, it is advisable to use a structural equation analysis [21]. To complete the analysis it useful to take into account the fulfilment of the multivariant normality condition. The corresponding test produced evidence for the rejection of the null normality hypothesis (χ^2=8713,784; p=0,000). Considering the absence of normality from the variables, we opted for the Weighted Least Squares (WLS) estimation method since it is less sensible to sample distribution and produces more efficient estimations as long as it is based on a large sample [7]. The software used was LISREL 8.71 and the variance-covariance matrix was used as the "raw material" to offer a starting point for the generalization of the obtained results onto other contexts.

For the formation of the groups, the measure of the individual's experience of the website was divided by the median, distinguishes between those individuals with zero visits or zero hours of website use in the studied period (group 1) and those with a certain time of use during the studied period (group 2). The global fit indices prove to be within the limits established by the literature (table 3).

Table 3: Goodness of fit indices

Chi-square	RMSEA (90% RMSEA)	NFI	NNFI	CFI	IFI	RFI	Critical N
935.63 d.f. 114 p=0.01	0.073 (0.069 ; 0.077)	0.98	0.98	0.98	0.98	0.98	440.88

What follows is a presentation of the Website Acceptance Model (WAM) with its corresponding standardized coefficients for different groups of experience (in italics low experience and in bold high experience) (fig.5). All the weights prove to be significant at 1%, as recommended by [21], except the relationship between ease of use and attitude, which in the case of high experience is significant at 5%. Besides, no modifications to the structural model are intended.

Fig. 5: Website Acceptance Model moderated by experience of the website
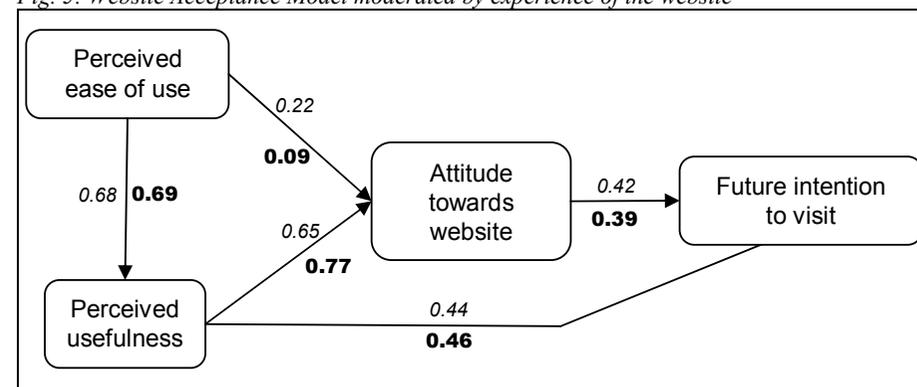
The comparison between the estimated coefficients for both groups and each pair of variables (table 4) is carried out on the basis of a measurement of the signification of the differences between the coefficients using a t-test for independent samples[1] (e.g. [20], [28]).

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[1] The coefficient comparison test, based on the t-statistic, follows the expression
$H_o: B_1 = B_2$

$$t = \frac{B_1 - B_2}{\sqrt{SE_1^2 - SE_2^2}}$$

where B_i are unstandardized structural coefficients and SE_i are standard errors corresponding to these coefficients.

Table 4: Comparison of the groups based on experience of the Internet

Causal relationship	Group 1 (Low)		Group 2 (High)		B_1-B_2	t	p-value[2]
	B_1	SE_1	B_2	SE_2			
EASE → USEFULNESS	0.91**	0.035	0.94**	0.039	-0.03	-0.57	0.285
EASE → ATTITUDE	0.33**	0.051	0.13*	0.067	0.20	2.38	**0.009****
USEFULNESS → ATTITUDE	0.72**	0.034	0.86**	0.041	-0.14	-2.63	**0.005****
USEFULNESS → INTENTION	0.46**	0.043	0.49**	0.059	-0.03	-0.41	0.341
ATTITUDE → INTENTION	0.40**	0.038	0.37**	0.052	0.03	0.47	0.320

**p<0.01 *p<0.05

As can be seen from the above results, there are significant differences in the weights of ease of use and perceived utility with respect to the attitude to the website brought about by the experience moderation effect. Thus, hypotheses H_A and H_B obtain empirical support. In this regard, individuals with high experience of the website employ to a greater extent than the individuals with low experience the perceived usefulness in shaping their attitude to the website, and indirectly, to the future use of the website. Nonetheless, individuals with low experience of the website focus to a greater extent than individuals with high experience on the ease of use in the shaping of their attitude. This factor is not as important for these individuals in their future use of a given website. These individuals are sufficiently knowledgeable about the medium to preclude the difficulty of use from putting limits on their future use of the system.

As far as hypothesis H_C is concerned, it has to be rejected. The direct effect between perceived usefulness and intention of use is not moderated by the experience of the individual of the website. Nonetheless, this moderation effect does take place in the indirect relation through the influence of this variable on the attitude.

5. Discussion of the findings and implications

The modelling of the acceptance behaviour of new Information Technologies is extremely useful to managers who need to assess the probability of success in the introduction of these technologies, in particular the Internet and its web pages. On the basis of the Theory of Reasoned Action, the Technology Acceptance Model and the inescapable relevance of the experience moderation effect, the study has provided a Website Acceptance Model which serves as the starting point for the generalization of the results onto other contexts.

[2] As the hypotheses assume the polarity of the moderation, the tests of the hypotheses are unilateral and the signification is expressed considering only one tail in T-distribution.

The results obtained demonstrate that it is crucial to take note of the determinants of the acceptance of web intermediaries in website design and the provision of services on the Internet. Similar to [17], the results show an important direct effect of the perceived usefulness on the intention to revisit a website, irrespective of the level of experience of the user, as well as an indirect effect through the attitude towards the website. The explanation of this finding is founded on the fact that the principal motivations for the use of the website are clearly functional.

The proposed models of behaviour show that in the process of shaping the attitude towards a website and the intention to revisit the website, there are substantial differences due to the differing levels of experience of the users. More specifically, the results are as follows:

− In users with low experience of a website, the influence of perceived usefulness on the process of forming the attitude towards the website is substantially smaller than in users with high experience.

− In users with high experience of a website, the influence of perceived ease of use on the attitude towards the website is substantially smaller than in users with low experience. By the same token, in a high experience situation, the attitude is conditioned primarily by usefulness, the direct effect of ease of use being practically non-existent.

In general, the web designer or the information manager of an organization should spare the Internet user both the connection costs and the waste of time necessary to "learn" how to use a difficult website thus permitting him or her to allocate those valuable resources to other tasks.

In addition, the results show that retaining the initial design of a website as the definitive one is not the correct course of action from the perspective of the user. Thus, whenever it is possible to identify the user by means of a permanent *cookie*, there arise two interesting implications for the boosting of the acceptance of a website. For one thing, in the case of the more proficient Internet users who exhibit a goal-directed behaviour and a more in-depth evaluation of the website, web designers should devote more attention to the perceived usefulness of the website. With regard to that, it is possible to shape the factors within the control of the organization, such as the offering of services or the making available of information of value. Users with high experience may prefer a more difficult interface if it enables them to achieve their objectives.

On the other hand, novice users opt for the search for new experiences and focus on the novelty of a website, which is why organizations should develop designs focused on the user, in permanent contact with the user as distinct from merely focusing on technical aspects, as proposed by Landauer (1997 in [14: 147]). At the same time, however, one must not lose sight of the perceived usefulness of the web. With regard

to that, in order to attract new clients, it is necessary to devote more attention to those aspects which are easier to process and evaluate. This will ultimately contribute to an enhanced ease of use which is also conducive to increasing the acceptance of the website through attitude and perceived usefulness. In other words, it will result in a website that is user-friendly, intuitive, interactive, compatible with a wide range of operating systems and adapted to the user's needs thus enabling the user to find what he or she needs.

Last but not least, it is worth noting that the users' opinions about a specific website are of great importance for any explanation of user behaviour, albeit not of the same significance as some other factors such as perceived usefulness. In this sense, research of opinions and attitudes enables web managers to adapt to their particular needs.

Appendix

Scales used

Measure of ease of use (Adapted from [17] and [37]):
− The website is complicated – simple.
− The website processing is slow – rapid.
− The website is non-interactive – interactive.

Measure of perceived usefulness (Adapted from [17], [37] and [46]):
− On the whole, the website is a capable and knowledgeable provider of information on the Internet.
− On the whole, the website is an expert in its field.
− The website is competent and efficient.

Measure of attitude towards a website [9]:
− I like the website.
− I consider it a good website.
− I think it is a nice website.

Measure of the future intention to visit a website [6] and [31]:
− I intend to continue visiting the website in the future
− My intention is to continue using this website rather than an alternative one
− I want to continue using this website rather than stop using it

Measure of the experience of a website [19]
The number of hours the respondent had dedicated to visiting the website during the period immediately preceding the survey. This information is obtained from the surfing data recorded by the website server. Each individual is identified by means of a permanent *cookie* in a way that enables the surfing data to be linked to the data obtained from the survey.

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