Explaining B2C e-commerce acceptance: An integrative model based on the framework by Gatignon and Robertson

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Abstract

This study attempts to analyze e-commerce adoption, proposing a global model that integrates the most relevant approaches in the literature. Gatignon and Robertson’s Adoption Model is taken as a reference framework because of its overall nature and its agreement with the main theories used to explain e-commerce acceptance. Thus, the model proposed to explain e-commerce adoption by consumers includes the simultaneous influence of attitudes, social norms, perceived risk, personal innovativeness in the field of new technologies and attributes perceived in the technology. The results obtained show that attitudes toward the system and Subjective Norm are the main determinants of the intention to shop on the Net. On the contrary, perceived risk has no significant effect on adoption process, while the influence of personal innovativeness is only relevant in the first purchase on the Internet.

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1. Introduction

The Internet’s capacity to access, organize and communicate information in a more efficient way enables new formulas for the relationship between consumers and firms. New economic agents and new business models have emerged linked to them. This way, the development of e-commerce offers great opportunities for both manufacturers and retailers, but it also presents important challenges for organizations, demanding an in-depth review of marketing strategies and consumer knowledge (Jones and Vijayasarathy, 1998; Goldsmith and Bridges, 2000; Rowley and Slack, 2001).

In this context, the present study attempts to analyze which are the factors that determine consumers’ intention to shop online, and that lead Internet users to become buyers on the Net. In particular, an overall adoption model of Internet shopping is proposed, which, with an integrative perspective, includes the most relevant approaches in the literature about e-commerce. In this sense, given that the Internet represents an innovation as a purchase channel (Jones and Vijayasarathy, 1998; Dahlén, 1999; Vijayasarathy and Jones, 2000; Miyazaki and Fernández, 2001; Fenich and O’Cass, 2001), Gatignon and Robertson’s (1985) Adoption Model is taken as a reference framework. Although this model was enunciated more than 20 years ago, it is still highly relevant. The selection of this model is justified by its overall nature and by its agreement with the general approaches of the main theories used to explain e-commerce acceptance and, in particular, with the Theory of Planned Behavior (Schifter and Ajzen, 1985; Ajzen, 1991) and the Technology Acceptance Model (Davis, 1989; Davis et al., 1989).

The first part of the study includes a review of relevant literature in reference to the Internet and e-commerce acceptance, taking the theoretical framework proposed by Gatignon and Robertson (1985) as a reference. Likewise,
the corresponding research hypotheses are propounded, which together, give place to an overall adoption model of online shopping by consumers. Subsequently, the methodology used in this study is described and the results obtained from a sample of regular users of Internet that have never made transactions on the Net are presented. To finish, the most relevant conclusions of the study are detailed.

2. Literature review and research hypotheses

The main characteristics and contributions of the model proposed by Gatignon and Robertson (1985) are summarized next, giving special attention to the explicative variables of a new product or behavior adoption. Subsequently, the relevant literature review that examines the influence of each one of these variables on the acceptance of purchasing on the Internet is tackled. The corresponding research hypotheses are enunciated for every case.

2.1. Gatignon and Robertson’s (1985) Innovation Adoption Model

Gatignon and Robertson (1985) attempt to integrate the different research perspectives of the innovation diffusion process into a general model, which is the base for the development of further research on the subject. Thus, on the basis of an extensive review of relevant literature, these authors postulate that the acceptance or non-acceptance of a novel product or behavior is the consequence of an adoption process followed by a diffusion one. Given that the aim of this research is to analyze the adoption process, our study will be focused on it.

According to Gatignon and Robertson (1985), the decision to adopt an innovation, captured through the intention to purchase, is influenced by three variables: (1) the attitudes toward it and the cognitive process by which they are constituted (Eastlick and Lotz, 1999); (2) the uncertainty or perceived risk in the new product or behavior; and (3) the consumers’ purchase patterns. Likewise, on the basis of the literature on innovation diffusion, the model incorporates as indirect determinants of adoption the individuals’ perceptions with respect to the attributes of innovation, other people’s influence and the individuals’ personal characteristics (Fig. 1).

According to the model, the formation of attitudes toward a new behavior or product is determined by four factors: (1) individuals’ personal characteristics and, in particular, personal innovativeness; (2) characteristics perceived in the innovation; (3) the uncertainty or risk associated with it; and (4) the influence of the people or groups of reference.

Although it was enunciated more than 20 years ago, Gatignon and Robertson’s (1985) model remains highly relevant, as the review of the recent literature on innovation adoption evidences. In this sense, it is worth mentioning the similarity between this theoretical framework and other models that, with a more specific approach, have been extensively used to study the acceptance of new products and behaviors: the theories of Reasoned Action (Ajzen and Fishbein, 1980), and Planned Behavior (Schifter and Ajzen, 1985; Ajzen, 1991), the Technology Acceptance Model (Davis, 1989; Davis et al., 1989) and the Decomposed Theory of Planned Behavior (Taylor and Todd, 1995) (see Table 1 for a resume of this theoretical models). Thus, these theories include the attitude toward an innovation as one of the most important antecedents of its adoption. In addition, other people’s influence on the acceptance process is explicitly included in both the Theories of Reasoned Action and Planned Behavior, and implicitly in the TAM (Davis et al., 1989; Mathieson, 1991). Finally, the TAM includes the characteristics perceived in the innovation as direct antecedents of the attitude and even of the effective adoption.

Moreover, in the specific context of research on e-commerce, much empirical evidence has shown the importance of previous behavior patterns, the perceived risk in the system and personal innovativeness in the adoption of Internet as a purchase means. Therefore, the literature on e-commerce has come to support – although partially

![Fig. 1. Innovations Adoption Model by Gatignon and Robertson (1985).](image-url)
With the aim to explain an overall adoption model of Internet shopping based on these authors’ contributions, we next present a review of the literature on e-commerce, which supports the effect of the variables considered in this theoretical framework: (1) the subjects’ attitudes toward the system; (2) relevant people’s influence; (3) the perceived risk in the innovation; (4) the individual’s personal characteristics and, in particular, his or her innovativeness; (5) the perceived attributes of the new product or technology.

2.2. The effect of attitudes on Internet shopping adoption

The individuals’ attitudes have been included as determinants of behavior in the vast majority of overall models of consumer behavior (Engel et al., 1968, 1986; Howard and Sheth, 1969; Howard, 1989), as well as in other more specific behavior models (Ajzen and Fishbein, 1980; Gatignon and Robertson, 1985; Schifter and Ajzen, 1985; Bagozzi and Warshaw, 1990). In this sense, it is worth mentioning – as it was previously mentioned – the importance given to attitudes in the models focused on innovation adoption, such as the Technology Acceptance Model and the Decomposed Theory of Planned Behavior.

In the literature about e-commerce, several authors have supported the influence of attitudes on the use of (or intention to use) Internet as a purchase system. Among these studies, it is worth mentioning those based on the theories of Reasoned Action and Planned Behavior (Shim and Drake, 1990; Limayem et al., 2000; Fitzgerald and Kiel, 2001; Flynn and Goldsmith, 1993; Hsu and Chiu, 2004) and the Technology Acceptance Model (Fenech and O’Cass, 2001; Chen et al., 2002; Gentry and Calantone, 2002; O’Cass and Fenech, 2003; Shih, 2004). Likewise, from other perspectives, several authors have also observed a relevant impact of attitudes on Internet shopping behavior (Eastlick and Lotz, 1999; Goldsmith and Bridges, 2000; Cho, 2004).

According to the theoretical models and the empirical evidence pointed out, the following hypothesis is proposed:

H1: Individual attitude toward e-commerce positively influences the intention to purchase on the Internet.

2.3. Social influence on e-commerce acceptance

With a perspective close to Gatignon and Robertson’s (1985) model, other people’s influence is examined in many of the models traditionally used to analyze e-commerce adoption, such as the theories of Reasoned Action, and Planned Behavior and their subsequent development into the Decomposed Theory of Planned Behavior. In particular, these models include as an antecedent of intention the subjective norm, which represents the individual’s motivation to act according to the opinions of people relevant to him or her. Likewise, although the basic definition of the Technology Acceptance Model does not include the normative influence of the reference groups as it considers that it is indirectly reflected through attitudes, several authors (Malhotra and Galletta, 1999; Venkatesh and Davis, 2000) include the Subjective Norm in the model and they observe that it has a relevant effect on the use of (or intention to use) the system.

In reference to research on e-commerce, Shim and Drake (1990), Limayem et al. (2000) and Gentry and Calantone (2002) obtain empirical evidence that supports the
significant effect of Subjective Norm on the intention to purchase on the Internet. According to what has previously been mentioned, the following hypothesis is enunciated:

H2: Subjective Norm positively influences the intention to shop on the Internet.

Moreover, Gatignon and Robertson’s (1985) innovation adoption model shows the effect of social groups on the formation of individuals’ attitudes. Later, in their extension of the Technology Acceptance Model, Malhotra and Galletta (1999) test the significance of social influence on individuals’ attitudes toward an innovation. Likewise, Hsu and Chiu (2004) find a relevant effect of the Subjective Norm on the attitudes toward an electronic service. On the basis of the specified evidence, the following hypothesis is proposed:

H3: Subjective Norm positively influences attitudes toward shopping on the Internet.

2.4. The influence of perceived risk in the decision to shop online

Gatignon and Robertson (1985) identify the uncertainty or perceived risk in an innovation as a direct determinant of adoption. In the specific context of e-commerce, diverse studies have supported the disincentive effect of perceived risk on the acceptance of Internet shopping (Korgaonkar and Wolin, 1999; Goldsmith, 2000; Goldsmith and Lafferty, 2001; Miyazaki and Fernández, 2001). In this sense, empirical evidence obtained by Liang and Huang (1998), Vijayasarathy and Jones (2000), Liao and Cheung (2001), Salisbury et al. (2001), Featherman and Pavlou (2003) and Pavlou (2003) has supported the negative influence of perceived risk on the intention to buy products on the Net. On the basis of these studies, the following hypothesis is proposed:

H4: The overall risk perceived in shopping on the Internet has a negative influence on the intention to adopt this behavior.

Moreover, several studies have also observed a negative influence of perceived risk on attitudes toward e-commerce (Jarvenpaa and Todd, 1997; Vijayasarathy and Jones, 2000; Fenech and O’Cass, 2001; Shih, 2004; Hsu and Chiu, 2004). According to the empirical evidence obtained in these studies, the next hypothesis is formulated:

H5: The overall risk perceived in shopping on the Internet has a negative influence on attitudes toward such behavior.

2.5. Personal innovativeness in the adoption of virtual commerce

Among the consumer’s personal characteristics, innovativeness has received considerable attention from researchers on shopping behavior (among others, Robertson, 1971; Hurt et al., 1977; Midgley and Dowling, 1978; Hirschman, 1980a; Rogers, 1983, 1995; Agarwal and Prasad, 1998), in view of its relevance in the process of adoption of new products (Robertson and Kennedy, 1968; Gatignon and Robertson, 1985; Agarwal et al., 1998) or behaviors (Citrin et al., 2000).

The influence of personal innovativeness on shopping behavior has been supported by several authors in the context of e-commerce (Donthu and García, 1999; Eastlick and Lotz, 1999). In this sense, different studies have pointed out the effect that the specific domain innovativeness has on the intention to shop on the Internet. In accordance with these authors, the relevant hypothesis is enunciated:

H6: Personal innovativeness in the domain of new technologies positively influences the intention to shop on the Internet.

Moreover, in the context of e-commerce, Goldsmith (2000) and Goldsmith and Lafferty (2001) support Gatignon and Robertson’s (1985) approach by testing the significant influence of the tendency to innovate on attitudes toward shopping on the Internet. The empirical evidence obtained by these authors justifies the following profound hypothesis:

H7: Personal innovativeness in the domain of new technologies positively influences attitudes toward shopping on the Internet.

Finally, following Robertson et al. (1984), Gatignon and Robertson (1985) state that personal innovativeness is linked to perceived risk in innovation adoption. Goldsmith (2000) and Goldsmith and Lafferty (2001) support this perspective by verifying that the most innovative individuals are more confident about how safe Internet shopping is. In line with these authors, the following hypothesis is proposed:

3 In recent literature on innovation diffusion, several authors have indicted that innovativeness is specific to a certain context or domain (Hirschman, 1980b; Goldsmith and Hofacker, 1991; Agarwal and Prasad, 1998). In accordance with this perspective and following diverse research approaches on Internet and e-commerce (Agarwal and Prasad, 1998; Citrin et al., 2000; Goldsmith, 2000, 2002; Goldsmith and Lafferty, 2001; Park and Jun, 2003), in the present research personal innovativeness in the field of new technologies is examined.
H8: Personal innovativeness in the domain of new technologies negatively influences perceived risk in shopping on the Internet.

2.6. Characteristics perceived in the system in the adoption of Internet shopping

According to the theoretical framework considered, the characteristics perceived in an innovation determine its adoption through its influence on attitudes and risk perception. In this sense, in the literature on innovation diffusion, several studies have propounded a series of general characteristics that can be extrapolated to any situation or technology (Ostlund, 1974; Tornatzky and Klein, 1982; Rogers, 1983, 1995; Davis, 1989; Davis et al., 1989; Moore and Benbasat, 1991). In particular, the empirical evidence obtained (among others, Tornatzky and Klein, 1982; Taylor and Todd, 1995; Moore and Benbasat, 1996; Agarwal and Prasad, 1997; Agarwal and Karahanna, 1998) allows the identification of three determinant attributes of innovation acceptance: perceived usefulness or relative advantage, Perceived Ease-of-Use or complexity and Perceived Compatibility with individual’s values and beliefs.

In the literature on innovation adoption, several models have propounded a causal relationship between the characteristics perceived in a new technology and the individual’s attitudes toward it (Gatignon and Robertson, 1985; Davis, 1989; Davis et al., 1989; Taylor and Todd, 1995; Moore and Benbasat, 1996). In this sense, on the basis of the Technology Acceptance Model, several research papers have obtained empirical evidence that makes it possible to support the significant influence of Perceived Usefulness and ease-of-use on attitudes in both the context of new technologies negatively influences perceived risk in shopping on the Internet. Hence, Perceived Compatibility constitutes, apart from an innovation attribute, a characteristic perceived in the innovation. Thus, according to the Technology Acceptance Model, the usefulness perceived in an innovation is determined by the ease-of-use associated with it – see Gefen and Straub (1997) for an extensive review of the literature about this topic. In the specific context of Internet shopping, the positive effect of ease-of-use on Perceived Usefulness has been tested by diverse authors (Gefen and Straub, 1997; Gentry and Calantone, 2002; Featherman and Pavlou, 2003; Shih, 2004; Shang et al., 2005). Moreover, on the basis of the literature on innovation attributes (Tornatzky and Klein, 1982; Moore and Benbasat, 1991; Taylor and Tod, 1995), Agarwal and Karahanna (1998) include Perceived Compatibility with the system in the Technology Acceptance Model and they proposed a direct relationship of this variable on Perceived Usefulness. From the indicated arguments, the following hypotheses are enunciated:

H12: The ease-of-use perceived in shopping on the Internet positively influences the usefulness perceived in this behavior.

H13: The compatibility perceived in shopping on the Internet positively influences the usefulness perceived in this behavior.

Finally, the adoption of e-commerce has been linked to previous experience in the use of the Net (Duhlén, 1999; Van den Poel and Leunis, 1999; Bhatnagar et al., 2000; Citrin et al., 2000; Park and Jun, 2003), identified by different authors as a component of the compatibility perceived in a behavior or technology (Agarwal and Karahanna, 1998). Hence, Perceived Compatibility constitutes, apart from an innovation attribute, an indicator of the individual’s behavior patterns, a variable included by Gatignon and Robertson (1985) in their Adoption Model.

The proposed research hypotheses give place to a model of Internet shopping behavior shown in Fig. 2. Likewise, Table 2 shows the theoretical definitions of the explicative variables included in the model. The methodology used is summarized in the next section in order to meet the aims of the study previously explained.

3. Research methodology

In order to empirically test the E-commerce Adoption Model and hypotheses previously mentioned, research aimed at Internet users in Spain is developed. In a preliminary stage a qualitative study is conducted. This study consists of several in-depth interviews, in which the statement from Internet experts, from both professional and academic environments is shown. According to the results in the previous qualitative study, quantitative research aimed to determine Internet users’ attitudes and beliefs toward e-commerce is developed. The selected method for data collection is the personal survey. Next, the developed survey
structure is described and the research design and field research are explained in detail.

3.1. Questionnaire structure and measurement scales

The data collection is carried out through a structured questionnaire, in which a series of multi attribute scales concerning the different variables identified in the proposed model are included (see Appendix). This methodology makes it possible to obtain valuations for psychological variables (Churchill and Iacobucci, 2002), which are not directly observed or which cannot be assigned a direct quantification. In particular, 7-point Likert scales, in which 1 indicates total disagreement with the shown statement and 7 total agreement, are used.

The scale used to measure the intention to shop on the Internet is developed from proposals in the studies by Taylor and Todd (1995) and Gefen and Straub (1997). Attitude toward e-commerce is measured through a scale adapted from Taylor and Todd (1995). To evaluate the subjective norm, items extracted from Taylor and Todd (1995) and Van der Heijden et al. (2003) are used. The perceived risk in online shopping is measured by means of a scale adapted from Stone and Gronhaug (1993) and Featherman and Pavlou (2003). To evaluate personal innovativeness in the domain of new technologies, the Agarwal and Prasad (1998) scale is used. Alternatively, the measurement of Perceived Usefulness and ease-of-use in e-commerce is made by means of items extracted from Davis (1989) and Moore and Benbasat (1991). To finish, the compatibility of Internet shopping is evaluated through a scale adapted from Moore and Benbasat (1991) and Taylor and Todd (1995).

In order to define the final questionnaire, we relied on the cooperation of 14 university professors, whose suggestions helped to make the corresponding modifications to the original survey draft. A questionnaire pretest was also carried out in order to guarantee a correct understanding of the questions.

3.2. Sample description

The data collection is made by means of a personal survey aimed at Internet users.4 The sampling procedure used is non-probabilistic. A quota stratification is employed according to the description of Internet users in Spain periodically carried out by the Estudio General de Medios.
of 95.5% for the most unfavorable case of infinite population and with a confidence level p = q = 0.5.

Table 3 shows the socio demographic profile of Internet users in Spain (AIMC, 2004) and the obtained final sample. The characteristics of Internet users without experience in Internet shopping – on which the intention to shop on the Net in the future is analyzed – are also detailed.

Table 3 proves that the sample obtained in the present research is very similar to the profile of the Internet users in Spain (AIMC, 2004). On the other hand, certain differences are observed between the group of subjects that have not previously bought on the Net and the overall sample. Thus, in the group of individuals without experience in e-commerce a higher percentage of women is observed (47.0% against 43.1% in the final sample). Besides, the percentage of university graduates (44.4% compared to 47.6% in the total sample) and of employees (48.3% compared to the 52.0%) is slightly lower in those Internet users that have not previously bought any product on the Internet.

4. Results

With the aim to analyze the validity of the proposed E-commerce Adoption Model, the presented hypotheses are verified over a sample of Internet users without previous experience in Internet shopping. In particular, a structural equations model (SEM) is followed with the Maximum Likelihood Robust estimation method, using the EQS 6.1 computer program. Therefore, a Confirmatory Factor Analysis (CFA) is carried out to evaluate the reliability and validity of the measurement scales of all variables included in the proposed model. Once the measurement model is validated, the causal model of structural equations is presented.

In reference to the psychometric properties of the scales, an initial Confirmatory Factor Analysis shows the need to remove item PEOU3 from the Perceived Ease-of-Use scale and item INN3 from the personal innovativeness scale, since the standardized lambda coefficients are in both cases lower than the required minimum value of 0.5. Once these corrections have been made, the convergent validity of the scales is verified (Table 4), as all the items are significant at a confidence level of 95% and their standardized lambda coefficients are higher than 0.5 (Steenkamp and Van Trijp, 1991). The discriminant validity of the proposed scales is measured by means of the procedure described by Anderson and Gerbing (1988). To this purpose, confidence intervals for the correlation between pairs of latent constructs are estimated and compared with the unit. It is observed that in none of the cases the proposed intervals contain value 1, which supports the discriminant validity of the proposed measurement model.

Reliability of measurement scales is evaluated from the Cronbach’s a, compound reliability and AVE coefficients (Bagozzi and Yi, 1988). It can be seen that the values of these statistics are, in every case, above the required minimum values of 0.7 and 0.5, respectively (Nunnally, 1978; Hair et al., 1998), which supports inner reliability of the proposed constructs (Table 4).

A structural equation system is followed for the proposed model of the adoption of shopping on the Internet. An early estimation of the structural model by the robust method indicates that hypotheses H4, H5, H7 and H10 are not significant. Therefore, according to the results obtained, perceived risk does not have any influence on e-commerce adoption – nor on the attitude toward the system nor on the intention to shop – by Internet users that have never made an online transaction. On the other hand, neither a direct effect of the subjects’ innovativeness nor Perceived Ease-of-Use on attitude toward Internet shopping is seen. According to these results, a structural model respecification is made, removing the relationships shown. Adjusted goodness of fit indexes indicate an appropriate
specification of the new model (Fig. 3), as BBNFI,
BBNNFI, CFI and IFI statistics exceed or are very close
to the recommended minimum value of 0.9, while the
RMSEA is below the maximum limit of 0.08 (Hair et al.,

### Table 4
First-order Confirmatory Factor Analysis – Internet non-buyers sample

<table>
<thead>
<tr>
<th>Latent variable</th>
<th>Measured variable</th>
<th>Standard lambda</th>
<th>$R^2$</th>
<th>Cronbach’s $\alpha$</th>
<th>Composite reliability</th>
<th>AVE</th>
<th>Goodness of fit indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention (average = 3.36)</td>
<td>INTEN1</td>
<td>0.90</td>
<td>0.81</td>
<td>0.88</td>
<td>0.90</td>
<td>0.70</td>
<td>$\chi^2$ (349) = 954.76 \ (p = 0.0000), BBNFI = 0.93, BBNNFI = 0.95, CFI = 0.96, IFI = 0.96, RMSEA = 0.05</td>
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<tr>
<td></td>
<td>INTEN2</td>
<td>0.94</td>
<td>0.89</td>
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<tr>
<td></td>
<td>INTEN3</td>
<td>0.88</td>
<td>0.77</td>
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<tr>
<td></td>
<td>INTEN4</td>
<td>0.58</td>
<td>0.33</td>
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<tr>
<td>Attitude (average = 3.82)</td>
<td>ATTIT1</td>
<td>0.81</td>
<td>0.65</td>
<td>0.94</td>
<td>0.95</td>
<td>0.81</td>
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<tr>
<td></td>
<td>ATTIT2</td>
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<td>ATTIT3</td>
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<td></td>
<td>ATTIT4</td>
<td>0.93</td>
<td>0.87</td>
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<tr>
<td>Subjective Norm (average = 3.47)</td>
<td>SN1</td>
<td>0.77</td>
<td>0.60</td>
<td>0.83</td>
<td>0.84</td>
<td>0.56</td>
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<tr>
<td></td>
<td>SN2</td>
<td>0.77</td>
<td>0.60</td>
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<td></td>
<td>SN3</td>
<td>0.65</td>
<td>0.42</td>
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<tr>
<td></td>
<td>SN4</td>
<td>0.79</td>
<td>0.63</td>
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<tr>
<td>Perceived Risk (average = 5.04)</td>
<td>RSK1</td>
<td>0.74</td>
<td>0.55</td>
<td>0.90</td>
<td>0.91</td>
<td>0.77</td>
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<td></td>
<td>RSK2</td>
<td>0.95</td>
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<td>RSK3</td>
<td>0.91</td>
<td>0.83</td>
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<tr>
<td>New Tech Innovativeness (average = 3.86)</td>
<td>INN1</td>
<td>0.86</td>
<td>0.75</td>
<td>0.87</td>
<td>0.87</td>
<td>0.68</td>
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<td></td>
<td>INN2</td>
<td>0.79</td>
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<td></td>
<td>INN4</td>
<td>0.82</td>
<td>0.67</td>
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<tr>
<td>Perceived Usefulness (average = 4.02)</td>
<td>PU1</td>
<td>0.82</td>
<td>0.67</td>
<td>0.90</td>
<td>0.89</td>
<td>0.68</td>
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<td></td>
<td>PU2</td>
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<td></td>
<td>PU4</td>
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<tr>
<td>Perceived Ease-of-Use (average = 5.06)</td>
<td>PEOU1</td>
<td>0.90</td>
<td>0.82</td>
<td>0.90</td>
<td>0.91</td>
<td>0.76</td>
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<tr>
<td></td>
<td>PEOU2</td>
<td>0.94</td>
<td>0.88</td>
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<tr>
<td></td>
<td>PEOU4</td>
<td>0.77</td>
<td>0.59</td>
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<tr>
<td>Perceived Compatibility (average = 2.57)</td>
<td>PCOM1</td>
<td>0.91</td>
<td>0.82</td>
<td>0.94</td>
<td>0.94</td>
<td>0.80</td>
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<tr>
<td></td>
<td>PCOM2</td>
<td>0.93</td>
<td>0.87</td>
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<tr>
<td></td>
<td>PCOM3</td>
<td>0.89</td>
<td>0.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PCOM4</td>
<td>0.86</td>
<td>0.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 3. Structural Model Estimation. Note: Fig. 3 includes standardized parameter estimates together with the t-student statistics for the unstandardized parameter estimations (in parentheses), for each causal relationship examined.
In addition, the $R^2$ coefficient values show a sufficient level of variance explanation of dependent variables.

The results summarized in Fig. 3 support the causal relationships proposed in hypotheses H1, H2, H3, H6, H8, H9, H11, H12 and H13. Thus, the positive influence of attitudes on the intention to adopt e-commerce by Internet users with no previous Internet shopping experience is verified. In addition, the empirical evidence obtained supports the effect of Subjective Norm on the intention to shop on the Internet and on attitudes toward the system. Therefore, Subjective Norm has both a direct effect on the intention to make an online transaction, and an indirect influence through attitudes toward e-commerce. In relation to personal innovativeness in the case of individuals that have never made a virtual transaction, the results obtained support the positive effect of this variable on the intention to shop on the Internet and its negative influence on the perceived risk in this behavior. With regard to the impact of perceived attributes in e-commerce, it is seen that both the usefulness and the compatibility perceived in the system have a significant influence on attitudes toward Internet shopping. Finally, with respect to the interrelation among attributes linked to e-commerce, the obtained empirical evidence supports the positive effect that both ease-of-use and compatibility have on Perceived Usefulness. According to these results, subjects will consider Internet shopping useful, as they perceive it to be a simple activity, compatible with their values, beliefs and needs.

5. Conclusions, limitations and future research venues

The most relevant research conclusions and the main implications of the obtained results for the management of e-commerce firms are explained next. To conclude, the limitations of the study and future research venues are shown.

5.1. Conclusions

From the theoretical framework proposed by Gatignon and Robertson (1985), the present study propounds an overall model of B2C e-commerce acceptance which includes the most important variables identified in the literature on innovation adoption: attitudes, other people’s influence, perceived risk, personal innovativeness and the system or technology characteristics. The theoretical model proposed is verified on a sample of Internet users without previous experience in online shopping.

Thus, in accordance with the approaches of traditional behavior models, subjects’ attitudes form the main direct determinant of the intention to shop on the Net. Consequently, the fact that individuals positively evaluate the consequences derived from making a transaction on the Internet constitutes a basic condition for the acceptance of e-commerce. On the other hand, the influence of other people has a positive impact on the intention to make an online transaction and on attitudes toward Internet shopping. These results show the importance that Internet users give to other subjects’ opinions on their behavior. Therefore, other people’s influence not only affects the acceptance intention but it also has a greater effect on consumers’ cognitive structures through its impact on the overall evaluation that subjects make of e-commerce. As a result, there is a motivation to behave according to reference groups’ opinions and wishes, but there is also an internalization of their values, ideas and beliefs.

With reference to perceived risk in e-commerce, a relevant effect of this variable on the decision to adopt Internet shopping is not seen. So, although uncertainty perceived in virtual transactions has been traditionally identified as a restraint for e-commerce acceptance, the obtained results indicate that risk does not have any influence on future intention to shop online or attitude toward the system. This fact seems to indicate that, although uncertainty may be perceived in e-commerce, the feeling of risk is not considered in the decision to shop on the Internet, which will be influenced by other factors, such as other people’s influence, individuals’ innovativeness or advantages associated with the system. However, the lack of influence of perceived risk on attitude and intention could be also explained by operational reasons. In the first place, some aspect of risk could be incorporated into other constructs in the model that may be formed taking into account risk perceptions, at least to certain extent. Thus, the direct influence of perceived risk could be blurred by the effects exerted by other factors with a close meaning as ease-of-use, usefulness, Subjective Norm, or compatibility. On the other hand, there could be a methodological reason related to the setting of research, which may have been defined somehow imprecisely. Thus, we examine e-commerce in general – without reference to any particular product category, time horizon or electronic retailer – thus relaxing the feeling of risk associated with the behavior.

Relating to personal innovativeness, the obtained results support the positive effect of this variable on the intention to shop on the Internet and its negative influence on perceived risk in e-commerce. In contrast, the proposed relationship between innovativeness and attitudes toward Internet shopping is not supported. Hence, subjects’ tendency to develop new behaviors or to try new products affects Behavior Intention and reduces perceived risk in it, but it does not have a direct influence on attitude formation. Consequently, personal innovativeness may lead subjects to develop novel behavior (Hirschman, 1980a), such as Internet shopping, for the mere desire to gain new experiences, although their attitudes toward it are not particularly positive.

Finally, with respect to the influence of perceived attributes in Internet shopping, the empirical evidence obtained supports the positive influence of Perceived Usefulness and compatibility in electronic shopping on attitudes toward that behavior, but it is not the same with ease-of-use. Thus, it is seen that the overall evaluation that individuals make of Internet as a purchase means is basically determined by...
its advantages compared to other channels, and by how close the system is to their previous values, beliefs and habits. In contrast, the ease of making an online transaction does not seem to constitute, by itself, a motivation nor a restraint to develop such behavior. However, ease of use, like compatibility, does have an effect on perceived usefulness in electronic shopping. As a result, the easier this activity is considered to be and the more consistent it is with previous values and beliefs of individuals, the bigger the relative advantage that individuals associate with making a virtual transaction.

According to the results presented, three main contributions could be highlighted. In the first place, the empirical evidence obtained supports the explanatory capacity of Gatignon and Robertson’s Innovation Adoption Model (1985), confirming most theoretical relationships proposed by these authors. Moreover, we have applied this framework to explain acceptance decision in a field in which it has scarcely been tested: a new shopping channel as is e-commerce. Thus, beyond testing Gatignon and Robertson’s model, the results obtained introduce new insight about which specific factors influence Internet shopping adoption, among those proposed by those authors (and that could be different from the factors that influence the adoption other innovations with different attributes). Finally, the most important contribution in this paper lies on the simultaneous study of the set of explanatory variables considered to explain consumers’ intention to buy online. Thus, although the constructs included in this study have been analyzed in previous research, there is very little evidence that jointly studies all these factors and therefore consider the interrelation and overlapping existing among them. In this sense, the non-significance of some causal relationships (as the influence of perceived risk on attitudes towards e-commerce and intention to buy online) might be caused by the inclusion of additional variables not considered simultaneously in previous research.

5.2. Implications for the management of retailing firms

The results obtained in the developed research show interesting implications for e-commerce diffusion and for the management of sale initiatives through Internet. Specifically, the understanding of the overall process of virtual shopping acceptance by final consumers is very useful to define strategies and performances aimed at leading Internet users to make electronic transactions.

In this sense it is worth mentioning in the first place the need to make an effort so that individuals improve their overall perception and opinion with respect to Internet shopping and electronic stores. Thus, those firms that are currently operating on the Net should not restrict their marketing strategies to the development of their own image and client mass. On the contrary, they should promote and foster e-commerce in general, as the only way to guarantee the future development of the business. Also, given Internet users’ receptivity to opinions in their social environ-

ment about shopping on the Internet, marketing strategies aimed to spread e-commerce should not exclusively be restricted to potential users of virtual retailers, but should also reach other people that could influence users’ acceptance (and that are not online buyers themselves). Thus, some communication campaigns could be targeted to the whole society (especially through public relations) in order to create a positive opinion about e-commerce in people relevant to potential adopters.

Likewise, given that the initial acceptance of Internet shopping is affected by subjects’ innovativeness, and in particular, by their tendency to try new computer systems, it will be essential to foster a technological culture in society. In this sense, initiatives aimed at consumer familiarization in the use of computer systems and at facilitating access to basic infrastructure and equipment, are of particular importance so that this technology becomes part of individuals’ daily life. Furthermore, firms operating on the Net should develop strategies to encourage the use of the channel as a purchase means, such as the inclusion of a shopping assistance section in the website or free testing in the case of digital services (e.g., music download, e-learning demonstrations, or scientific journals temporary access). Hence, the more familiar the subjects are with new technologies and e-commerce processes, the higher their tendency to adopt more and more innovative behaviors.

In conclusion, it is worth mentioning the significant impact that perceived attributes in e-commerce have on the decision to make future transactions on the Internet. Consequently, firms that develop their activity on the Net should foster and communicate the relative usefulness or advantages that their virtual establishments have in comparison with other traditional and online competitors. Also, retailers’ web sites should include simple shopping processes, with friendly interfaces and all the facilities that the consumer may need. Those systems or processes that mean a radical change to the individuals’ previous habits and values should also be avoided.

5.3. Limitations and future research venues

Despite the systematic methodology followed in its development, this research is not free of limitations. In this sense, it is worth mentioning the definition of the behavior aim of study. Thus, in the developed research, subjects’ beliefs and attitudes with respect to Internet use to buy any type of product are analyzed. Therefore, there is no mention of any good or service category in particular, which could affect the study results, as several authors have pointed out that not all products have the same sale potential on the Internet. The consideration of e-commerce in general corresponds to the search of an overall pattern in shopping on the Net, alien to the effect of the particular characteristics of a certain product category. Nevertheless, it would be interesting to examine in future research the effect that the type of product being bought and its attributes have on electronic shopping decision. In particular, an analysis of the existing differences...
in the process of buying tangible goods and services on the Internet would be especially relevant.

Likewise, from a methodological point of view, the dependent variable used in the research is also a limitation. So, the intention to shop on the Internet has been measured in a subjective way through individuals' perceptions with respect to their own behavior (Taylor and Todd, 1995; Chau, 1996). Although this method is recurrent in e-commerce research, some authors suggest the use of objective measures, such as real behavior (Szajna, 1996), while others (Thompson et al., 1991) propose the convenience of using both types of measure and comparing the correspondence between them. According to this limitation, it would be interesting for future research to analyze the coherence between buying intention and actual behavior.

Finally, the conclusions exposed in this study also present a series of questions for future research in relation to shopping behavior on the Internet. Therefore, as was previously mentioned, it would be necessary to analyze the product category in the process of e-commerce adoption. In particular, the influence of attitudes, Subjective Norm or individuals' innovativeness could vary from one product to another. Thus, personal innovativeness could have a more significant influence in the case of high technology products that incorporate radical innovations and are perceived as very novel. On the other hand, Subjective Norm could have a greater influence for those products and services in which fashion and trends are especially relevant, such as exclusive clothing or art pieces available on the Internet.

Lastly, when carrying out research on Internet shopping, it would also be interesting to consider other variables, such as the subjects' socio demographic characteristics, way of life or personal values, among others.

### Appendix A. Measurement scales

**Internet purchasing intention**

| INTEN1 | I intend to use the Internet to purchase (in the next 6 months). |
| INTEN2 | I expect to use the Internet to purchase (in the next 6 months). |
| INTEN3 | It is likely that I will use the Internet to purchase (in the next 6 months). |
| INTEN4 | I will not use the Internet to purchase (in the next 6 months). |

**Attitude towards Internet purchase**

| ATTIT1 | I like the idea of (... using the Internet to purchase in the next 6 months ...). |
| ATTIT2 | (Using the Internet to purchase in the next 6 months ...) is a wise idea. |
| ATTIT3 | (Using the Internet to purchase in the next 6 months ...) is a good idea. |
| ATTIT4 | (Using the Internet to purchase in the next 6 months ...) is a positive idea. |

**Subjective Norm regarding Internet purchase**

| SN1 | People whose opinions I value would approve that I used the Internet to purchase. |
| SN2 | People who influence my behaviour would think that I should use the Internet to purchase. |
| SN3 | It is expected from me that I use the Internet to purchase. |
| SN4 | People who are important to me would agree if I used the Internet to purchase. |

**Perceived risk in Internet purchase**

| RSK1 | If I used the Internet to purchase I would feel more worried than using other shopping channels. |
| RSK2 | If I used the Internet to purchase I would feel insecure. |
| RSK3 | If I used the Internet to purchase I would feel a lot uncertainty. |

**Innovativeness in New Technologies**

| INN1 | If I heard about a new information technology, I would look for ways to experiment with it. |
| INN2 | Among my peers, I am usually the first to try out new information technologies. |
| INN3 | In general, I am hesitant to try out new information technologies. |
| INN4 | I like to experiment with new information technologies. |

**Perceived Usefulness – using the Internet to purchase in the next 6 months**

| PU1 | ... would make shopping process easier. |
| PU2 | ... would enable me to shop more quickly. |
| PU3 | ... would be useful to get better purchases. |
| PU4 | ... would enhance my shopping effectiveness. |

**Perceived Ease-of-Use – using the Internet to purchase in the next 6 months**

| PEOU1 | ... would be easy to learn for me. |
| PEOU2 | ... would be easy to do for me. |
| PEOU3 | ... would require a lot of mental effort. |
| PEOU4 | ... would be easy following the instructions provided in virtual shops. |

**Perceived Compatibility – using the Internet to purchase in the next 6 months**

| PCOM1 | ... would be compatible with the way I like to buy. |
| PCOM2 | ... would fit well with the way I like to do things. |
| PCOM3 | ... would be coherent with my habits. |
| PCOM4 | ... would fit into my lifestyle. |

**References**


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