UNIVERSITAT DE BARCELONA

Adoption E-commerce in development country and the moderator effect of digital divide

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PhD in Business | Javier Alirio Sánchez Torres

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Thesis title:

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DEDICATION

Dedicado a mis padres que han sido un ejemplo para mi vida, también a los seres queridos que ya no están a mi lado, mis abuelos, mi amiga Nelcy que siempre me quiso a su lado trabajando como docente, a mis maestras y maestros durante las etapas de mi escuela, colegio y Universidad, especialmente a Alexandra Montoya por su motivación para culminar este gran reto.

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ABSTRACT

With the creation and worldwide diffusion of the Internet since the end of the last century, social and economic relations have seen a strong tendency to move from analog to digital, generating new ways of performing everyday tasks. In going digital, commerce has found a new channel of communication between client and company.

E-commerce was created with the characteristics of a new technology which has been widely adopted and diffused in nearly all regions, societies and cultures. However, like all innovations within a social system, there have been differences in its adoption that could be linked to inequalities in access and use.

This research focuses on analysing the adoption and diffusion of e-commerce in the developing Latin American country of Colombia. It focuses on Colombia because of the low number of large studies that have been conducted there, despite the great development of the Internet and ICTs in the country.

This study applies in parallel two lines of research - on one hand, it validates the UTAUT2 technological acceptance model for different types of e-commerce; on the other hand, it develops an index that measures the digital divide by country, finally analysing the two results to establish if the level of digital divide is linked to behavior in the adoption of e-commerce.

The work contains four sections that give rise to the chapters of this thesis in order of appearance: introduction, state of the issue, publications that respond to the objectives, and conclusions and future lines of research.

The introductory chapter justifies the relevance of the research in addition to setting the objectives and methodology of the work. The second chapter is the state of the issue, which addresses the main models of e-commerce adoption, as well as the digital divide.

Having defined the models and the methodological criteria, the third chapter includes the publications that respond to the objectives, within them the whole empirical process of the research is collected as well as the main results which have gone through the rigorous process of scientific publication in magazines indexed in the Scopus, in their majority.

Finally, chapter four contains the main conclusions of the work, as well as possible future lines of research. The results of this doctoral thesis have been valuable, since there were clear indications of the moderating effect of the digital divide on the adoption of e-commerce, which will help those at a business and governmental level to further understand, improve and develop e -commerce in this type of country.

Keywords: Adoption, e-commerce, B2c, B2b, C2c, e-government, e-banking, Digital Divide, UTAUT, customers, behaviour.

JEL Code: M31, M39, O32, 033, 035, 057, Q53, R59

CHAPTER 1. INTRODUCTION

1.1 JUSTIFICATION

Studies that describe the adoption of e-commerce and that have been guiding the academic analysis of the use of technology adoption models to study the behaviour of the virtual consumer's countries or regions have different approaches and areas of study, such as tourism, online banking, or shopping in general (Afshan & Sharif, 2016; Agudo Peregrina, 2014; Al-Qeisi & Al-Abdallah, 2013; Al-sharafi, Arshah, Abu-shanab, Fakhreldin, & Elayah, 2016; Alam, Ali, & Jani, 2011; Celik, 2016; Chiu, Chang, Cheng, & Fang, 2009; Chong, Ooi, Lin, & Tan, 2010; Goldman & Hino, 2005; Hernández-garcía, 2011; Lee, 2009; Leonard, 2012; Li & Tang, 2010; Mohamed, Ghoneim, Dennis, & Jamjoom, 2013; Muhayiddin, Elsadig, & Ismail, 2011; Musleh, Marthandan, & Aziz, 2015; Riffai, Grant, & Edgar, 2012; Venkatesh, Thong, James & Xu, 2012; Venkatesh, Morris, Davis, & Davis, 2003). However, it usually presents the context of application of this research in countries with high development of new information technologies, Internet and e-commerce (Europe, North America and Asian countries such as China and South Korea), but there are few studies applied to developing Latin American countries (Sánchez-Torres & Arroyo-Cañada, 2016; Tavera-Mesías, Sánchez-Giraldo, & Ballesteros-Díaz, 2011; Williams, Michael-D., Rana, Nripendra-P., & Dwivedi, 2015).

In this region, it is estimated that by 2020, e-commerce will represent 17% of all worldwide sales in the retail sector (Patiño, 2016). To be more ambitious: by 2050, e-commerce will impact all world trade. Latin America has doubled its number of purchases in the last three years, reaching US $7 billion in 2014 (NU. CEPAL, 2015); Colombia is slated to increase from US $1 billion in 2011 to US $5.2 billion this year.

This is the first reason for this investigation - the important development of this commercial channel makes it necessary to examine the characteristics of electronic buyers, to determine the actual context in the online purchase decision in Colombia, to provide businesses and the government with an accurate description of the electronic buyer.

On the other hand, in Latin America and the Caribbean there are large differences between regions. There is strong delay in infrastructure development and adoption of Internet services in the deployment of high-capacity transmission, supply of access, quality at affordable prices and expansion of access to poor or remote populations (Landau, 2012). All of this combines to create the great "digital divide", which is the measure of inequality among countries in access to, and use of, new communications technologies like the Internet and mobile telephony(World & Dreams, 2004). In literature there are just a few mentions of relationships between digital divide and e-commerce uptake (Chen & Wellman, 2004; James B. Pick & Nishida, 2015; Wei, Teo, Chan, & Tan, 2011). One such example linked part of the digital divide related to the learning and use of the Internet, to the moderating effect of age on Internet use (Vicente Cuervo & López Menéndez, 2008). It concludes that some demographic factors within the countries reinforce the digital divide, such as economic status or level of studies, and therefore there is a correlation between the degree of digital divide and the latency of socioeconomic factors in e-procurement (Katz, Agudelo, Bello, & & Rojas, 2015; James B. Pick & Nishida, 2015). The findings show that the digital divide is directly correlated with socioeconomic factors such as social status and level of education in the use of the Internet and e-commerce, therefore it can be assumed that the higher the level of this digital divide in a country, the more the adoption of e-commerce will be directly moderated by the socioeconomic level of the people. If just one group within the population has direct access to the use of electronic commerce (and thus purchasing), that group being those with high economic profiles and high levels of education, this could indicate that digital divide can be a great influencer on electronic purchasing (Pick & Nishida, 2015). This is another great reason to analyse if the digital divide directly or indirectly affects the adoption of e-commerce, offering the first empirical study that suggests this type of analysis.

In summary, this research represents a substantial and original contribution to understanding the user acceptance behaviour of e-commerce users and non-users in a developing country, taking into account the digital divide as a possible moderating effect.

1.2 OBJECTIVES

The limited studies for a Latin American country like Colombia, that show country-wide virtual consumer behavior, taking into context the high growth in this sector, with high economic projections and great benefits for governments and companies in this area; as well as the possible negative influence of the digital divide in e-commerce and high latency in these countries (Sánchez-Torres & Arroyo-Cañada, 2016), allow us to propose the following research questions:

"What factors have significant influence on the user acceptance of e-commerce by general users in Colombia?"

"Does the digital divide adversely affect trade acceptance of e-commerce by general users in Colombia?"

Specific objectives are:

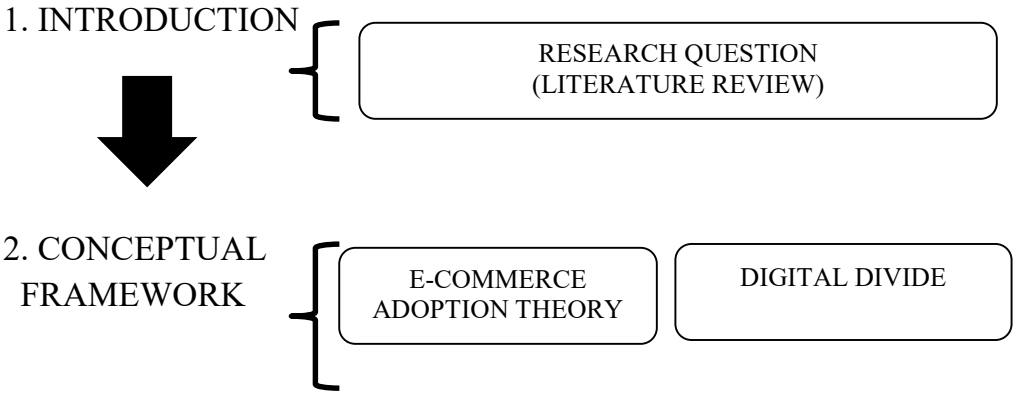
1. Determine factors with positive influence on user acceptance behaviour that should be considered, other than those identified by existing technology acceptance models.
2. Describe the general behaviour of users and non-users in the adoption of e-commerce in Colombia.
3. Propose a model for measuring the digital divide that includes all indicators suggesting literature, to determine the level of digital divide in Colombia.
4. Determine whether the digital divide adversely affects the adoption of e-commerce in Colombia.

1.3 METHODOLOGY

This research is presented as an empirical method, based on the positivist method checking deductive model to get results (Hoe, 2008).

For the first part of the literature review, we used a selective search method in the main Scopus and Web of Science databases to set the theory and items for the empirical model related to the adoption and diffusion of e-commerce in Colombia. Then, we validated the measurement tool and defined a wide sample at the national level that allowed us to give strength to the statistical analyses and structural equation modelling (SEM) that were used. Specifically, the partial least square statistical method was chosen as the most adequate, as its econometric methodology focuses on the prediction, as well as its psychometric approach modelling latent variables (unobserved) that are indirectly inferred from multiple measures observed (indicators), allowing us to combine and confront a priori knowledge and hypotheses with empirical data to provide confirmatory and exploratory results (Hoe, 2008).

For the second part, we performed a search of secondary information in governmental databases to obtain the macroeconomic data related to the digital divide, then for its analysis, we used Fuzzy analysis techniques, continuing with the methodology applied by (Arroyo-Cañada & Gil-lafuente, 2014) for the design and construction of the index of digital divide, which is a tool used as an alternative for decision making that compares results between the optimal measure as a benchmark and alternative elements by analysing their distance (Figure 1).



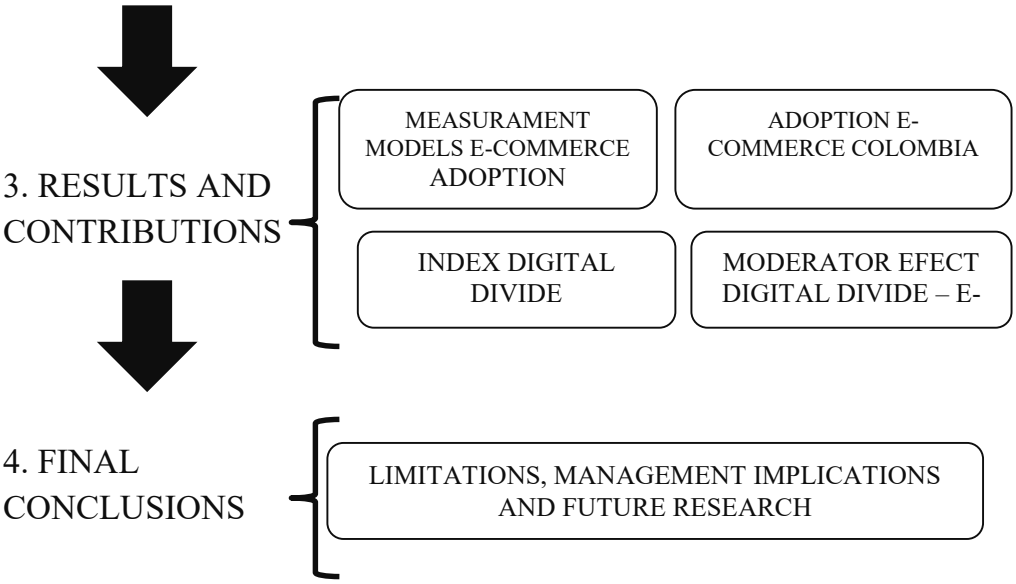


Figure 1. Structure of the doctoral thesis

1.4 STRUCTURE AND CONTENT

This thesis will be structured as follows:

First, and as necessary to advance the preparation of the model for measuring the digital divide, we will focus on developing the whole methodology concerning the definition, standardization and implementation of a tool to measure the digital divide by country, that allows us to make the first contribution to this research. During this stage and applying the methodology, the measurement model will be proposed, then we will seek secondary information, and the data will be analysed in order to generate a new worldwide Digital Divide.

In parallel, we will be developing the research that explains the phenomena proposed in the objectives of this study, as follows: we will be doing methodology data collection and measurement tool (UTAUT2), we will collect data, and we will do the empirical test with the partial least square methodology (P.L.S).

After analysing the results and determining which variables affect the adoption of e-commerce in Colombia, we will check the relationship between the digital divide and e-commerce adoption for the Colombian case, proposing a new contribution or line of future research.

CHAPTER 2. STATE OF THE QUESTION

2.1 INTRODUCTION

The Internet and new technologies have transformed people's daily lives, changed their forms of communication, leisure habits and use of free time, and created new everyday habits linked to virtuality, as personal relationships and public life were transferred to the network (Sánchez-Torres & Arroyo-cañada, 2016).

In business relationships the same thing happens, the client seeks new relationships with the company through the Internet and new information technologies; a new electronic commercial channel called e-commerce arises; (B2c, B2b, C2c, e-banking, e-government, among others), the growth of this commercial channel has developed rapidly, although the development is not uniform throughout the world (Sánchez-Torres & Arroyo-Cañada, 2016). As always, the most developed countries have been the first to adopt e-commerce - the United States, Southeast Asia, and Europe lead the development of this commercial channel, while in poor and developing countries, the advance slows down. There are distortions reflected in the digital divide between countries, and also within each country (Landau, 2012).

Then there are studies on the adoption of e-commerce focused on analysing the behavior of the virtual consumer (Al-Qeisi, Dennis, Hegazy, & Abbad, 2015; Çelik & Yilmaz, 2011; Kiwanuka, 2015; Venkatesh, V., Thong, James. Y., Xu, 2012; V. Venkatesh, Morris, Davis, & Davis, 2003), as well as describing how the diffusion of this new commercial channel and its development are applied not only to consumers, also to companies and organizations, depending on the type of electronic commerce, the type of product or service, or the sector (Bonera, 2011; Chong et al., 2010; Grandon & Pearson, 2004; Hernández-garcía, 2011; Huy et al., 2012; Slade, Dwivedi, Piercy, & Williams, 2015; Tiessen, Wright, & Turner, 2001; Zalatar, 2012; Zheng, 2009).

2.2 E-COMMERCE

E-commerce in 2016 reached a value of US $ 1,915 billion dollars, and its growth projections are exponential for the coming years. However, its diffusion and growth have been primarily concentrated in 3 regions: Asia, North America and Western Europe. Average annual online per capita transactions in these global regions in 2016 are led by Asia with 22.1 transactions per capita per year, followed by: North America with 19, Western Europe with 18.4, Oceania with 16, 1, Eastern Europe and Russia with 11.9, Africa and the Middle East with 11, and the lowest, Latin America with 9.2 (statista.com, 2017). According to (Agudo-Peregrina, 2014), these figures agree with the characteristics of the electronic buyers for each zone, relating the experience of the Internet buyer with the development of e-commerce, seeing as the buyers with high experience with Internet use and online shopping are found in North America, Asia, Western Europe and Oceania, while buyers with little network experience or fewer purchases made are in Africa and the Middle East, Eastern Europe and Latin America.

In the Latin American region, according to the UNCTAD B2c e-commerce index of the United Nations for 2015, which measures several aspects for the development and use of this digital channel, Chile, Uruguay and Trinidad and Tobago are the countries that have the best conditions in terms of development of e-commerce, followed by Brazil, Argentina and Costa Rica and then Venezuela and Colombia.

Statistics on e-commerce in Colombia are not accurate. In Euromonitor's study for 2016, virtual sales were estimated at US $ 3.1 billion, whereas in the Colombian e-commerce chamber (CCC)'s study, the figure was US $1.99 billion. Both studies agree that the growth of e-commerce is 18% per year. Although online sales in Colombia have grown, only 17% of Internet users have made any e-commerce transactions in 2016; of these transactions, 18% are e-government, 17% are e-banking, 65% are all types of electronic commerce between C2c people and B2c companies and individuals.
There are very few studies on the adoption and diffusion of e-commerce in the region and in Colombia; the studies by (Sánchez-Alzate & Montoya-Restrepo, 2016; Sánchez-Alzate & Sánchez-Torres, 2017; Tavera-Mesías et al., 2011), among others, emphasize the lack of confidence towards online shopping as the biggest problem for its development in the country.

2.3 MODELS OF TECHNOLOGY ADOPTION

The first researcher to analyse the behavior of people in relation to a technology was Professor Rogers. His great work, called the "Theory of Diffusion of Innovations" (Rogers, 1995), proposed fundamental concepts to understand the attitudes of people, organizations and social groups with respect to the use of a new technology. His studies focused on the United States, and one of his greatest contributions is the analysis of the individual stages of the adoption process of innovations, which identifies five intrinsic characteristics of the innovations that influence the decision making of the individual. This analysis set the precedent for many factors that other authors have continued to study and develop to this day (Hollenstein, 2004; Kiwanuka, 2015; Osorio-Gallego, Londoño-Metaute, & López-Zapata, 2016; Sánchez-Torres & Arroyo-Cañada, 2016; J. Wang & Tang, 2009; Weber & Kauffman, 2011).

2.3.1 Innovation Diffusion Theory (IDT)

Rogers (1995) characterizes and classifies the users of an innovation in function of the state of diffusion of this within a society in the following way:

- Innovators: Those who, for the first time in the social group, agree to the use of an innovation. They are characterized by a psychological profile with minimal aversion to risk, as well as for their taste for new technologies. This group is usually in a high socioeconomic profile, because they have sufficient resources to access the innovations that are expensive in the first phase.

- Early adopters: Characterized by being socially referent people, they have access to innovations when they are already within the reach of society and make their adoption 'trendy' due to the strong social influence they generate.

- Early majority: Your person of average social standing. They adopt innovations based on what their influential referents encourage them to use.

- Last majority: Individuals who have personality or educational characteristics inclined towards risk aversion, usually are people with

socioeconomic or advanced limitations and are delayed with respect to other members.

- Lagged: Individuals who are reluctant to adopt any innovation, due to personality traits similar to the previous group, however, these individuals will not make use of the new innovation even though it is already widely used within their social group.

According to Rogers, the process of adopting a new technology is developed in a general way within a society, passing through five stages:

1. Launch: First appearance of the innovation in the social system.

2. Emerging: Innovation is evaluated by a small group of individuals (innovators).

3. Establishment: Innovation is disseminated within society and is adopted by, in addition to innovators, pioneers who begin to influence the other members.

4. Maturity: Once it is within the reach of the entire population, it begins to be adopted by the majority of society. Usually at this stage, this innovation is ending its life cycle and can be replaced in the near future by new innovations.

5. Decline: Innovation has already been adopted by the majority of the population and is no longer considered as such, it could be said that it is the period of obsolescence because it gradually disappears of another that replaces it.

2.3.2 Individual process in the adoption of an innovation

Likewise, Rogers found in his studies that individuals go through five stages during the adoption and use of an innovation:

1. Knowledge: The individual is aware of the existence of the innovation, but lacks complete information about it.

2. Persuasion: In the interest generated by the innovation, the individual undertakes a proactive search for specific information.

3. Decision: The individual obtains information on the innovation and analyses the advantages and disadvantages, making the decision to adopt the innovation or not.

4. Implementation: The individual adopts the innovation; the degree of use varies depending on their experience with it, as well as new information they may obtain.

5. Confirmation: At this stage, the individual decides whether to continue using the innovation, or to stop using it.

Likewise, it proposes five characteristics that are intrinsic to one's own innovation and that influence the individual's decision about adoption, which will be the basis for the research models developed later to examine the adoption of the technologies, having:

1. Relative advantage: The benefit that comes with the use of the innovation with respect to others or predecessors.

2. Compatibility: The degree to which the innovation is compatible with the values, experiences and needs of the individual.

3. Complexity: The degree of difficulty perceived by each individual regarding learning to use the innovation.

4. Divisibility: The degree of difficulty regarding the use and experience of innovation.

5. Observability: The degree to which the innovation is visible to other members of society - the greater known it is, the easier to cause reactions among all members.

2.3.3 Theory of Reasoned Action (TRA)

This psychological theory was developed to study the effect of attitudes, intentions and behaviours of people regarding the making of decisions, such as the purchase or use of a technology (Fishbein & Ajzen, 1975a). The concept of attitude has been widely studied, generating different studies and applying different analyses.

From these studies, Fishbein & Ajzen (1975) propose a model of behavior analysis composed of four variables:

1. Beliefs: The opinions about the object that the individual holds, obtained through direct observation and information received from other sources (outside). From these beliefs, the following attributes are formed.

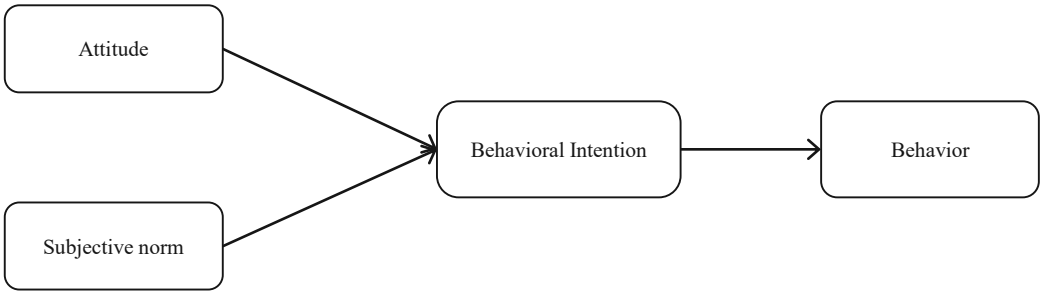
2. Attitudes: The amount of affection (or lack thereof) that the individual has for an object, generated by the type of attributes that the individual associates with the object in the process of belief formation.

3. Intent of behavior: Intentions arise from the attitude that the individual generates about the object. In order for them to be fulfilled, the individual's intentions and behavior must maintain the same level of specificity regarding action, goal, context, and time interval.

4. Conduct: The final and concrete action of the whole process regarding the intent towards the use of the object.

Finally, the theory of reasoned action finds that there are two antecedent factors of intention (Fishbein & Ajzen, 1975a). The first is the attitude towards behavior, which corresponds with the predisposition to respond to an object as being the best predictor of behavior. Second is the subjective norm, that being the sum of normative beliefs that are external to the individual that can be negative or positive in regards to a certain object.
This theory has a great limitation because it assumes the voluntary control of the subject. In reality, other factors such as incomplete information and other external factors come into play, and can affect intentions towards the behavior (Figure 2).

Figure 2. Model (TRA)

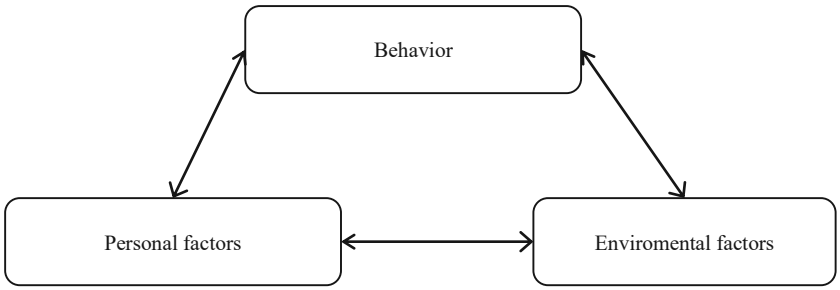


By: (Fishbein & Ajzen, 1975)

2.3.4 Social Cognitive Theory (SCT)

This theory is based on a behavioural model that correlates three elements that influence each other in the individual for learning (Bandura, 1977). The behavior of the individual, according to the authors, the individual in addition to their internal factors internalizes information through their personal characteristics that are determined by their environment - likewise, the characteristics of the individual influence the environment, creating a first relationship of reciprocity (Figure 3).

Figure 3. Model (SCT)



By: (Bandura, 1977)

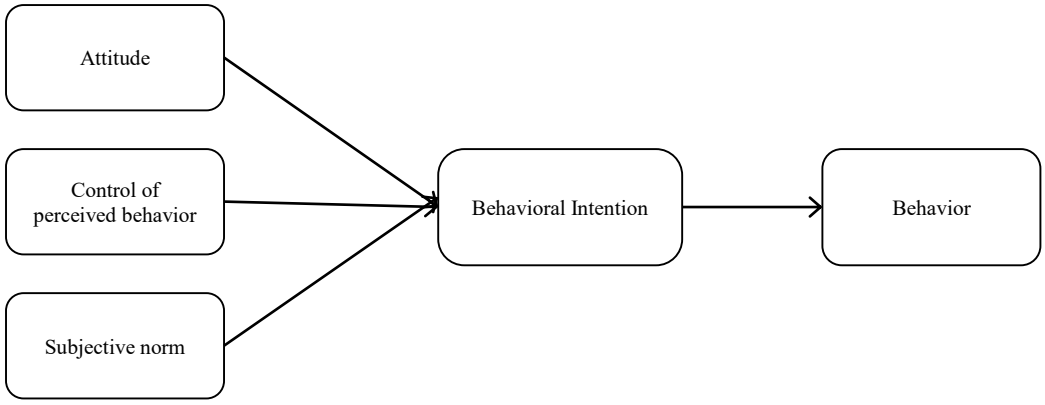
Bandura (1977) introduces the concept of self-efficacy, which explains these relationships better: when the subject receives outside information, they process it, forming an expectation that they will keep in mind when preparing to perform an action. It is clear that the individual will be able to analyse both the action and the result, that is, they will have the conviction that they can perform the behavior required to produce a certain result in a satisfactory way

(expectation of efficacy) and will also tend to perform a behavior when they estimate that it will give a certain result (expectation of result).

2.3.5 Theory of Planned Behavior (TPB)

This theory complements the theory of reasoned action, as it attempts to explain behaviours that lack voluntary control in the individual (Ajzen, 1991) (Figure 4). It is also part of the principle that the main generator of behaviour is the intention of the individual, which is influenced by the individual's motivational factors, among other factors (such as the necessary resources or opportunities to conduct the behavior, grouped under the concept of control of the perceived behavior, being a novel factor since it resembles the concept of self-efficacy-perceived proposed by Bandura).

Figure 4. Model (TPB)



By: (Ajzen, 1991)

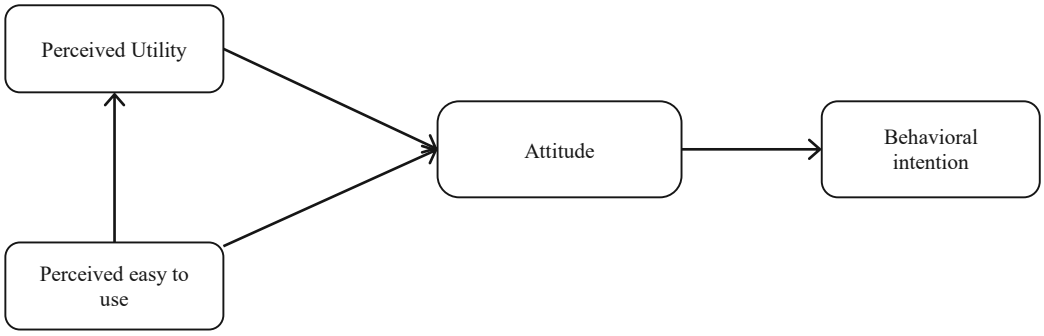
2.3.6 Model of Technology Adoption (TAM)

This theory was developed with two fundamental purposes: the first was to continue the analysis of the learning processes in order to perfect or complement previous theories, and the second was to propose a specific model of measurement of acceptance by users towards the adoption of a novel technological system for them. (Davis, 1989b, 1993; Davis, Bagozzi, & Warshaw, 1992).

The TAM model starts with the theoretical proposal of the theory of reasoned action (TRA), where the variables that lead to the intention are the attitude and the subjective norm, but two new external factors related to the innovation are added, that through the attitude have an indirect effect on the intention and were not taken into account.

Although these factors were included in social cognitive theory, they had not previously been directly associated with decisions about using new technologies. That is why the TAM model proposes perceived utility as the degree to which an individual believes that through the use of a particular system, they could improve their development at work. It also defines the perceived ease of use as the degree to which an individual considers that the use of a particular system will be free from mental or physical exertion. Therefore, there is a positive relationship between perceived ease of use and perceived utility (Davis, 1989b) (Figure 5).

Figure 5. Model (TAM)



By: (Davis, 1989)

Later, this model was complemented by five additional TAM 2 factors (Agudo Peregrina, 2014a), two of them related to social influence (subjective norm - image) and three referring to the cognitive process (relevance to work - quality of output - demonstrability of results). This model includes for the first time the effect of moderation of previous user experiences and voluntary use. The model takes the concept of subjective norm of TRA and relates it to the intention of use, the perceived utility and the image, and manages to

support the importance that the individual has on the social influence of those close to them, or leaders of influence (Davis, 1989b).

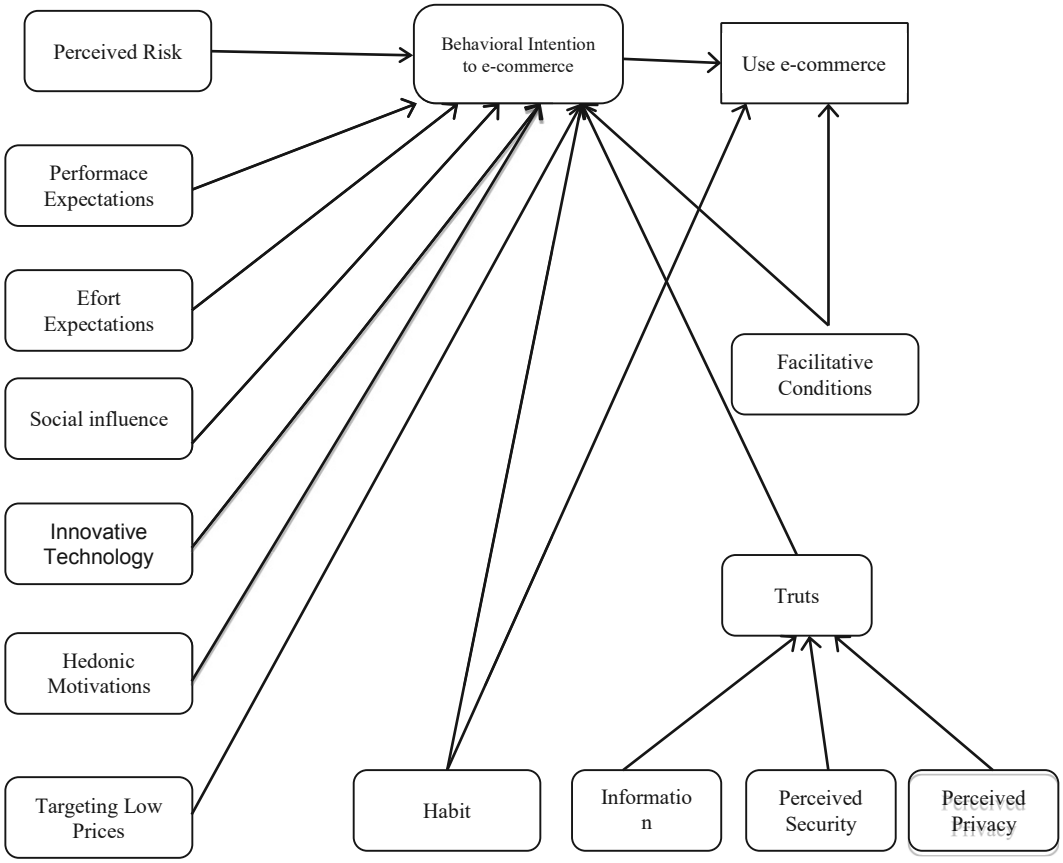
Finally, the model was transformed to analyse the behaviour in using the systems by the employees of an organization, adding new factors grouped by factors of anchorage and factors of adjustment, that are predictors of the user-perceived ease of use, in order to verify that the greater the moderating effect of the experience on the ease of use, the more the experience will increase the effect of perceived ease of use on the intention to use.

2.3.7 Unified Theory of Acceptance and Use of Technology (UTAUT)

The theoretical model UTAUT is the proposal of aggregation of all the previously proposed models, with the objective of allowing a complete study of adoption phenomenon (Venkatesh et al., 2003). For this reason, a study was carried out in different types of organizations with different types of technologies (Kiwanuka, 2015). Three experiments were also carried out, which ensured that the effectiveness of the model was fully verified.

The first UTAUT model proposed four determinants of the intention to use, and the adoption of a technology by an individual: the performance expectancy that represents the factors: relative advantage (IDT), perceived utility (TAM) and expectations of result (SCT); the effort expectation, which groups the factors perceived ease of use (TAM) and ease of use (IDT), the social influence that represents the subjective norm (TAM), and the image (IDT), and finally, the facilitating conditions that group the concepts of control of the perceptual behavior (TAM) and compatibility (IDT) (Venkatesh et al., 2003).

Figure 6. Model UTAUT



Proposed by: (Agudo-Peregrina, 2016)

Another contribution made by UTAUT is the moderating effects that affect the relations of the model, since gender and age affect all relations of the model, the experience of use mo
derates the relationships between the expectations of effort and social influence with the intention of use, and also between facilitating conditions and behavior; finally it is the will to use that moderates the relationship between the facilitating conditions and the use behavior (Agudo Peregrina, 2014a).

The UTAUT2 model was adapted to analyse the adoption of technologies in end users by adding 3 new constructs related to consumer behavior: hedonistic motivations, perceived value, and habit. (Venkatesh et al., 2012) (Figure 6).

2.3.8 Digital Divide

The digital divide, according to (Leal, 2008), are the differences in the adoption opportunities of the Information and Communication Technologies presented by countries worldwide. The greatest distinction is that in the most advanced countries, the massification of internet depends on individual preferences, interests or generational limitations, while in countries with low socio-economic levels, the digital divide is what determines access to technologies (Jordán, Galperin, & Peres, 2010; Wong, Ho, Chen, Gu, & Zeng, 2015). Several authors have evaluated the digital divide, but their methods have varied in the measurement of variables and concepts used (Akhter, 2003; Y. Chang, Kim, Wong, & Park, 2015; W. Chen & Wellman, 2004; J B Pick & Sarkar, 2015; Vehovar, Sicherl, Hüsing, & Dolnicar, 2006; White, Gunasekaran, Shea, & Ariguzo, 2011; World & Dreams, 2004; Zhao, Collier, & Deng, 2014). Early studies analyse the digital divide through four concepts: Motivational access, Material access, Skill access and Usage access (Van Dijk, 2006). Motivational access refers to the desire to have a computer and to be connected to information technologies (IT). Material access is the lack of technological infrastructure and possibilities of access to it. Skill access includes operational skills (software and hardware), information skills (ability to process information) and strategic skills (strategic applicability of use for the individual and social good). Finally, usage access is largely linked to the demographic characteristics of users and Internet connections, and it should be taken into account that the model of "access gaps" is considered rather static, as it does not explain the interrelations between different types of access gaps. Subsequent authors grouped the analysis of the digital divide into three states, a first initial level of access to IT, software and hardware access is evaluated (Chang et al., 2015). From this perspective, the digital divide is caused by two types of factors: technological access and social access. Technological access is the degree of access that a person has to use computers and the Internet, while social access refers to the involvement of the socioeconomic condition in the use of IT. In order to participate in digital society, one should at least have basic IT knowledge and the ability to use computers and get connected to the Internet. Finally, to evaluate achieving outcomes in its use, at the final stage is online participation, which refers to any general user behavior of participation and interaction with other people in various Internet services.

With this model, some authors propose causal interrelations between various indicators that support the concept of dynamic interactions between access gaps.

Concluding this brief theoretical part, it continues to develop in each of the articles that respond to each objective, especially to objective number 1, where the shape of the UTAUT2 model is described in detail. In addition, in the article that responds to objective 3, the theoretical development of the measurement variables of the digital divide is deepened.

CHAPTER 3. DIFFERENCES IN THE ADOPTION OF ELECTRONIC COMMERCE BETWEEN COUNTRIES*

* Artículo publicado en: Sánchez-Torres JA and Arroyo-Cañada FX (2016) Diferencias de la adopción del comercio electrónico entre países. *Suma de Negocios* 7(16): 1–10.

3.1 ABSTRACT

The aim of this paper is to examine the moderating effects in the adoption of e-Commerce as the diffusion state in a country, emphasizing the characteristics presented by each country according to the development of this commercial channel.
Secondary exploratory data analysis allowed to find primary relationships of development of e-commerce adoption and variables used to describe it, such as Social Influence (SI) and Expectations of Effort (EE).

keywords
Adoption, e-Commerce, Consumer Behavior, Digital Divide, Internet, Innovation.

3.2 INTRODUCTION

There are important differences between the traditional process and buying online, the most important technological Interactive degree (Agudo-Peregrina et al., 2014). This component has been guiding the academic analysis of the use of technology adoption models to study the behaviour of the virtual consumer countries or regions which have different approaches and areas of study, such as in Tourism (Bukhari et al. 2013), (St. Martin & Smith, 2012), (Escobar-Rodriguez & Carvajal-Trujillo, 2014); Online banking (Kaplan & Nieschwietz, 2003) or shopping in general (Tan et al., 2013).

However, the most of these studies have been focused in countries with high development of new information technologies, Internet and e-commerce (Europe, North America and Asian countries such as China and South Korea); there are few studies that describe this dynamic in developing countries which has not allowed an advanced theoretical research on the subject (Mesías et al., 2011).

Some studies found the moderating effect of culture or other social factors as result (Tan et al, 2013; Yoon, 2009), so few studies have considered to analyse the differences that exist in electronic e-commerce between developed countries and developing or third world countries.

There are differences between regions, especially in Latin America and the Caribbean where there is a strong delay in infrastructure development and adoption of Internet services in the deployment of high-capacity transmission, supply of access, quality and affordable prices and expanding access to regions and poorer or remote populations, all this creates the great "digital divide", which is the measure of inequality among countries in access to and use of new communications technologies like Internet and mobile telephony; This can be a great influential of electronic purchasing according to recent studies (Jordan et al., 2010; Landau, 2012).

Therefore, the objective of this paper is to examine whether the level of development of the Internet in a country affects the widespread use of electronic commerce and describe the differences for buyers relations between electronic purchasing depending on the degree of moderation generated by digital divide.

Specific objectives are:

- To conduct a review of the literature on the variables that influence electronic shopping, as well as elements of the moderators in order to detect any trends or characteristics of virtual buyer.
- To determine from secondary sources if there is any relationship between Digital Divide and relationships between variables that explain the use of e-Commerce so that to be able to propose a model that includes this dynamic.

3.3 LITERATURE REVIEW AND DEFINITION OF HYPOTHESIS

Moderators Adoption of e-Commerce

The adoption model presented by Venkatesh et al. (2003), (2102) presents four types of moderators: Gender, Age, Experience of Use and Will Use; having conclusive studies on the indirect or direct influence on purchasing online (Table 1), recently have joined socioeconomic factors, of which there are few studies that prove its moderating effect on the level of education (Agudo-Peregrina, 2014) although the social level, has always been influential in technological innovations, as (Rogers, 1995) the economic and social system of each society will affect the process, generating a barrier or gap in access to innovation, such as social status, because the opportunities for access to new technologies are greater in those individuals belonging to high levels economically by specifying more the moderating effect of these on e-commerce.

Table 1. Moderators Adoption of e-Commmerce.

Moderator	Findings	Author
Gender	Men respond better than women to buy online in a practical manner, focused on low prices and lack of social interaction.	Alreck & Settle, (2002); Çelik, (2011); Dittmar et al, (2004); L. Zhou et al, (2007)
Age	The results of these studies are conflicting and say some young people who are most likely to	

	shop online because of the newness of this technology, thus having the most positive influence on several young relations purchase decision, but other studies say they are the older age people who influence, so it can not determine its validity.	Venkatesh et al (2003, 2012); A.C. Teo el al, (2012); Tsai, et al, (2013); Misra & Rao (2000); Mapeshoane y Town (2012); Liebermann & Stashevsky (2002)
Use Experience	Seniority with internet users positively affects the purchase online (usability or expectations Effort), also negatively it affects the perception of perceived risk and thus improved confidence.	Brengman & Geyens, (2002); Bresoolles & François (2008); Kee & Wan (2007); Liebermann & Stashevsky (2002); Dholakia & Uusitalo (2002); Bhatnagar et al. (2000)
Socioeconomics Factors	Income level: There are no studies that analyse the moderating effect of income but the most adoption studies have shown that buyers tend to have higher income levels.	Allred et al, (2006); Kim et al, (2000); Siyal et al, (2006), Soopramanien & Robertson (2007); (2014)
	Level of education: Adoption studies show that the highest levels are buyers with high levels of training, also, other results validate that the higher the education level, the lower the expectation of effort, reduce the perceived risk and increase trust.	Garin-Muñoz & Pérez-Amaral (2011); Cheng & Wang, 2010); Kee & Wan (2007); Chen & Dhillon (2003)

Theory of Diffusion of Innovations

The theory of diffusion of innovation establishes a set of principles by which a general innovation is disseminated in a society, the term diffusion as the process by which an innovation is communicated through channels on a period is used time for all members of a society, being the key to the great social changes in humanity (Rogers, 1995).

According to Rogers (1995), the innovative approach called "innovativeness" is the degree to which an individual has come forward to adopt new ideas than other members of the social system, categorizing therefore adopt the attitude of these innovations: (1) Innovative, (2) Initial Early Adopters, (3) Majority (4) Late Majority and (5) behind. Also, the degree of participation of these categories in the use of innovation, the diffusion in society, has different characteristics, being predominantly high level of education, high social status and a high degree of social interaction in users in early stages of this innovation.
While the end of mass states, you will find that in general users have mastered and have become common such innovation by presenting a group of "laggards" that in the case of e-commerce found a study that actually shows that there are people whose characteristics do not allow them to adopt the use of the internet for shopping, either by age or by learning to use, it took over in using this virtual channel to the other users (Mattila et al., 2003).

The adoption of a technological innovation of an individual depends on the type of social system to which it belongs, being influential factors Standards and influence leader, extrinsic factors that patterns of technology adoption or call Social Influence Subjective Norm (Venkatesh et al 2003). Moreover, according to the theory proposed by Bandura (1977), learning is generated by each individual, by observing the behaviour of other members it creates similar behaviour called vicarious experience, which influences on him to adopt or not innovation. This translated into the model of technology adoption means that the variable Social Influence tends to be of great importance when the state of diffusion in society is in early stages of adoption (Figure 7), the starting point for the next stage of popular adoption by the above pose the following hypothesis:

H1: The Social Influence tends to high levels of impact on the intention use of e-commerce where its disclosure in a country is in initial levels.

H2: Expectations of Effort / Perceived Usefulness and facilitative conditions tend to have high levels of impact on the intentional use of e-commerce where its disclosure in a country is in levels of overcrowding.

The digital divide as Leal (2008) is the differences in opportunities for adoption of Information and Communication Technologies presented by countries worldwide; the difference generated in the most advanced countries, the population of internet depends on individual preferences, interests or limiting generational, while in countries with low socioeconomic levels, the digital divide is the one that determines access to these technologies (Landau 2012).

The definition of the digital divide is not so unified, international organizations such as the Organisation for Economic Co-operation and Development (OECD) and the International Telecommunication Union (ITU) take into account based on the Internet use by the population under the effect indicators moderator socioeconomic levels, primarily income and educational level (Peral-Peral et al. 2015) (Table 2).

Figure 7. Model UTAUT 2

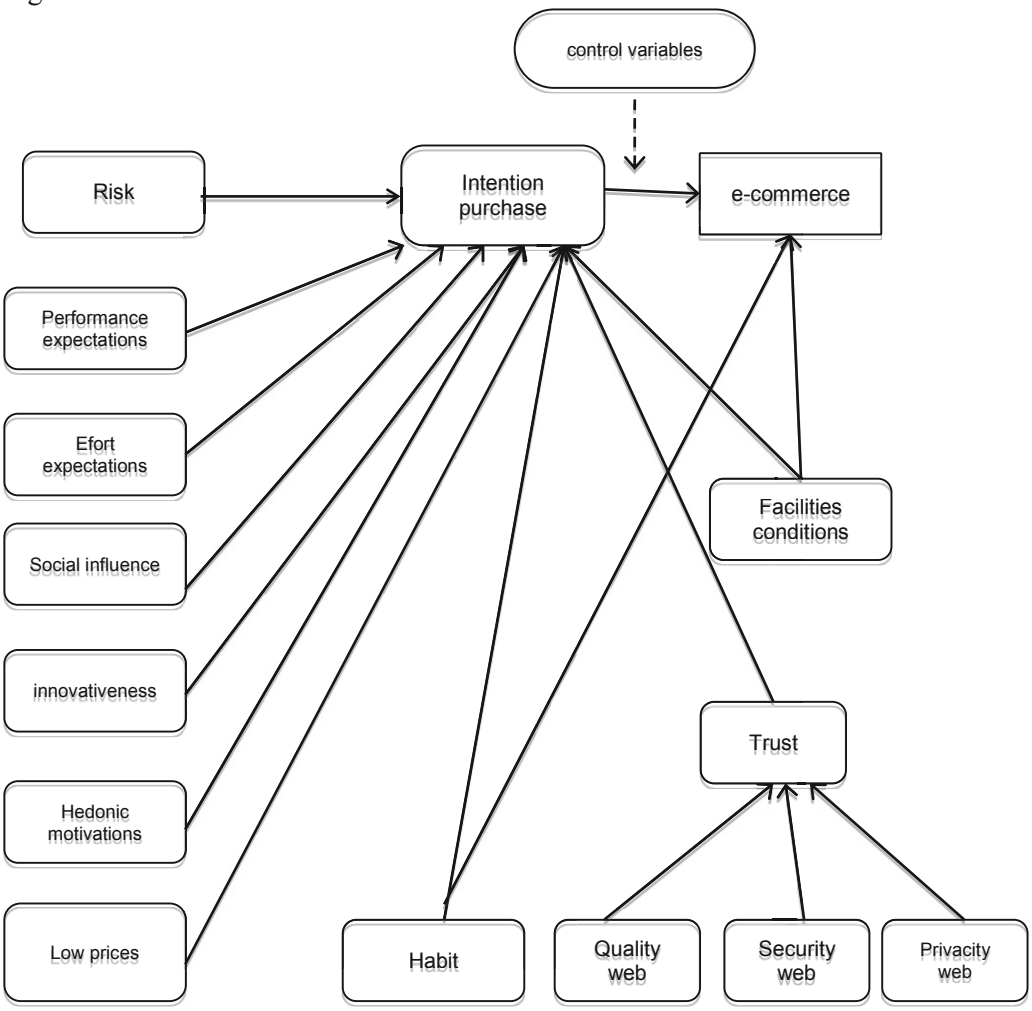


Table 2. Indicators measuring Digital Divide

- Fixed Internet lines per 100 or 1000 inhabitants
- Computers per 100 or 1000 inhabitants
- Internet servers per 100 or 1000 inhabitants
- Internet users per 100 or 1000 inhabitants
- Mobile phones connected to the Internet per 100 or 1000 inhabitants
- Lorenz curve of inequality in Internet use by countries
- Price per 100 KGB / s relative to GDP per capita.
Computer price relative to GDP per capita.

In the literature there are few relationships of digital divide and e-commerce uptake, the findings show that the digital divide is correlated with socioeconomic factors such as social status and level of education in the use

of internet and e-commerce (Akhter 2003) (Jordan et al. 2010) (Peral-Peral et al. 2015), therefore it can be assumed that the higher the level of this digital divide in a country, the adoption of e-commerce will be moderated directly by the socioeconomic level of the people, so that buyers will have a high economic profile and highly educated, having associated this to just a group of the population which has access directly to the use of electronic commerce and therefore it can be associated as proposed by Rogers (1995), taking the level of awareness of this commercial channel will be slowed to initial states, with the characteristics that entails, so the following concluding hypothesis would propose to:

H3: The Digital Divide adversely affects electronic shopping; creating the state of broadcasting in a country established in initial stages (Social Influence High, low or no experience of use and facilitative conditions, and large-scale users belonging to socioeconomic high).

On the contrary,

H4: A country with low digital divide will have a high development of e-commerce throughout society (Users will not be affected by social influence, they have high influence of the user experience, effort and facilitative conditions, not being moderating variables socioeconomic).

3.4 METHODOLOGY

To achieve the objectives, taking into account the limitations in obtaining and analysing empirical data, this study was made on the Secondary data source, dividing the analysis into two main parts.

In the first part, a specific literature search did not intend to be a bibliometric study, but that its goal was to develop a proprietary database to validate the hypothesis, therefore, empirical studies were sought with structural equation modelling (SEM) to containing at least one of the two discussed variables, which are: Social Influence (SI) and Expectations of Effort (EE).

From database studies they were classified according to the allocation of the Digital Divide taking as variable of categorization the Usability Individual

Internet, one of the best in describing the effect of the Digital Divide by the WEF (2014) finally classifying countries into two groups, Upper Little Digital Divide and Digital Divide.

In the second part, an exploratory analysis was to analyze the relationships of the variables involved in buying online as the involvement of Digital Divide by developed country, initially doing with Social Influence (SI) variable likewise for the variable Effort Expectancy (EE), as a measurement tool having the significance of the coefficients Path as indicators of influence of an explanatory variable against an explained (Fornell & Larcker 1981), having all secondary data. They had characteristics that allowed comparing their results to contain all of the same order statistical analysis (SEM).

Search of secondary information

The approach used to examine the hypothesis was proposed by a review of the literature, based on the search and observation of the main bases of Emerald, Scopus and Web of Science data.

Approximately 202 articles containing empirical studies on adoption of e-Commerce, which had access to a sample of 25 items having some published studies were found containing cross comparing at least two countries so that the total increased finally studies 28 (Table 3).

Its own database has been extracted in order to obtain the relationship of involvement of the Social Influence variables (SI) and Expectations of Effort (EE) on the electronic purchase it was made; for this, the results of each of the studies taking Paht values for all possible relationships generated in the models used, which were mostly TAM and UTAUT were taken.

Then the countries where the studies were performed according to the degree of impact of the digital divide, using one of the variables that best describe this relationship (individual Usability internet) assuming that the higher the digital divide worst since occupies classified within that classification (WEF 2014).

Table 3. studies adoption of e-Commerce

Autor	Theory	Country	Sample	Digital Divide High			
					(PE)	(EE)	(SI)
(Escobar-Rodríguez & Carvajal-Trujillo, 2014)	UTAUT2	SPAIN	1.296	NO	0,099*	0,085*	0,146*
(Castañeda, Frías, & Rodríguez, 2009)	TAM	SPAIN	331	NO	0,33*	0,34*	-
(San Martín & Herrero, 2012)	UTAUT	SPAIN	1083	NO	0,41*	0,10	0,02
(K. S. Tan et al., 2013)	UTAUT	KOREA	150	NO	0,166*	0,248*	0,066
(K. S. Tan et al., 2013)	UTAUT	MALAYSIA	150	SI	0,444*	-0,122	0,001
(H. Kim et al., 2009)	TAM	KOREA	495	NO	0,42*	0,25*	0,31*
(Y. P. Chang & Zhu, 2011)	TAM	TAIWAN	705	NO	0,42*	0,20*	-
(Venkatesh, V., Thong, James. Y., Xu, 2012)	UTAUT2	HONG KONG	1.512	NO	0,21*	0,16	0,14
(Karahanna, 2003)	TAM	E.E.U.U.	213	NO	0,40*	0,25*	-
(C. M. Chiu, Wang, Fang, & Huang, 2014)	TAM	CHINA	150	SI	0,18*	0,28*	-
(Kanchanatanee, Suwanno, & Jarernvongrayab, 2014)	TAM	THAILAND	430	SI	0,098	0,188	-
(H. H. Lee & Chang, 2011)	TAM	KOREA	749	NO	0,31*	-0,11	-
(Delafrooz, Paim, & Khatibi, 2011)	TRA	MALAYSIA	370	SI	0,179*	0,225*	-
(Ck Ayo, Adewoye, & Oni, 2011)	TAM	NIGERIA	549	SI	-0,093	0,192*	-
(Sheng & Zolfagharian, 2014)	RA	E.E.U.U.	243	NO	0,59*	-	-
(Çelik & Yilmaz, 2011)	TAM	TURKIA	606	SI	0,65*	-	-
(Palvia, 2009)	TAM	E.E.U.U.	496	NO	0,22*	0,23*	-
(Li & Tang, 2010)	TAM	CHINA	287	SI	0,11*	0,13	-
(Yoon, 2009)	TAM	CHINA	270	SI	0,130*	0,198*	-
(Capece, Calabrese, Di Pillo, Costa, & Crisciotti, 2013)	TAM	ITALY	304	NO	0,74*	0,474*	-
(Al-Maghrabi & Dennis, 2011)	TAM	SAUDI ARAB	459	SI	0,19*	-	0,19*
(Tavera-Mesías et al., 2011)	TAM	COLOMBIA	497	SI	0,332*	0,00	-
(Lin, 2010)	TAM	TAIWAN	242	NO	0,50*	0,37*	-

(Abbasi, Chandio, Soomro, & Shah, 2011)	TAM	PAKISTAN	935	SI	0,30*	0,10	0,12
(Abbasi et al., 2011)	TAM	PORTUGAL		NO	-	-	-
(Abbasi et al., 2011)	TAM	AUSTRIA		NO	-	-	-
(K. I. Al-Qeisi & Al-Abdallah, 2013)	UTAUT	JORDAN	224	SI	0,412*	0,16	-
(Riffai et al., 2012)	UTAUT	OMAN	315	SI	0,345*	0,178	-

Significance Analysis of Relationships

To assess whether there is a relationship between the degree of diffusion of the Internet and the adoption of e-Commerce Factors that are latent in each proposed level in the Theory of Technological Innovation and which were examined in the studies found taking the values with significance will be examined statistically influenced the results (Table 4).

Table 4. Results influence on the electronic purchase of Social Influence (IS) and expectations of Effort (EE)

Author	Adoption Model	Country	Sample	Validity and significance regarding purchase electronic*	
				(EE)	(SI)
(Escobar-Rodríguez & Carvajal-Trujillo 2014)	UTAUT2	Spain	1.296	0,085*	0,146*
(Castañeda et al. 2009)	TAM	Spain	331	0,340*	-
(San Martín & Herrero 2012)	UTAUT	Spain	1083	0,100	0,020
(Tan et al. 2013)	South Korea	South Korea	150	0,248*	0,066
(Tan et al. 2013)	UTAUT	Malaysia	150	-0,122	0,001
(Kim et al. 2009)	TAM	South Korea	495	0,250*	0,310*
(Chang & Zhu 2011)	TAM	Taiwan	705	0,200*	-
(Venkatesh, V., Thong, James. Y., Xu 2012)	UTAUT2	Hong Kong	1.512	0,160	0,140
(Karahanna 2003)	TAM	E.E.U.U.	213	0,250*	-
(Chiu et al. 2014)	TAM	China	150	0,280*	-
(Kanchanatanee et al. 2014)	TAM	Thailand	430	0,188	-

(Lee & Chang 2011)	TAM	South Korea	749	-0,110	-
(Delafrooz et al. 2011)	TRA	Malaysia	370	0,225*	-
(Ayo et al. 2011)	TAM	Nigeria	549	0,192	-
(Sheng & Zolfagharian 2014)	RA	E.E.U.U.	243	-	-
(Çelik, Yilmaz, Celik, & Elik, 2011)	TAM	Turkey	606	-	-
(Palvia 2009)	TAM	E.E.U.U.	496	0,230*	-
(Li & Tang 2010)	TAM	China	287	0,130	-
(Yoon 2009)	TAM	China	270	0,198	-
(Capece et al. 2013)	TAM	Italy	304	0,474*	-
(Al-Maghrabi & Dennis 2011)	TAM	Saudi Arabia	459	-	0,190
(Mesías et al. 2011)	TAM	Colombia	497	0,000	-
(Lin 2010)	TAM	Taiwan	242	0,370*	-
(Abbasi et al. 2011)	TAM	Pakistan	935	0,100	0,120
(Abbasi et al. 2011)	TAM	Portugal	935	-	-
(Abbasi et al. 2011)	TAM	Austria	935	-	-
(Al-Qeisi & Al-Abdallah 2013))	UTAUT	Jordan	224	0,164	-
(Riffai et al. 2012)	UTAUT	Oman	315	0,178	-

3.5 DISCUSSION

Social Influence adoption of E-commerce

Few studies have taken into account this factor study found, because many authors omitted to assess the relationship between subjective norm and Social Influence with the use of electronic commerce and therefore tested only eight studies (Table 5).

Taking inconsistent results in countries with high digital divide as developed countries; however, for Spain, the study of Escobar-Rodriguez & Carvajal-Trujillo (2014) focused only on examining the purchase of electronic tickets, so the bias in the type of purchase does not validate its results for e-Commerce. Likewise, the study of South Korea Kim (2009), was written 6 years ago, therefore, the spread in this country could be in less incipient stages by then, allowing understand why the study of Tan et al., (2013) and

the Social Influence is not validated in the use of e-Commerce for the same country.

As for countries with high initial levels Digital Divide and adoption of e-commerce in both countries the Social Influence, Saudi7 Arabia and Pakistan is validated, taking only one country of the 3 which does not affect the purchase online, Malaysia being argued by the author shows that the Young made up of "Generation Y" who are adopters who are on a mature level of diffusion (Table 5).

Table 5. Relationship between type of country (Digital Divide) and direct effect of the Social Influence in the e-Commerce.

Type of country	Total	Significance of social influence (SI) in the e-Commerce	Total	Little or no significance of social influence (SI) in the e-Commerce
Low involvement Digital Divide	2	Spain (Escobar-Rodríguez & Carvajal-Trujillo 2014) South Korea (Kim et al. 2009)	3	Spain (San Martín & Herrero 2012) South Korea (Tan et al. 2013) Hong – Kong (Venkatesh, V., Thong, James. Y., Xu 2012)
High involvement Digital Divide	2	Saudi Arabia (Al-Maghrabi & Dennis 2011) Pakistan (Abbasi et al. 2011)	1	Malaysia (Tan et al. 2013),

Source: Authors

Therefore, the results show that Hypothesis 1 can preliminarily assess probable segmentation trend to electronic shopping, since the analysis of each case shows similar signals between the Social Influence and its effect on the intended use of e-commerce when diffusion in a country is in initial levels or latency digital divide; and little significance or no when the state of development of e-commerce and its diffusion within a society is advanced and the digital divide is low, a conclusion that approaches the results of studies Karahanna (2003) in relation to the influence social and electronic purchasing in a country with highly developed internet.

Expectations of Effort in the adoption of e-Commerce

Expectations of Effort is defined as the user's perception of the ease of use of electronic commerce, they are directly related to factors such as experience or familiarity, in all studies found that depending on the country and its impact on the Digital Divide positively its significance was validated if the country does not have a latent state of it (only 3 studies are contradictory in their results: San Martin & Herrero (2012), Venkatesh, V., et al., (2012), Lee & Chang, (2011), may be due to the inclusion of other variables such as the hedonic motivations or habit, other factors influenced positively and can prove that buyers in developed countries have transformed their expectations Effort in these variables).

Otherwise occurs in countries where e-commerce is in the early or late levels, high involvement of the Digital Divide, where the significance of Effort Expectations are nil or very low, demonstrating that even the user's use of e-commerce is difficult and do not find it easy to use, only Malaysia has significance by Tan et al. (2013), because it is biased to young people aged 18 -25 years with the population loses validity.

The results of the testing of the hypothesis 2 demonstrate that the level of the digital divide is inversely related to the significance of the variable Expectations Effort (EE) on the e-procurement; finding that in countries where the level of the digital divide is high, this variable is not significant; and that the opposite occurs in countries where the digital divide is low, being influenced by high expectations Effort (EE) in the e-procurement (Table 6).

Table 6. Relationship between type of country (Digital Divide) and direct effect of the Expectations of Effort (EE) in the e-Commerce.

Type of country	Total	Significance of Expectations of Effort (EE) in the e-Commerce	Total	Little or no significance of Expectations of Effort (EE) in the e-Commerce
Low involvement Digital Divide		Spain (Escobar-Rodríguez & Carvajal-Trujillo 2014) Spain (Castañeda et al. 2009) South Korea (Tan et al. 2013)		Spain (San Martín & Herrero 2012)

	11	South Korea (Kim et al. 2009), Taiwan (Chang & Zhu 2011) E.E.U.U. (Karahanna 2003) South Korea (Tan et al. 2013) E.E.U.U. (Palvia 2009) Italy (Capece et al. 2013) Taiwan (Lin 2010)	3	Hong-Kong (Venkatesh, V., Thong, James. Y., Xu 2012) South Korea (Lee & Chang 2011)
High involvement Digital Divide	2	Malaysia (Tan et al. 2013)	6	Colombia (Mesías et al. 2011), Pakistan (Abbasi et al. 2011), Malaysia (Delafrooz et al. 2011), Thailand (Kanchanatanee et al. 2014), Jordan (Al-Qeisi & Al-Abdallah 2013) Oman (Riffai et al. 2012) Nigeria (Ayo et al. 2011)

As results, the test of the predictive ability of the variables Social Influence (SI) and Expectations of Effort (EE) and the level of Digital Gap Broadcasting from the state in which electronic commerce is in a country or society (Hypothesis 3 and 4) was satisfactory for several countries in the sample; evaluating a first group of countries with high development of e-Commerce and very low digital divide, (Tan et al. 2013) South Korea (San Martin & Smith 2012) and in Spain (Capece et al. 2013) in Italy, where the characteristics of virtual shopper have little or no Social Influence to use the e-Commerce and a positive influence of their expectations Effort in e-Commerce, ease of use of this commercial channel purchase online, fulfilling the characteristics associated by Rogers (1995) to technology found in mass levels where most of the population begins to return the usual.

Otherwise, Colombia (Christ et al. 2011) and Pakistan (Abbasi et al. 2011) are greatly affected by the digital divide and the combined results demonstrate that electronic shoppers have high Social and little or no influence Effort Experience in electronic shopping: with which you can also see that they are in a state primary broadcast socially enabling validate the hypotheses 3 and 4.

As a final highlight of data analysis aspect, the failure to check the influence of the socioeconomic effect was due to in most analysis studies we couldn't verify the characteristics of buyers to socioeconomic status, except for specific reviews of the moderating effect of characteristic in the samples mainly by age and gender, not being the ones to examine in this study.

3.6 CONCLUSIONS

The aim of this study was to examine whether the level of development of the internet in a country affects the widespread use of an electronic commerce and thus to describe the differences between electronic buyers that could arise against the reasons for the use of this new trade channel depending the extent of the digital divide.

The literature review found that there are elements moderators electronic shopping that are linked to consumer intrinsic variables such as sorting shoppers depending on the use of e-commerce, novice or regular, male or female, age group, etc. (Sharp-Pilgrim et al, 2014), (Mattila et al. 2003); few studies examining extrinsic moderators buyers, those physical, economic, political, social influence also consumer electronics were found, and therefore direct concern about the possibility of use or by the users of such technology as expounded Rogers (1995) and Jordan et al. (2010) on the involvement of externalities (Digital Divide) that can directly influence the dynamics of e-Commerce.

A theoretical relationship between the spread of e-Commerce with features making individual purchase was found, allowing ratification in the case of electronic purchasing approaches Rogers (1995), about the types of virtual buyers depending on the level of diffusion Internet in a country, taking as explanatory variables Social Influence (SI) and the Expectations Effort (EE).

This exploratory study has validated the proposed hypotheses, with the conclusions first e-commerce meets the evolving conditions of a technological innovation proposed by Rogers (1995), therefore, as first proposed relationship (H1) the Social influence tends to high levels of impact on the intended use of e-commerce where its disclosure in a country is in

initial stages, losing such influence as decrease the digital divide and development of e-Commerce increases. (There are new concepts of social influence developed states of the e-Commerce that is generated within the same network, linked to the interaction between virtual agents called "Virtual Communities" Groups of influence in the Network, among others, according to (Brodie et al. 2013), it is a growing trend of online shoppers actively participate in processes of interaction between themselves in order to share information about their virtual shopping experiences, which should not be confused with the primary concept Social influence linked to individuals).

As a second relationship (H2) Expectations Effort (EE) and the facilitative conditions tend to have high levels of influence on the intended use of e-commerce where its disclosure in a country is in levels of overcrowding or high diffusion in society, nothing that when other variables related to the use of e-commerce such as hedonic motivations, or habit, are measured can move this influence because that for this type of users is common use and they can generate other incentives to buy.

In the case of countries with levels of features that Rogers (1995) presented as initial development, Expectations Effort (EE) are not validated or minimum level of acceptance, which means it is a purchase scheme which is not considered easy to use or present facilities for election, which the authors attributed correctly to the need for further development of e-Commerce and channel the Internet in these countries (Christ et al. 2011).

The third (H3), the rate of diffusion of e-commerce in a country will be affected by the digital divide in a negative way, creating their slow development in spreading, so the features that are latent in the adopters will be having High Social Influence (SI), low or no expectations of Effort (EE). Also their "primary" adopters belong to higher socioeconomic levels, characteristics given by Rogers (1995) belonging to the initial phases of the spread of this technology (Figure 1).

In a country with low Digital Divide contrary relations (H4) happen, this will present a rapid adoption of Internet use and therefore a stage of establishment or the masses, allowing online shoppers not to be affected by social influence,

They have high influence of the user experience, effort and facilitative conditions, not being moderators socioeconomic variables in the decision to buy the internet in general.

The implications of this work in digital marketing research provides analysis of the moderating effect of the digital divide as new in the study of models of adoption of e-Commerce, the results have shown that the guidelines of the diffusion theory proposed by Rogers (1995) innovations largely explain the results of examining the profile of consumer electronics in the country.

Therefore, the results of this exploratory research offer a precedent practical way to understand a model to determine population characteristics depending on the degree of Digital Divide and potential socioeconomic moderators that may arise. It is an interesting analysis for companies and governments to meet their buyer profile, the type of products and services for market having regard to their characteristics.
Facing the latency of the digital divide in many countries, should be followed by governments in reducing inequality in access and use of Internet for the development of e-Commerce can spread to states and therefore overcrowding electronic consumer is not affected by barriers to access or use, allowing more people to make internet shopping.

Finally, in order to some companies can help you understand why your market, the features that have their buyers, allowing to determine which country or region, may have better opportunities for electronic sales by segment or target.

Limitations

The limitations of this study are based on the development of a proprietary database having the difficulty of finding secondary data to allow an analysis with a significant amount of data, likewise, failed to analyze the socioeconomic moderator element because in most obtained studies these factors were not analyzed within each sample.

As for the proposed model, it should be noted that this analysis is partial and that there are more factors that moderate the electronic commerce, the digital divide can also moderate other variables affecting the purchase such as variable ease of use, where and what has validated their relationship from the point of view of learning and use of internet (Leal 2008) (Fernández 2005), (Peral-Peral et al. 2015).

Future research

The future research can be seen on two central goals, the first will be the testing of the proposed relationship between the digital divide and e-Commerce Adoption considering that so far are few such studies in the literature, except that in recent years it is being used UTAUT model (Al-Qeisi et al., 2015), (Escobar-Rodriguez & Carvajal-Trujillo, 2014), which would allow subsequent studies used to develop a database containing more information to corroborate the moderating effect of digital divide in the adoption of electronic commerce.

CHAPTER 4. E-BANKING IN COLOMBIA: FACTORS FAVOURING ITS ACCEPTANCE, ONLINE TRUST AND GOVERNMENT SUPPORT[†]

[†] Artículo aceptado en: Sánchez-Torres JA, Arroyo-Cañada F, Varon-Sandobal A, et al. (2018) E-banking in Colombia: factors favouring its acceptance, online trust and government support. *International Journal of Bank Marketing* 36 (1).

4.1 ABSTRACT

Purpose - This study aims to examine the adoption of e-banking in Colombia, including a comprehensive analysis of consumer trust in this type of transaction and of the impact of the current government policy to promote e-commerce.
Design/ Methodology - An empirical investigation based on the UTAUT2 model collected data from throughout the country to develop 600 online questionnaires.
Findings - The proposed model was validated in that the factors hypothesized to build trust in the use of electronic banking were shown to be significant: trust, performance expectancy and effort expectancy had a positive impact on the use of financial websites in Colombia, while government support did not have a significant impact.
Implications and limitations of the study - The study explains the antecedents to trust, as well as the government support variable, and concludes by producing a model that is highly successful in predicting financial customers' online behaviour.
Practical implications - The results can help Colombia's government and private banks to further develop trust and other conditions necessary for e-banking.
Social implications - Government policies to support the development of e-banking are not viewed favourably by Colombians.
Originality/ Value - This study is one of the first to present empirical findings on the acceptance of e-banking in Latin America; it further presents a model that integrates the most important variables needed for an analysis of the acceptance of e-banking.

Type of paper - Research article
Keywords - E-banking, E-commerce, Adoption, UTAUT, Colombia

4.2 INTRODUCTION

The continuing development of the Internet offers countless innovations in consumer services. In recent decades, other technologies have become closely integrated with information and communication technologies (ICT) because these offer a cost efficient way for businesses to create a competitive advantage in the market and retain their customer base (Bhatt & Bhatt, 2016; Laukkanen, 2016). Banks have adopted the Internet as a new channel for improving offered services while simultaneously increasing process efficiency, for example, electronic payments, as it provides an online platform that supports many e-commerce transactions (M.-C. Lee, 2009). E-banking platforms can offer bank customers services that are typically provided in physical branches, such as account status inquiries, transfers and payments to third parties, bank statements, the ability to consult savings and credit simulators, and 24-hour access, among others.

In light of this trend, several studies have found that customers cite a number of reasons for preferring e-banking (Al-sharafi, Arshah, et al., 2016; Charles k. Ayo, Oni, Adewoye, & Eweoya, 2016; Hui Ling, Islam, Abdul Manaf, & Wan Mustafa, 2015; M.-C. Lee, 2009; M. Tan & Teo, 2000; Yousafzai, Pallister, & Foxall, 2003), including transaction speed, lower management costs, greater control over service delivery, shorter wait times, a perception of more customized service, and greater convenience given access to services that is not limited by time or space (M.-C. Lee, 2009; Montazemi & Qahri-Saremi, 2015).

Despite its appeal, consumers have been slow to adopt e-banking in some emerging countries (Montazemi & Qahri-Saremi, 2015). In fact, acceptance of new technologies generally lags behind the pace at which they are introduced in all regions of the world (Katz et al., 2015). In regions like Latin America, where there is a significant digital divide (Landau, 2012; Sánchez-Torres & Arroyo-Cañada, 2016), consumers are refraining from using these types of technologically advanced services due in part to a lack of awareness but also due to concerns about security, usability and trustworthiness (Bhatt & Bhatt, 2016).

In Colombia, for example, data from the Superintendence of Finance (2016) shows that although both monetary and non-monetary online transactions increased from 951,616,157 in 2012 to 1,905,341,076 in 2015 (comprising 43.97% of total operations for that year), much scepticism is still apparent when only monetary transactions are considered; these accounted for 313,888,272 operations by 2015, representing only 13.10% of total monetary transactions. Other indicators such as the low rate of credit card use (just 10%) and the high cost of financial services reveal widespread scepticism of e-banking in this country (Rodríguez-Raga & Riaño Rodríguez, 2016). In addition, government policies and public programmes to develop the digital sector, including e-banking, are limited throughout Latin America (Katz et al., 2015) due to the sector's lack of importance, poor coordination between different sectors, a lack of transparency in the management of those resources devoted to the sector, a lack of trust between the private and public sectors, and the high cost for companies to implement technology services. Therefore, it is important to understand the factors that influence customers' decision to use banking services and how they may be encouraged to engage with them (Charles k. Ayo et al., 2016).

This study, therefore, intends to analyse the behaviour of e-banking users in Colombia in order to explore the adoption of financial services based on variables drawn from the literature, specifically as follows: first, following the Unified Theory of Acceptance and Use of Technology (UTAUT) model of technology acceptance (Venkatesh, 2003; 2012), test those variables that clients considered most important in their decision to use e-banking; second, examine whether government policies on Internet use are directly and positively related to the acceptance of e-banking; and third, analyse the trust factor in depth because it is a particularly relevant factor in financial transactions (Oliveira, Faria, Thomas, & Popovič, 2014) and therefore integral to an analysis of the acceptance of e-banking.

4.3 REVIEW OF THE LITERATURE

Acceptance of e-banking

Research on the acceptance of online transactions has been guided by theoretical models that explain the acceptance of technologies based on the characteristics of virtual channels, which have been widespread in modern society for only 20 years. Several authors have used theories of technology acceptance to analyse e-banking as well as mobile banking (Afshan & Sharif, 2016; Oliveira et al., 2014); the main theories are the Theory of Diffusion of Innovations (Rogers, 1995), the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975b), the Social Cognitive Theory (SCT) (Bandura, 1997; Bonera, 2011)), and the Decomposed Theory of Planned Behaviour (DTPB) (Taylor & Todd, 1995). Research on the acceptance of e-banking (Fishbein & Ajzen, 1975b) has applied two theoretical models that have contributed to analysing the variables most important to this acceptance. The first of these is the Technology Acceptance Model (TAM) (Davis, 1989b), which predicts that an individual's decision about whether to use e-banking is affected by his or her view of the "Perceived Usefulness" and the "Perceived Ease of Use" of electronic banking services (Bukhari et al., 2013). This model is complemented by Davis and Venkatesh and the UTAUT, which subsequently evolved into UTAUT2 (2012) (Venkatesh et al., 2003)). UTAUT2 combines five basic constructs of the eight previous theories: performance expectancy, effort expectancy, social influence, facilitating conditions and trust. The UTAUT and UTAUT2 models have been widely used to study acceptance of e-banking, indicating that performance expectancy, facilitating conditions and trust are important to the acceptance of e-banking (Afshan & Sharif, 2016; Kurila, Lazuras, & Ketikidis, 2016; Williams, Michael-D., Rana, Nripendra-P., and Dwivedi, 2015, Hui Ling, Islam, Abdul Manaf, & Wan Mustafa, 2015).

Variables that have been applied in previous studies of the acceptance of e-banking have been chosen for the first hypothesis of this model.
Effort expectancy for the use of e-banking, defined as the degree of ease with which e-banking can be used (Viswanath Venkatesh et al., 2003), combines the concepts of ease of use of an innovation (Rogers, 1995) and the perceived ease of use from the TAM (Davis, 1989a); these have been amply

demonstrated to influence the use of e-commerce (Venkatesh, V., Thong, James. Y., Xu, 2012) and e-banking (Chong et al., 2010). Especially in regard to financial transactions, the user expects greater ease online than in branch offices, for example by saving time and minimizing travel. Therefore, the following hypothesis is proposed:

H1: Effort expectancy has a positive impact on the intention to use e-banking in Colombia.

Performance Expectancy refers to the user's beliefs about the benefits brought by using a technology (Viswanath Venkatesh et al., 2003). It combines perceived usefulness (Davis, 1989b), extrinsic motivations (Davis et al., 1992) and the expectation of results (Bandura, 1977). As one of the most studied and relevant concepts in the acceptance of technological innovation, it has been amply validated with regard to e-commerce and e-banking in that users perceive economic benefits, satisfaction and convenience from e-banking (Oliveira et al., 2014; Zhu, Lee, O'Neal, & Chen, 2011). Thus, the following hypothesis is proposed:

H2: Performance expectancy has a positive impact on the intention to use e-banking in Colombia.

Government support

Empirical research about the relation of government support to e-banking acceptance is limited to a few studies of Asian countries (Chong et al., 2010; M. Tan & Teo, 2000). However, these studies indicate that it improves acceptance of e-banking, finding that all government policies designed to foster the use of this channel are meaningful; these policies may include less expensive Internet service, web security policies and consumer protection legislation. Efforts to reduce the digital divide and the consequent positive effect on Internet usage have also been extensively studied (Ghobadi & Ghobadi, 2013; Landau, 2012; White et al., 2011). A programme spearheaded by the Economic Commission on Latin America and the Caribbean (CEPAL) calls for governments in the region to commit to reducing the digital divide in their respective countries (Katz et al., 2015; NU. CEPAL, 2015) and, consequently, to developing policies for online

commerce and banking. It is believed that this programme may be contributing to the acceptance of e-banking in Colombia.

Therefore, the following hypothesis is proposed:

H3: Government support for e-banking has a positive impact on the intention to use e-banking in Colombia.

Web trust and its antecedents

Trust is one of the most important variables in a user's decision to online purchase; it is defined as the psychological state of a client's perception of the seller's integrity and benevolence (Zhu et al., 2011). In studies of e-commerce, analysis has concentrated on the characteristics of trust and risk involved in an online purchase (Agudo-Peregrina, 2014; Bonera, 2011; Chen & Dhillon, 2003; Chiu et al., 2009; Choon, Bin, Hoi, Keoy, & Hassan, 2011; Escobar-Rodríguez & Carvajal-Trujillo, 2014; Flavián & Guinalíu, 2006; Kim et al., 2009; Bukhari et al., 2013; Palvia, 2009). This variable carries additional weight in online purchases due to the buyer's heightened sense of uncertainty (Zhu et al., 2011); with regard to e-banking, studies by Afshan & Sharif (2016) and Chong et al. (2010) show that clients value guarantees by financial institutions regarding online purchases and the handling of confidential information. Therefore, the following hypothesis is proposed:

H4: Perceived trustworthiness of e-banking has a positive impact on the intention to use e-banking in Colombia.

H5: Perceived trustworthiness of e-banking has a positive impact on the use of e-banking in Colombia.

To strengthen this analysis, the antecedents of trust will also be measured. Although there are several models that examine this process (Kaplan & Nieschwietz, 2003; Zhu et al., 2011), this study has chosen to use the model proposed by Kim, Ferrin, & Rao (2008) and subsequently validated in studies of online purchases by Escobar-Rodríguez & Carvajal-Trujillo (2014), as it offers the most frequently studied constructs: quality of information,

protection of privacy and protection of security. The latter two are considered relevant to an examination of e-banking by Yousafzai, Pallister, & Foxall (2003).

The quality of information variable is very important to the study of the acceptance of web information as it relates to decision-making (Erkan & Evans, 2016). For the purposes of trust, it can be defined as a user's perception that a website contains complete and accurate information about the products or services of interest (Kim et al., 2008): the website's information is related to the degree of trust it inspires in the user (Escobar-Rodríguez & Carvajal-Trujillo, 2014). Therefore, the following hypothesis is proposed:

H6: The quality of information has a positive impact on the perceived trustworthiness of e-banking.

Protection of privacy is the next variable that directly affects web trust; this is defined as the website user's perception that the online transaction is controlled and protected against any unauthorized use. For the purpose of e-banking acceptance, it has been demonstrated that the clients' perception regarding the protection of privacy directly influences their level of confidence (Kim et al., 2008) in online transactions, since financial information requires high levels of security and control (Yousafzai et al., 2003). This variable has also been the focus of a study of online financial transaction security by Al-sharafi, Arshah, Abu-shanab, Fakhreldin, & Elayah (2016) Therefore, the following hypothesis is proposed:

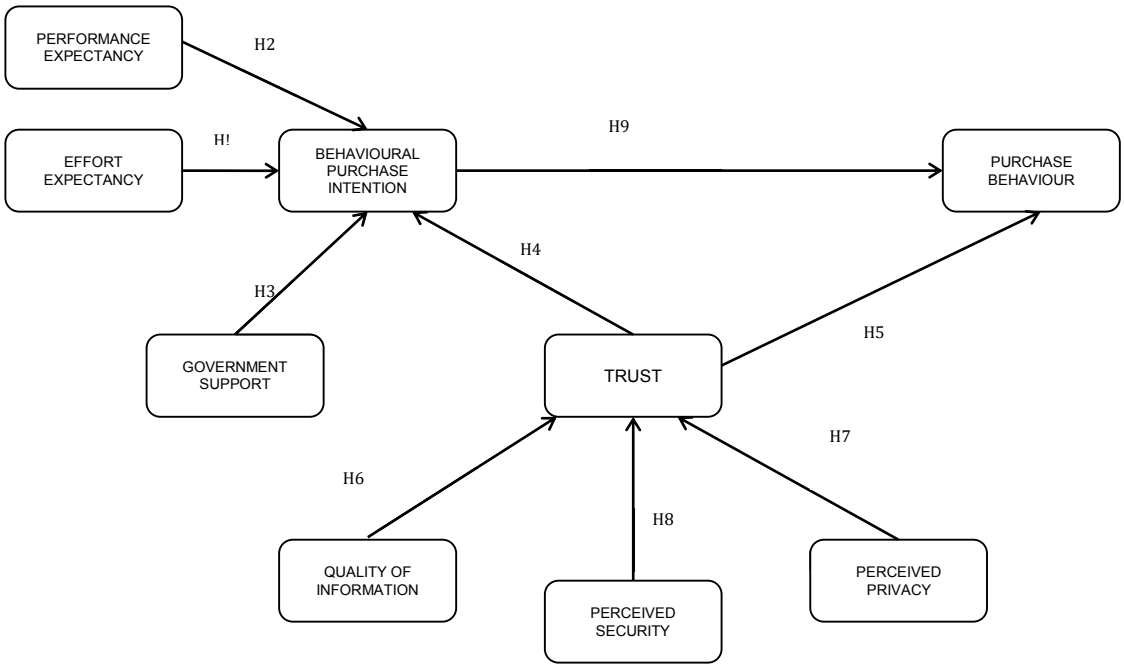
H7: Protection of privacy has a positive impact on the perceived trustworthiness of e-banking.

The third factor that fosters trust in the web is perceived protection of security, which consists of several features: authentication, protection, verification and encryption (D. J. Kim et al., 2008). When users of a financial website are aware of these factors, they tend to believe that the site will guarantee their security during the online transaction, which serves as an antecedent to trusting the site (Escobar-Rodríguez & Carvajal-Trujillo, 2014). In accordance with this and several previous studies that have

validated web site trust (Al-sharafi, Arshah, et al., 2016; Escobar-Rodríguez & Carvajal-Trujillo, 2014; Flavián & Guinalíu, 2006; Kim et al., 2008) the following hypothesis is presented:

H8: Perceived protection of security has a positive impact on the perceived trustworthiness of e-banking.

Figure 8. Proposed model



Intention and use of e-banking

Finally, the UTAUT and UTAUT2 models examine the impact of variables on the intention to use e-banking and, subsequently, on the relation between intention and actual use (Venkatesh et al., 2003; 2012). Therefore, our model concludes by proposing that a user's intention to use e-banking has a direct effect on his or her actual use of e-banking, which may be tested in the following hypothesis:

H9: Intention to use e-banking has a positive impact on the use of e-banking in Colombia.

4.4 METHODOLOGY

Sample and data collection

This study focused on collecting the perceptions of e-banking users throughout Colombia by means of an electronic questionnaire, an approach that has been validated in similar studies of e-banking (Agudo Peregrina, 2014; Escobar-Rodríguez & Carvajal-Trujillo, 2014) including studies set in Portugal (Oliveira et al., 2014), Pakistan (Al-sharafi, Arsha, et al., 2016) and Singapore (Tan & Teo, 2000). The questionnaire was built and pre-tested with a group of 30 teachers to rule out language and comprehension problems, as recommended by previous studies (Oliveira et al., 2014)). The final questionnaire contained at least three indicators per variable (Annex 1). To facilitate responses, the use of multiple items per construct was followed, and Likert-type scales were used for the questionnaire responses ranging from 1 ("Strongly disagree") to 7 ("Strongly agree") to effectively measure any variables that are not directly observable (Churchill & Iacobucci, 2004). The sample was determined using the methodology of stratified sampling with geographic quotas, as this is deemed the most appropriate for studies of large populations that require a representative sample of all members (Hoe, 2008). Thus, the country of Colombia was divided into five geographic zones considering the five most important cities, such that zones 1, 2 and 3 would account for 80% of the sample, with zones 4 and 5 comprising the other 20%. Data collection occurred between November 2015 and May 2016. To achieve the sampling goals, a national team was established with coordinators in each of the main cities to manage the dissemination of the questionnaire through an e-mail from universities to ensure greater acceptance. A total of 734 questionnaires were returned, of which 134 were excluded due to inconsistent responses, leaving a final sample of 600 valid questionnaires. The most important characteristic of the sample is that it did not achieve the sampling objectives for areas 4 and 5, as more than 90% of the sample was concentrated in areas 1, 2 and 3, which include the cities where most of the country's inhabitants (Córdoba-pachón & Orr, 2009) are located. Although randomly selected, the sample was distributed equally between men and

women, 70% of whom were between 18 and 34 years of age, 88% of whom were university educated, and 79% of whom earned more than the national average (Table 7); these figures are consistent with the profile of e-banking and financial service users in Colombia (Rodríguez-Raga & Riaño Rodríguez, 2016).

Table 7. Sample characteristics

Demographic profile		Internet and e-commerce acceptance profile
Gender: Men 54% Women 46%	Age: 18-34 years 70% 35-44 years 20% 45-55 years 10%	Experience with Internet use: More than 10 years 55% Between 5 - 10 years 45%
Educational level: Primary 0% High School 12% Technical degree 26% University 42% Post-graduate 20%	Economic level (income‡): Very low 3% Low 18% Moderate 45% Upper-middle 20% High 12% Very high 2%	Location: Zone 1 (Antioquia, Caldas, Quindío, Risaralda) 25% Zone 2 (Boyacá, Cundinamarca, Bogotá) 42% Zone 3 (Cauca, Valle del Cauca) 27% Zone 4 (Atlantic, Bolivar, Cesar, San Andrés, Magdalena, Santander) 6% Zone 5 (Arauca, Caquetá, Huila Meta, Nariño, Tolima, Vaupés) 1%
Marital status: Single, separated, widowed 63% Married, Free union 37%	Size of household: 1 person 9% 2 people 18% 3 people 28% 4 people 55% 5 people 16%	

*Adapted from the classification used in Colombia according to public sources

Data analysis and findings

This study employed a regression analysis of the latent variables with the aid of the SmartPLS 3.0 program; this was based on the optimization of partial least squares (PLS), a multivariate technique for testing structural models that is recommended for exploratory models. This program was chosen, first, because it has been used in previous studies to test the UTAUT and UTAUT2 models for the acceptance of e-banking and e-commerce; second, due to the

large number of latent variables that it contains; and finally, because the tested model is an exploratory effort, and it has shown that PLS is the most appropriate for this type of analysis (Escobar-Rodríguez & Carvajal-Trujillo, 2014; Hair, Ringle, & Sarstedt, 2013; Kiwanuka, 2015; Matute Vallejo, Polo Redondo, & Utrillas Acerete, 2015).

The data analysis was performed in two stages: first, the measurement model was estimated and, second, the validity of the structural model was examined.

Table 8. Loads of the indicators

	Non-buyers	
Indicator	Load	t-value*
(BI24) < - intention to use e-banking	0.976	357,981
(BI34) < - intention to use e-banking	0.974	339,876
(EE14) < - effort expectancy	0.969	270,843
(EE14) < - effort expectancy	0.962	213,590
(EE14) < - effort expectancy	0.963	233,034
(IQ14) < - quality of information	0.949	141,041
(IQ24) < - quality of information	0.960	226,804
(IQ34) < - quality of information	0.948	109,565
(PE14) < - performance expectancy	0.952	172,376
(PE24) < - performance expectancy	0.949	162,282
(PE34) < - performance expectancy	0.911	62,156
(PP14) < - perceived privacy	0.892	83,988
(PP24) < - perceived privacy	0.881	63,207
(PP34) < - perceived privacy	0.843	51,748
(PS14) < - perceived security	0.936	136,743
(PS24) < - perceived security	0.935	136,360
(PS34) < - perceived security	0.904	87,439
(PT14) < - trust	0.967	246,806
(PT24) <- trust	0.960	213,168
(PT34) < - trust	0.965	210,118
B14 < - intention to use e-banking	0.946	122,314
GS1 < - government support	0.926	104,844
GS2 < - government support	0.957	198,713
GS3 < - government support	0.888	55,464

* All items had significance with p-value < 0.001.

Validation of the model measure

The measurement instrument was validated through a test analysis to determine first the convergent and discriminant validity of the constructs and, second, the reliability of each item. The convergent validity of each construct was acceptable, as all had loadings higher than 0.505 (Hair, Hult, Ringle, & Sarstedt, 2014). Each item's individual reliability was measured by the correlations of its loadings with every variable; table 8 shows that the loadings for each indicator were significant, and all are validated. The internal consistency for all indicators in relation to their corresponding variables was measured using Dillon-Goldstein's test; this is known as the composite reliability coefficient, and all values were greater than the minimum acceptable level of 0.70 (Gefen, Straub, & Boudreau, 2000). Cronbach's alpha test was also applied, and it also obtained values higher than the 0.7 minimum needed for confirmation (Churchill & Iacobucci, 2004). Finally, convergent validity was again analysed taking variance into account, i.e., that indicators and their construct have similar variance, which should be greater than 0.50 of the variability explained by the indicators (Fornell & Larcker, 1981)(Table 9). Discriminant validity was tested by comparing each variable's AVE with the correlation of each construct of each variable squared; the values obtained from the square root of the AVE were greater than the constructs, showing that each variable was more closely associated with its own items than with those of other variables (Fornell & Larcker, 1981) (Table 9).

The discriminant validity was verified by comparing the value of the average variance extracted (AVE) of each variable with the correlation of each construct of every variable squared. The values obtained from the square root of the AVE were higher than those of the constructs, thus indicating that each variable was related more strongly with its own items than with those of other variables (Fornell & Larcker, 1981) (Table 10).

Table 9. Convergent validity of indicators

Variables	Cronbach's Alpha	Composite reliability	Average Variance Extracted (AVE)
Quality of information	0.949	0.967	0.907
Trust	0.962	0.975	0.929
Performance expectancy	0.931	0.956	0.879

Effort expectancy	0.963	0.976	0.931
Intention to use e-banking	0.963	0.976	0.932
Perceived privacy	0.843	0.905	0.761
Perceived security	0.916	0.947	0.856
Government support	0.915	0.946	0.854

Table 10. Discriminant validity of indicators - Fornell & Larcker test

	Quality of information	Trust	Performance expectancy	Effort expectancy	Intention to use e-banking	Perceived privacy	Perceived security	Government support	Use of e-banking
Quality of information	0.953								
Trust	0.896	0.964							
Performance expectancy	0.844	0.854	0.937						
Effort expectancy	0.836	0.849	0.885	0.965					
Intention to use e-banking	0.812	0.816	0.868	0.779	0.965				
Perceived privacy	0.669	0.693	0.635	0.603	0.615	0.872			
Perceived security	0.869	0.887	0.788	0.773	0.759	0.737	0.925		
Government support	0.230	0.217	0.253	0.251	0.234	0.237	0.247	0.924	
Use of e-banking	0.352	0.375	0.360	0.350	0.414	0.256	0.325	0.006	1.000

Validation of the structural model

Turning to the structural model, a re-sampling was conducted using the bootstrapping technique. A test of the significance of the model's parameters was performed using 1,000 sub-samples from the study data; this confirmed that the model had fulfilled its predictive capacity by obtaining R squared values greater than 0.10 for the three variables explained (Hair et al., 2014). The hypotheses were tested as follows. Hypothesis 1 (H1: B=-0.182) was not significant, as users do not perceive effort expectancy with regard to the use of e-banking. Hypothesis 2 (H2: B=0.679) was significant, showing that performance expectancy is highly influential in users' intention to use e-banking. Hypothesis 3 (H3: B=0.019) was not significant, indicating that government support does affect the intention to use e-banking. Hypothesis 4 (H4: B=0.301) was significant, showing that perceived trustworthiness positively affects the intention to use e-banking. Hypothesis 5 (H5: B=0.181)

was significant, showing that perceived trustworthiness positively affects the actual use of e-banking. Hypothesis 6 (H6: B=0.506) was significant, finding that the perceived quality of information positively affects the perception of trust. Hypothesis 7 (H7 7: B=0.054) was significant, showing that perceived privacy in banking websites positively affects the perception of their trustworthiness. Hypothesis 8 (H8: B=0.408) was significant, indicating that the perceived security of financial websites positively affects perceptions of the bank's trustworthiness. Hypothesis 9 (H9: B=0.326) was significant, confirming that intention to use directly and positively affects the actual use of e-banking in Colombia (Table 11).

Figure 9. Validation of the model

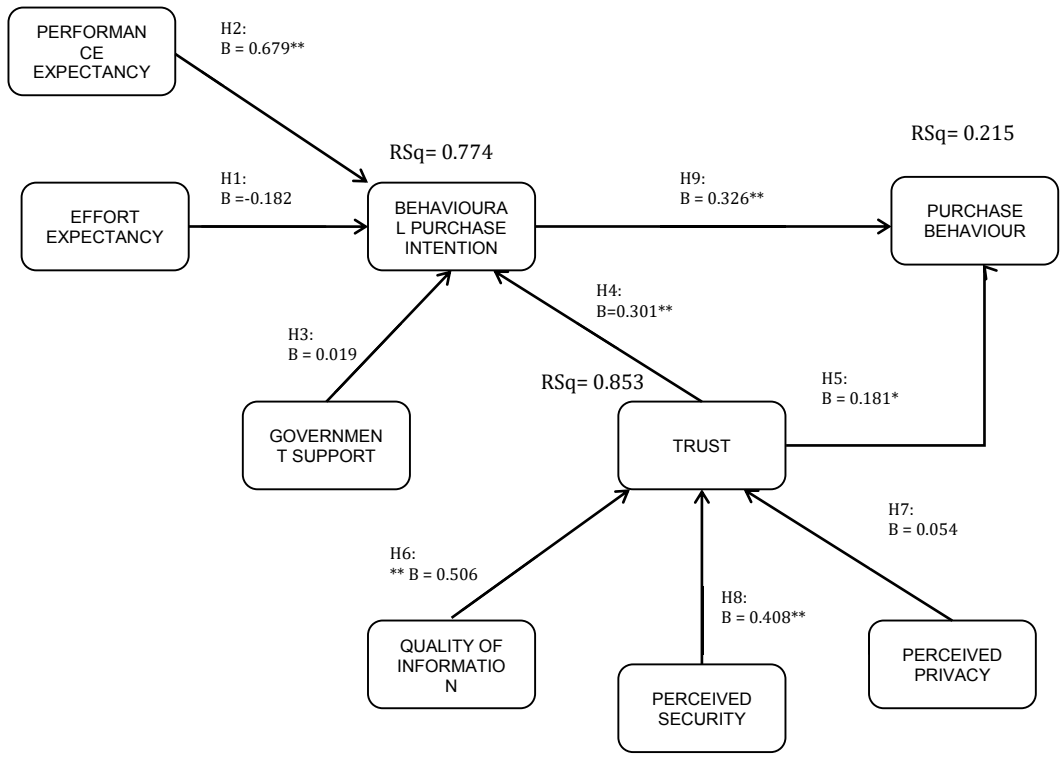


Table 11. Summary of the validity of the structural model

Hypothesis		Effect	Original Sample (O)*	R squared	Standard Deviation (STDEV)	T Statistics (|O/STDEV)	P Values
H1	Accept	effort expectancy - > intention to use e-banking	-0.182*	Intention to use e-banking R= 0.774	0.057	1,941	0.050
H2	Accept	performance expectancy - >intention to use e-banking	0.679**		0.074	9.215	0.000
H3	Reject	government support - > intention to use e-banking	0.019		0.019	0.984	0.325
H4	Accept	trust -> intention to use e-banking	0.301**	Trust: R= 0.853	0.061	4,978	0.000
H5	Accept	trust -> use of e-banking	0.181*	Use of e-banking R= 0.215	0.065	1,936	0.017
H6	Accept	quality of information - > trust	0.506*		0.063	7,965	0.000
H7	Reject	perceived privacy -> trust	0.054		0.030	1,819	0.069
H8	Accept	perceived security -> trust	0.408**		0.058	7,082	0.000
H9	Accept	intention to use e-banking - > use of e-banking	0.326**		0.063	5.168	0.000

Notes: Significant at: *p<0,05 t-value 1,960; **p<0,01, t-value 2,576

4.5 DISCUSSION

This study aimed to describe the variables that influence the acceptance of e-banking in Colombia. More specifically, the study sought to test the relationships between the main variables that influence the acceptance of e-banking (Afshan & Sharif, 2016; Kurila, Lazuras, & Ketikidis, 2016; Williams, Michael-D., Rana, Nripendra-P., & Dwivedi, 2015, Hui Ling, Islam, Abdul Manaf, & Wan Mustafa, 2015). First, the effort expectancy variable was found to have no significant impact on the intention to use e-banking in Colombia. This result contradicts the findings of other studies on the acceptance of e-banking (Afshan & Sharif, 2016; Oliveira et al., 2014). This unexpected finding may indicate that users have already developed expertise in managing e-banking operations, rendering this variable insignificant; however, the negative result could also indicate precisely the opposite, denoting a lack of user experience and the novelty of Internet access in this country that leads to doubts and negative expectations about the use of e-banking. The results of the performance expectancy variable are consistent with the theory (Oliveira et al., 2014; Yousafzai et al., 2003) and indicate that users in Colombia have high expectations regarding the benefits

that e-banking use will bring; this finding supports claims that this construct is essential to the acceptance of e-banking.

Users of e-banking in Colombia did not feel that government support of Internet use had any effect on their intention to use online banking; these results differ from other studies that found this variable to be highly significant, especially in Asian countries (Chong et al., 2010; Tan & Teo, 2000). This finding merits detailed analysis, as the government has implemented a series of policies over the past decade focusing on developing the digital sector. These policies may have been ineffective with regard to e-banking, or users may consider them irrelevant to their decision to use these services, perhaps because banking is a private sector activity that has distanced itself from these policies in users' eyes.

With regard to perceived trustworthiness, the study validates the strong influence of this factor on both the intention to use and the actual use of e-banking, demonstrating that users place high importance on a number of security features and that these bolster users' confidence in banking websites (Chong et al., 2010; Yousafzai et al., 2003).

More detailed analysis reveals that clients consider certain features of a website to be essential. The first is the quality of information: it is important that a client is able to find a webpage containing all information needed for banking, including processes, transactions, policies, customer service and resolution of problems. Since this is highly valued in the Colombian case, it may be deduced that users perceive the country's e-banking sites to offer high quality information.

Perceived privacy is the next important aspect for developing a perception of e-banking as trustworthy. This factor was shown to be significant, but given the context of distrust in online transactions in Colombia (Tavera-Mesías et al., 2011), especially when personal information or large financial sums are involved, Colombians may fear that their financial information, bank accounts and balances could be vulnerable to hacking or theft. It is believed the approval of e-banking in Colombia is tied to improvements in website security, as well as to the fact that banks have taken steps to raise clients' awareness about the proper use of their confidential information

Finally, in connection with the previous two factors, perceived security is also highly valued by Colombian users as contributing significantly to their perception of websites' trustworthiness. This result stems from the development and adoption of electronic encryption, and the adaptation of

high-level global security for online transactions and highly secure personal access by all financial institutions.

As a final contribution to this line of research, this study is one of the first to analyse the factors that affect the acceptance of e-banking in Latin America, focusing on the Colombian case because of the country's current leading role in the development of online services and commerce (Katz et al., 2015; NU. CEPAL, 2015). These results reinforce the importance of key variables in the use of e-banking. Further, they support the critical role played by the antecedents of trust, which is of great importance to users of virtual services. Finally, the government support variable is found to be not significant, so it is not possible to determine its direct impact on the acceptance of e-banking.

4.6 IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study is one of the first to present empirical findings on the acceptance of e-banking in Latin America. It presents a model that integrates the most important variables for an analysis of the acceptance of e-banking, especially in countries or regions where development is recent, making an original contribution by explaining the antecedents of trust as well as the government support variable. Further, this model can be used to predict the online behaviour of financial clients.

For the business sector (in this case, financial institutions), this study determines which variables are most important to their clients and analyses their needs and behaviour with regard to the use of financial websites.

Considering Colombia’s government, the study examined whether citizens believe that government policies have a positive impact on the use of e-banking. This study found that citizens do not believe that government support favours online commerce, and the reasons behind this result should be examined, as it has been national policy to promote Internet use. One would expect to find a positive impact from this policy on the acceptance of e-banking, particularly as not all citizens have access to financial services and banking due to social gaps, such as education and economic level (Landau, 2012).

The limitation of this study is that despite its high degree of prediction, the proposed model may be missing other variables that would improve the

description of the acceptance of e-banking. Other authors (Afshan & Sharif, 2016) analyse different antecedents for trust and integrate other technological constructs, allowing them to analyse differences between men and women to determine the moderating effect of gender (Oliveira et al., 2014). Additionally, the inclusion of the government support variable did not produce the expected result, leaving doubts about its direct or indirect influence on e-banking; thus, further studies are required in similar countries to confirm the result. It is proposed that further studies apply this model in other countries in the region to test for possible differences that can contribute to improving online financial services in Latin America.

Annex 1. Questionary adoption e-banking

Construct	Item	Source
(AU)	AU1 ¿How many times during the last year have you used your bank's services online?	Venkatesh (2012) Escobar & Carvajal (2014)
(BI)	BI1. I intend to use online banking if time and costs are reasonable for me. BI2. In the future I will use online banking. BI3. I intend to use online banking in the future.	Venkatesh (2012)
(PE)	PE1. Overall I think online banking makes it easier for me to do my daily financial transactions. PE2. Overall I think online banking is more useful than other traditional forms of banking (Physical office). PE3. Overall I think online banking easier communications with my bank.	San Martín & Herrero (2012) Venkatesh (2012)
(EE)	EE1 Overall I think online banking is easy and simple to use. EE2. Overall I think online banking is clear and understandable. EE3. Overall I think online banking allows different types of operations being easy to learn and remember their use.	San Martín & Herrero (2012) Venkatesh (2012) Escobar & Carvajal (2014)
(GS)	GS1. Overall I think the government has policies that promote the use of internet and e-commerce. GS2. Overall I think the government is promoting the development of online banking. GS3. Overall I think the government has a favorable legislation to use online banking.	Chong et al., (2010)
(PT)	PT1. Overall I think online banking is trusted. PT2. Overall I think online banking fulfills its promises and	Agudo-Peregrina (2014) Escobar & Carvajal (2014)

	commitments. PT3. Overall I think that online banking is reliable for electronic procedures offered.	
(IQ)	IQ1. Overall I think, online banking informs me fully about the transaction and its final check. IQ2. Overall I consider that online banking is easy to navigate and content lets me know so detailed and accurate all the information. IQ3. Overall I consider that online banking gives me true and updated information on their products or services.	Escobar & Carvajal (2014)
(PS)	PS1. I believe that online banks have a secure web for electronic transactions. PS2. I consider that online banks guarantee on its website that throughout the process is not interrupted or transaction information allowing successfully finish is not lost. PS3 I consider that online banks keep and handle my personal information safely.	Escobar & Carvajal (2014)
(PP)	PP1. I am concerned that online banks will use my personal data for their business interests without my permission. PP2. I am concerned that the online banks will exchange my personal data with others with my authorization. PP3. I am concerned that unauthorized persons (i.e. hackers) have access to my personal information.	Escobar & Carvajal (2014)

CHAPTER 5. THE COLOMBIAN ELECTRONIC CONSUMER: ANALYSIS OF THE LEADING FACTORS OF E-COMMERCE USE. §

§ Artículo publicado en: Sánchez-Torres JA, Arroyo-Cañada F, Rojas-Berrio S, et al. (2018) The Colombian Electronic Consumer: Analysis of the leading factors of e-commerce use. *International Journal of Electronic Marketing and Retailing.*

5.1 ABSTRACT

Purpose – There are few studies describing the adoption of electronic B2C (business-to-consumer) commerce in poor and developing countries. The purpose of this article is to examine which factors lead to electronic purchasing in Colombia.
Design/methodology/discussion – The adoption of electronic commerce has been studied using different models grouped into the Unified Theory of the Acceptance and Use of Technology (UTAUT). The study was conducted on a national level using an online questionnaire, with a total of 941 responses from online consumers.
Findings – The results validated the model in general, with only the expected variables of effort and hedonistic motivations not being significant; additionally, online trust is positively affected by perceived security, information quality and perceived privacy.
Originality/value – The analysis confirms that the relationships proposed in the theory of the adoption of online shopping in an emerging country are met, offering a detailed analysis of each of the variables that the online shopper considers; additionally, this article has validated that in Colombia, online shopping affects the search for low prices.
Keywords: Customer, Electronic Commerce, Online Purchase Intention, Trust.
Type of article: Research paper

5.2 INTRODUCTION

Globalization has contributed to the development of information and communications technology, which has led to the establishment of new productivity parameters in the market, resulting in a revolution in knowledge and technology (Toffler & Toffler, 2006) (Cecere, 2016).

Specifically, this technological revolution has brought social and cultural changes and consequences during its expansion, generating a process that Rogers (1995) refers to as technological adoption, which can be analyzed with respect to the moment in time in which this innovation is present within society.

Thus, electronic commerce (e-commerce) is one of the most recent innovations responsible for expanding society's use of the internet. In 1995, the first online sales websites were created, and in only two decades, internet use quickly developed and spread, such that total internet sales in 2016 increased 20% globally, amounting to US$ 1.6 billion. Nevertheless, growth has not been equal in all regions, with sales in Asia-Pacific countries increasing 35.1% in 2016, followed by North America (31.1%) and Western Europe (23.9%), whereas in regions with low penetration and development, internet sales growth in 2016 was as follows: Latin America (4.1%), Central and Eastern Europe (3.5%) and, finally, the Middle East and North Africa (2.4%) (Cecere, 2016).

These figures presume that the diffusion of e-commerce does not evolve similarly in all regions of the world. Authors such as Sánchez-Torres and Arroyo-Cañada (2016) consider North American, Western European and Asian-Pacific countries to be in a state of mature diffusion—that is, according to Rogers (1995) characterization, internet diffusion is established and commonly used by a majority of the population—whereas some countries in Latin America, Central and Eastern Europe, the Middle East and Africa are in the beginning stages of internet use with "early adopters," although some are at a stage of more mature development but are characterized by a "late majority," with adoption problems attributed to limitations in conscience, knowledge, development, resources and access as reflected in the high levels of digital gaps that extend to such organizations as small and medium enterprises (Erumi-Esin & Heeks, 2015; Vega & Rojas, 2011).

A clear example of the complexity of adopting e-commerce exists in Colombia, a country whose e-commerce potential is characterized by dynamic positive growth, exhibiting an accelerated increase from 2011, when sales amounted to US$ 1 million, to a goal for 2016 of US$ 5.2 billion (Patiño, 2016); however, only 10% of internet users make electronic purchases (CEPAL, 2015). The limited number of studies on this topic have found that the electronic consumer distrusts the use of the digital channel (Sánchez-Alzate and Montoya-Restrepo 2016). Although the factors that motivate online consumer purchases are the ease of use of e-commerce and the utility it generates, it is necessary to study other factors that could directly impact the decision to purchase, such as prices, trust and payment methods, among others (Mesías et al., 2011; Junadi, 2015; Slade et al., 2015; Wang and Yi, 2012; Muhayiddin et al., 2011).

Colombia is a developing country that, in the last decade, has developed communication and internet technologies, implementing large government programs in the development of the use of e-commerce, this why by 2015 it ranked 45th worldwide in the atlas of economy complexity (Katz et al., 2015), which compares indicators of technological and economy development, being the first country in the Latin American ranking zone. In this context, it is pertinent to choose this country as a reference to analyze how the adoption of B2C e-commerce is in the developing countries and the region.

Thus, the objective of this study is to analyze which factors influence electronic purchases in Colombia, focusing specifically on: 1) the basis of the Unified Theory of the Acceptance and Use of Technology (UTAUT) model of technological adoption, determining which factors influence the intention to make an electronic purchase; 2) analyzing the perception of trust towards electronic purchases, considering any possible preceding variables, perceived security, confidentiality and information quality; and 3) associating the results of innovation adoption with regards to the possible types of adopters, considering the theory of diffusion proposed by Rogers (1995).

5.3 LITERATURE REVIEW AND ESTABLISHMENT OF HYPOTHESES

The models of technological adoption and the Unified Theory of the Acceptance and Use of Technology (UTAUT)

The study of electronic consumer behavior is based on adoption models related to innovation or technology, an analysis that the theory of the diffusion of innovations, proposed by Rogers (1995), explains with a life cycle that is timed according to the moments of adoption of an innovation by a population group. Similarly, social, cognitive and behavioral psychology fields have developed different theories that attempt to deepen the understanding of relationships between attitudes, intentions and behaviors (Agudo-Peregrina, 2014). The theory of reasoned action (TRA) proposes a model in which intention is the factor that generates a behavior; this intention is affected by the attitude towards the behavior and the subjective norm (Fishbein & Ajzen, 1975). Social cognitive theory (SCT) presents a behavioral model based on the influence of personal and environmental factors and the individual's behavior, using self-efficacy as an important concept (Bandura, 1977; Bonera, 2011). The theory of planned behavior (TPB) also adds the concept of perceived control to the TRA. The most applied theory in the study of e-commerce is the technology acceptance model (TAM) (Davis, 1989), which predicts behavior vis-à-vis the intention of a behavior via the attitude of the individual, which is affected by perceived utility and perceived ease of use (Bukhari et al., 2013).

All the variables of technology adoption theories were grouped in a proposal by Venkatesh et al. (2003), (2012); under the UTAUT, in which five constructs are grouped: performance expectancy, effort expectancy, social influence, facilitating conditions and use intention, which, under the influence of the moderating aspects of gender, age and experience describe in greater detail society's motives to use e-commerce (Table 12) (Figure 10).

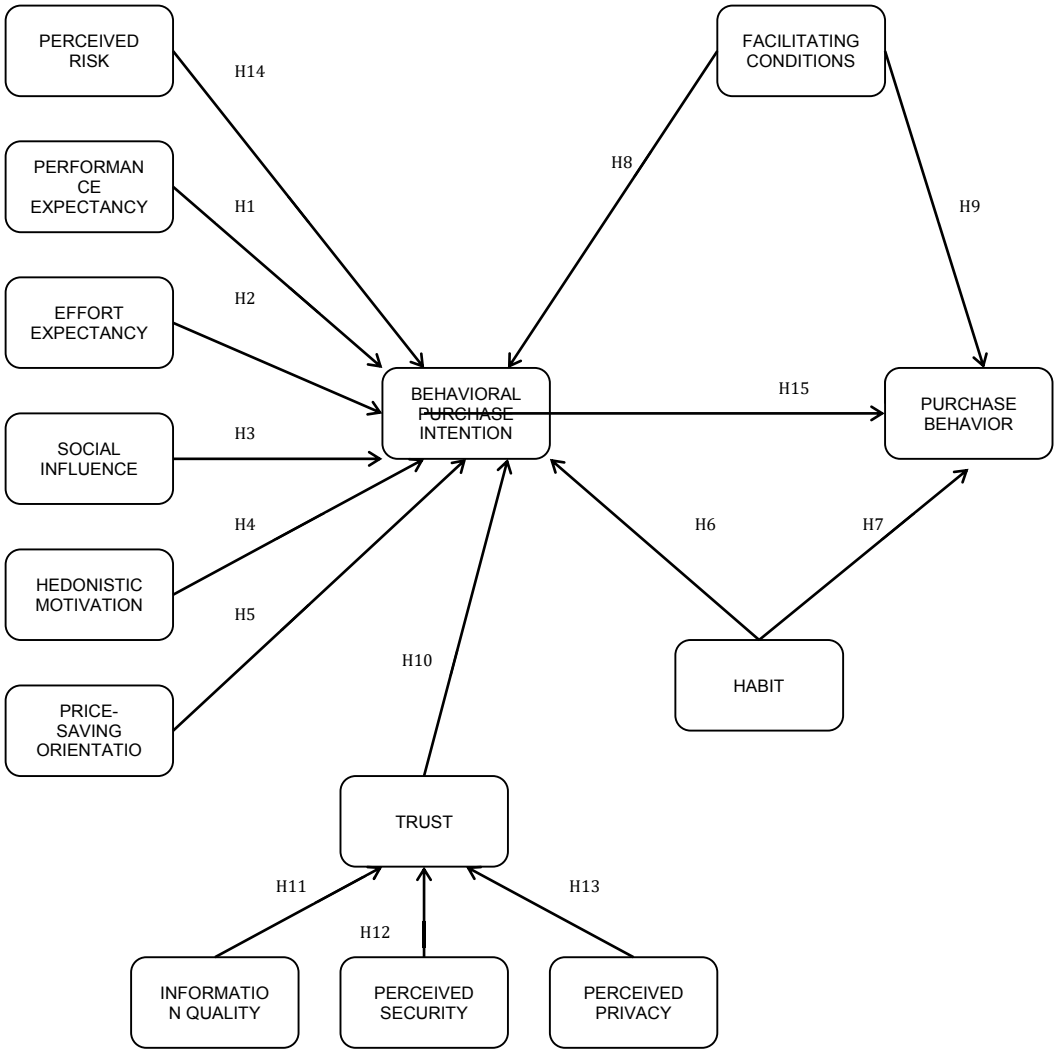
Table 12. Theories of e-commerce adoption grouped in the UTAUT

Theory/Model	Construct	Correspondence/UTAUT Construct
Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975)	Subjective Norm	Social Influence (SI)
Technology Acceptance Model (TAM) (Davis, 1989; Davis et al., 1989)	Perceived Performance	Performance Expectancy (PE)
	Ease of Use	Effort Expectancy (EE)
	Subjective Norm	Social Influence (SI)
Motivational Model (MM) (Davis et al., 1992)	Extrinsic Motivation	Social Influence (SI)
	Intrinsic Motivation	Effort Expectancy (EE)
Theory of Planned Behavior (TPB) (Azjen, 1991; Ajzen and Driver, 1991)	Subjective Norm	Social Influence (SI)
	Perceived Control	Facilitating Conditions (FC)
Innovation Diffusion Theory (IDT) (Moore and Benbasat, 1991)	Relative Advantage	Performance Expectancy (PE)
	Ease of Use	Effort Expectancy (EE)
	Image	Social Influence (SI)
	Visibility	Facilitating Conditions (FC)

Source: Adapted from Escobar and Carvajal (2014).

The configuration of the model is presented below, aggregating the UTAUT2 model, as well as other variables that can directly impact electronic purchasing in Colombia. Finally, in this hypothesis section, three precedent variables of perceived confidence for internet purchasing are presented:

Figure 10. UTAUT2 Model



Performance expectancy

Defined as the degree to which the use of a system generates some type of benefit (Venkatesh *et al.,* 2003), this variable is validated for electronic purchasing in different highly developed countries as well as developing countries, for example Kim *et al.,* (2009), Tan *et al.,* (2013) in South Korea, Mesías *et al.,* (2011) in Colombia, Castañeda *et al.* (2009), Escobar & Carvajal (2014) and San Martín & Herrero (2012) in Spain, Delafrooz *et al.* (2011) and Tan *et al,* (2013) in Malaysia, Chang & Zhu (2011) and Lin (2010) in Taiwan, Venkatesh, *et al.* (2012) in Hong Kong, Karahanna (2003)

and Palvia (2009) in USA; Chiu *et al.,* 2014, Li & Tang (2010) and Yoon (2009) in China; Kim *et al*. (2016) in Russia; and the study of Çelik & Yilmaz (2011) in Turkey:

> H1: The performance expectancy in the use of e-commerce positively affects the intention to purchase online in Colombia.

Effort expectancy

Similar to the concept of the perceived ease of use of technology proposed by Fishbein & Ajzen (1975), effort expectancy is grouped by Venkatesh et al. (2003) along with other variables, such as the concepts of ease of use of an innovation (Rogers, 1995) and the perceived ease of use from the TAM theory (Davis, 1989). Expectations of effort are linked to the Internet purchases domain, generally related to the high development of e-commerce and, therefore, to have experience in the use of this technology; the studies in countries results are contradictory depending especially in the moment in which they were carried out, since in the early years of the decade of the 2000 it was novel for all countries, also recent studies in developing countries found that it was not significant for the use of e-commerce; Countries where it has been significant, for example: Spain (Escobar-Rodríguez and Carvajal-Trujillo, 2014, Castañeda *et al.,* 2009), South Korea (Kim et al., 2009), China (Chiu *et al.,* 2014, Yoon, 2009), USA (Karahanna, 2003, Palvia, 2009), Italy (Capece *et al.,* 2013) Taiwan (Chang & Zhu 2011; Lin, 2010) or Russia (Kim *et al.,* 2016). It was not significant in developing countries such as Malaysia (Tan *et al.,* 2013), Colombia (Tavera-Mesías *et al.,* 2011), Thailand (Kanchanatanee *et al.,* 2014), Pakistan (Abbasi *et al.,* 2011), Jordan (Al-Qeisi & Al-Abdallah, 2013) and Oman (Riffai *et al.,* 2012), therefore, it is necessary to analyze again Colombia:

> H2: Effort expectancy in the use of e-commerce positively affects the intention to purchase online in Colombia.

Social influence

Originating from the concept of subjective norms, this variable relates the influence of social factors and image in electronic purchasing, validated in

various studies in different countries, South Korea by Kim *et al* (2009), Spain by Escobar and Carvajal (2014), although it is also possible for this variable to not be validated, for example, in the study in Malaysia and South Korea by Tan *et al* (2013), where a sample of young "generation Y" individuals do not consider others' opinions about internet use, another study where it was not significant was Hong Kong (Venkatesh *et al.,* 2012). Similarly, social influence is a variable whose validity authors such as Sánchez Torres and Arroyo-Cañada (2016) associate with the stage of the diffusion of e-commerce in society; As users gain positive experience with electronic purchases, they pay less attention to the classical social influence.

H3: Social influence in the use of e-commerce positively affects the intension to purchase online in Colombia.

Hedonistic motivations

Hedonistic motivations are associated with pleasure or enjoyment in purchasing. This factor has been examined in few studies since it can be associated with experienced buyers (Agudo-Peregrina, 2014); however, they are validated by (Venkatesh et al., 2012) in Honk-Kong, Bonera (2011) and Escobar & Carvajal (2014) in Spain; (Sheng & Zolfagharian 2014) in U.S., (Çelik, & Yilmaz, 2011) in Turkey, (Al-Maghrabi & Dennis, 2011) in Saudi Arabia, (Delafrooz *et al.,* 2011) in Malaysia and (Lee & Chang, 2011) in South Korea.

H4: Hedonistic motivations in the use of e-commerce positively affect the intention to purchase online in Colombia.

Purchase orientation towards low prices

Interpreted as the opportunity cost of favorable prices perceived by the client, compared to other traditional purchasing channels (Escobar & Carvajal, 2014), this variable is validated in the aforementioned study in Spain, and also by Mohamed *et al.,* (2013) and Bonera (2011), in Malaysia (Delafrooz *et al.,* 2011) and Hong-Kong (Venkatesh *et al.*, 2012).

H5: Purchase orientation towards low prices in the use of e-commerce positively affects the intention to purchase online in Colombia.

Habit

Related to intention and continued use, habit is not validated for e-commerce by the majority of researchers (Agudo-Peregrina, 2014), but it is validated as a secondary predictor in the study from Spain by Escobar & Carvajal (2014) and also significant in Hong-Kong (Venkatesh *et al.*, 2012).

H6: Habit in the use of e-commerce positively affects the intention to purchase online in Colombia.
H7: Habit in the use of e-commerce positively affects the use of online purchasing in Colombia.

Facilitating conditions

These variables group together the control of perceived technology behavior and compatibility, which are very influential on intention (Agudo-Peregrina, 2014; Wu et al., 2009), as validated by others countries Escobar & Carvajal (2014) (Spain), Tan et al. (2013) (South Korea and Malasya) and Bonera (2011).

H8: Facilitating conditions in the use of e-commerce positively affect the intention to purchase online in Colombia.

H9: Facilitating conditions in the use of e-commerce positively affect the use of online purchasing in Colombia.

Trust

Defined as the belief that a seller will behave ethically and will not exploit the vulnerability of a consumer (Mohamed *et al.,* 2013), this variable has been extensively studied in many papers related to e-commerce, in studies of e-commerce adoption has been significant in South Korea (Kim *et al.,* 2009), Colombia (Tavera-Mesías *et al.,* 2011), Taiwan (Chang & Zhu 2011), USA

(Karahanna, 2003;, Palvia, 2009), Russia (Kim *et al.,* 2016), Trinidad and Tobago (Mohammed & Tejay, 2017) and Spain (Escobar & Carvajal, 2014).

H10: Trust in the use of e-commerce positively affects the intension to purchase online in Colombia.

Perceived risk

These are the possible negative consequences derived from the use of the means of electronic purchase. Very significant negative relationships have been found with intention to purchase (Agudo-Peregrina *et al.,* 2014). This variable has been poorly studied in the adoption models since is preferred to examine its antagony, the trust; however, its negative significance was bought in the adoption of e-commerce by buyers in Taiwan (Chang & Zhu 2011) and Nigeria (Ayo *et al.,* 2011):

H11: The perceived risk in the use of e-commerce positively affects the intention to purchase online in Colombia.

Intention to purchase

The intention to purchase is the primary influencer on the use of a certain type of purchasing platform (Venkatesh *et al.,* 2003). Behavioral theories have directly related intention to use with the final use behavior, as intentions originate from the individual's attitude about something, which leads to a determined behavior (Fishbein & Ajzen, 1975).

H12: The intention to purchase online positively affects the use of online purchasing in Colombia.

Variables that precede trust

These variables refer to the direct perceptions of the use of the internet, information about the purchasing process, methods of payment and the management of confidential client information (Escobar & Carvajal, 2014), validated by Escobar & Carvajal (2014), Bonera (2011), San-Martín &Herrero (2012) and Mesías *et al* (2011).

Information quality

Information quality is a very important variable in the study of the adoption of web information related to decision making (Erkan & Evans, 2016). In particular, a user's perception that a website's information is complete and accurate with regards to his or her needs about products or services he or she is interested in purchasing or enjoying is very important (Kim *et al.*, 2008; Moon & Hwang, 2016).

H13: The informational quality of a website positively affects the perceived trust for electronic purchasing in Colombia.

Perceived security

The perception of perceived security protection combines various characteristics: authentication, protection, verification and encryption (Kim *et al.,* 2008). If users of a financial website perceive such factors, they tend to believe the site guarantees their security when performing online transactions (Escobar-Rodríguez & Carvajal-Trujillo, 2014). Prior studies in e-commerce directly relate perceived security with trust (Flavián & Guinalíu, 2006; Al-sharafi *et al.,* 2016; Kim *et al.*, 2008; Escobar-Rodríguez & Carvajal-Trujillo, 2014, (Mohammed & Tejay, 2017) and even with the anxiety derived from purchases conducted in online environments (Çelik, 2016).
H14: The security of the information on a website positively affects the perceived confidence for online purchasing in Colombia.

Perceived privacy

Defined as users' perceptions of a website during use, this is the perception that the security of an online transaction is controlled and protected against possible unauthorized uses (Yousafzai *et al.,* 2003; Fakhoury & Aubert, 2015; Kim *et al.*, 2008; Al-sharafi *et al.*, 2016):

H15: The perceived privacy of a website positively affects perceived trust for online purchasing in Colombia.

5.4 METHODOLOGY

Measurement tool

To contrast the hypotheses of the proposed model, concepts from the literature were used, and to avoid any problems in translating to Spanish, the measurement scale adapted from the study for the general adoption of e-commerce in Spain was used (Agudo-Peregrina, 2014). Additionally, to avoid any problems in comprehension due to language, a pre-test trial was conducted with a group of 50 internet users representing several Colombian cities to evaluate each of the questions, without major changes in the final proposed tool (Annex 1).

Sample and data collection

Being an exploratory study for the entire national territory of Colombia and because the majority of the country's population is concentrated in large urban cities, it was determined that the target population would be internet users who make non-specific online purchases (without discerning the type of product or service) from businesses in the country's principal cities, focusing on the following cities: Bogotá, Medellin, Cali and Barranquilla. A zone was generated for each city, integrating geographically and culturally similar cities. First, it was determined that a sampling by quotas be performed, considering as a primary condition that proportional data be obtained from each zone. According to data estimated by the National Statistical Department DANE (2016), zones 1,2 and 3 contained 77% of the Colombian population, also zone 1 contained 30% of the population, zone 2 27%, and zone 3 20%, zones 4 and 5 the remaining 21%, therefore, the sample has largely fulfilled with collecting the minimum quotas for each zone, although in the zones 4 and 5 few surveys were obtained due to the difficulty of covering field work in these regions. The secondary guidelines were that the genders of respondents be balanced and that the survey be circulated through all socioeconomic levels of the population, to avoid possible biases (Table 2).
The mechanism for data collection was an electronic questionnaire, validated in other studies for this type of research (Escobar-Rodríguez & Carvajal-

Trujillo 2014; Agudo-Peregrina, 2014). To facilitate the responses, a multi-item methodology per construct was followed, using Likert-type scales for the questionnaire answers, with a range from 1 (="I disagree strongly") to 7 (="I agree strongly"), as a way to efficiently measure variables that are not directly observable (Churchill and Iacobucci, 2004).
Data collection was conducted from November 2015 to May 2016. To achieve the study's objectives, a national team was formed with coordinators in each of the central cities to manage the dissemination of the questionnaire. Additionally, an incentive was offered for people who voluntarily responded to the questionnaire, awarding a laptop computer to the winner of a raffle held among all participants in the month of June 2016, in Bogotá. A total of 1,245 questionnaires were collected, of which 309 exhibited problems of consistency in the responses, thereby resulting in a final sample of 936 valid questionnaires;

The demographic results show a profile of e-commerce adopter in Colombia that is presented homogeneously between men and women, with ages mostly between 18 and 34 years old (75%), digital generations (millennials and digital natives), which have high educational level (83% have 2nd and 3rd cycle studies) and belong to average socioeconomic levels 44%, they are people who mostly live in couples by 83% and have experience in using the internet (97% use it daily), although in internet purchases 67% said to have experience as much of only 2 years, which prompts to infer that the experience variable should be considered of low character for the whole population and it is not necessary to make a moderation analysis since any result will be related to the low experience in its adoption; Likewise, moderation by gender tests (Venkatesh, 2003) were carried out following the theoretical line of the UTAUT theory but no differences to present were found in this study (Table 13).

Table 13. Sample characteristics

Demographic profile		Internet and e-commerce adoption profile
Gender:	Age:	Frequency of internet use:
Men 49%	18–34 years 75%	Once a week 3%
Women 51%	35–44 years 17%	Daily use 97%
	45–55 years 8%	
Education level:	Economic level (income**):	Experience using the internet:
Primary school 0%		
High school 17%	Very low 5%	More than 10 years 50%
Technical school 26%	Low 21%	5–10 years 40%
Undergraduate 41%	Middle 44%	1–5 years 10%
Postgraduate 15%	Upper-middle 19%	Less than 1 year 0%
	High 10%	
	Very high 2%	
Marital status:	Number in household:	Experience using e-commerce:
Single,	1 person 9%	
separated, widowed : 17%	2 people 18%	More than 2 years 40%
Married,	3 people 28%	1–2 years 27%
cohabitating :	4 people 55%	6 months–1 year 33%
83%	5 people 16%	
Location:		
Zone 1 (Antioquia, Caldas, Quindío Risaralda)		25%
Zone 2 (Bogotá, Boyacá, Cundinamarca)		38%
Zone 3 (Cauca, Valle del Cauca)		31%
Zone 4 (Atlántico, Bolívar, Cesar, San Andrés, Magdalena, Santander)		6%
Zone 5 (Arauca, Caquetá, Huila Meta, Nariño, Tolima, Vaupés)		1%

* Adapted from the stratification used in Colombia according to public sources.

5.5 DATA ANALYSIS AND RESULTS

Regression analysis of the latent variables used in this study was performed using the software SmartPLS 3.0, which is based on the technique of optimizing partial least squares, a multivariate technique recommended for testing exploratory structural models; it has also been used on other occasions to test the UTAUT model because of the large number of latent variables the model contains (Matute-Vallejo et al., 2015; Escobar-Rodríguez & Carvajal-Trujillo, 2014; Kiwanuka, 2015). The data analysis was performed in two stages: the first in which the measurement model was evaluated, and the second in which the structural model was examined for validity.

Table 14. Indicator weights

Indicator	Weight	t-value††
BI1	0.854	82.151
BI2	0.876	103.514
BI3	0.864	91.492
EE1	0.921	174.921
EE2	0.913	142.236
EE3	0.846	68.535
FC1	0.891	96.773
FC2	0.920	146.108
FC3	0.853	71.779
HM1	0.936	156.668
HM2	0.941	147.862
HM3	0.939	119.618
HT1	0.938	204.500
HT2	0.935	193.909
HT3	0.860	73.177
IQ1	0.913	138.450
IQ2	0.883	95.040
IQ3	0.924	160.150
PE1	0.917	157.203

PE2	0.891	107.264
PE3	0.856	70.927
PO1	0.838	60.642
PO2	0.877	85.379
PO3	0.898	116.504
PP1	0.936	162.257
PP2	0.888	66.681
PR1	0.887	13.960
PR2	0.892	13.612
PR3	0.924	21.432
PS1	0.916	152.480
PS2	0.891	99.981
PS3	0.866	63.470
PT1	0.903	106.886
PT2	0.920	148.263
PT3	0.906	137.255
SI1	0.919	117.121
SI2	0.930	159.024

* All items were significant with a p-value <0.001.

Table 15. Convergent validity of the indicators

Variables	Cronbach Alpha	Composite reliability	Average variance extracted (AVE)
Information quality (IQ)	0.892	0.933	0.822
Facilitating conditions (FC)	0.866	0.918	0.789
Trust (PT)	0.896	0.935	0.828
Effort expectancy (EE)	0.875	0.923	0.799
Performance expectancy (PE)	0.866	0.918	0.789
Habit (HT)	0.898	0.937	0.832
Social influence (SI)	0.830	0.922	0.855
Intention to purchase (BI)	0.831	0.899	0.747
Hedonistic motivations (HM)	0.933	0.957	0.881
Prices-saving orientation (PO)	0.841	0.904	0.759
Perceived privacy (PP)	0.802	0.909	0.833
Perceived risk (PR)	0.880	0.929	0.813
Perceived security (PS)	0.870	0.920	0.794

Validation of the measurement model

The process for validating the measurement instrument was performed as part of the exploratory analysis. The first step was to establish convergent and discriminant validity of the constructs and the confidence of each item. The convergent validity of each construct was acceptable, as they all have weights greater than 0.505 (Hair et al., 2016). The individual confidence of each item was measured using the correlations of the weights of each item against each variable; Table 3 verifies that the weights for each indicator were significant, and thus, all were validated. To measure the internal coherence of the measurement of all the indicators in relation to their corresponding variables, validation included the use of Dillon-Goldstein's rho, known as the coefficient of composite reliability, in which all the values are greater than the minimum acceptable value of 0.70 (Gefen *et al.,* 2000). Cronbach's alpha test was also used, obtaining values that were also greater than 0.70, the minimum allowed for confirming studies (Churchill & Iacobucci, 2004). Finally, the convergent validity was analyzed again, accounting for variance, i.e., there is a similar variance between the indicators and their construct, such that more than 0.50 of the variability should be explained by the indictors (Fornell & Larcker 1981) (Table 15). The discriminant validity was confirmed using a comparison between the value of the average variance extracted (AVE) for each variable and a correlation of each construct of the square of each variable, with the values obtained from the square root of the AVE being greater than those from the constructs; thus, each variable is considered to be more related to its own constructs than to the other variables (Fornell & Larcker, 1981) (Table 16). To complete the analysis of convergent validity, the Henseler-Ringle test was conducted (Table 17), with all values found to be less than 0.90 and therefore presenting discriminant validity (Henseler *et al.*, 2014).

Table 16. Discriminating validity of the indicators – Fornell and Larcker test

	IQ	AU	FC	PT	EE	ER	HA	SI	BI	HM	PO	PP	PR	PS
IQ	**0.907**													
AU	0.182	**1.000**												
FC	0.593	0.183	**0.888**											
PT	0.747	0.254	0.496	**0.910**										
EE	0.620	0.216	0.656	0.580	**0.894**									
PE	0.592	0.240	0.648	0.582	0.768	**0.888**								
HT	0.583	0.273	0.507	0.616	0.539	0.614	**0.912**							
SI	0.376	0.182	0.415	0.442	0.483	0.497	0.418	**0.925**						
BI	0.552	0.245	0.644	0.555	0.638	0.727	0.583	0.466	**0.864**					
HM	0.553	0.202	0.514	0.562	0.566	0.594	0.596	0.469	0.528	**0.939**				
PO	0.577	0.149	0.657	0.499	0.611	0.596	0.527	0.401	0.580	0.568	**0.871**			
PP	0.517	0.158	0.401	0.497	0.407	0.392	0.389	0.337	0.392	0.362	0.356	**0.912**		
PR	0.032	-0.062	0.143	-0.053	0.059	0.046	-0.068	0.054	0.096	-0.006	0.164	0.097	**0.901**	
PS	0.814	0.226	0.563	0.767	0.610	0.605	0.594	0.408	0.562	0.563	0.573	0.606	0.011	**0.89**

IQ: Information quality, AU: Use of e-commerce, FC: Facilitating conditions, PT: Perceived trust, EE: Effort Expectancy, PE: Performance expectancy, HT: Habit, SI: Social Influence, BI: Intention to purchase, HM: Hedonic motivation, PO: Prices-saving orientation, PP: Perceived privacy, PS: Perceived security.

Table 17. Discriminating validity of the indicators – Henseler-Ringle test

	IQ	AU	FC	PT	EE	ER	HA	SI	BI	HM	PO	PP	PR	PS
IQ														
AU	0.192													
FC	0.679	0.198												
PT	0.768	0.267	0.562											
EE	0.700	0.228	0.752	0.649										
PE	0.675	0.259	0.747	0.658	0.776									
HT	0.647	0.288	0.569	0.686	0.600	0.691								
SI	0.436	0.200	0.490	0.513	0.566	0.586	0.484							
BI	0.642	0.269	0.759	0.641	0.740	0.753	0.672	0.560						
HM	0.607	0.209	0.574	0.613	0.622	0.659	0.648	0.532	0.599					
PO	0.669	0.162	0.769	0.572	0.709	0.697	0.599	0.478	0.694	0.641				
PP	0.602	0.176	0.479	0.576	0.480	0.469	0.453	0.409	0.477	0.417	0.429			
PR	0.047	0.070	0.157	0.065	0.072	0.050	0.076	0.062	0.108	0.016	0.190	0.117		
PS	0.789	0.242	0.649	0.764	0.693	0.693	0.669	0.478	0.659	0.623	0.666	0.717	0.017	

IQ: Information quality, AU: Use of e-commerce, FC: Facilitating conditions, PT: Perceived trust, EE: Effort Expectancy, PE: Performance expectancy, HT: Habit, SI: Social Influence, BI: Intention to purchase, HM: Hedonic motivation, PO: Prices-saving orientation, PP: Perceived privacy, PS: Perceived security.

Validation of the structural model

Continuing with the structural model, a resampling was conducted using the bootstrapping technique. Using 1,000 sub-samples from the study data, a significance contrast was performed with the parameters of the model. On

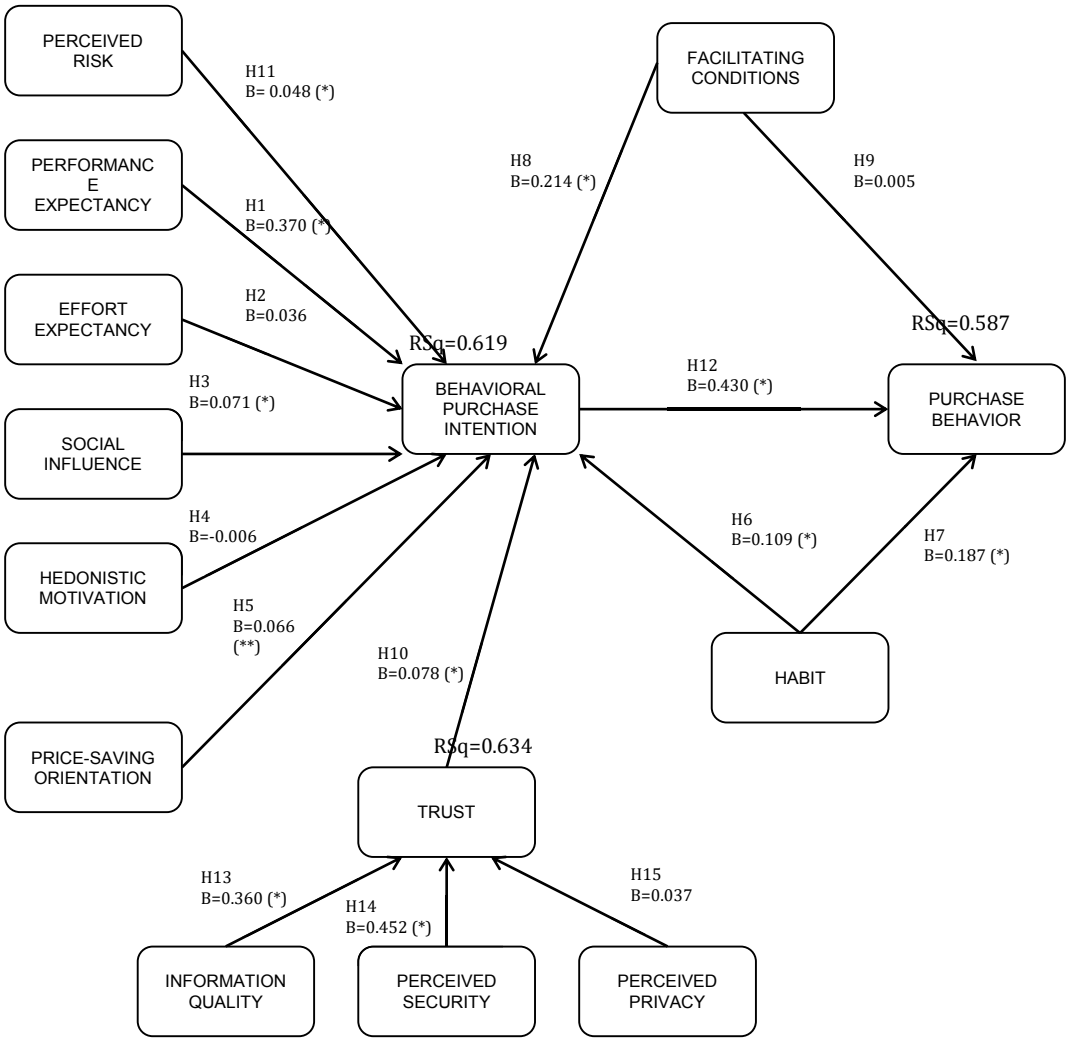
the basis that the model has fulfilled its predictive capacity by obtaining R-squared values greater than 0.10 (Hair *et al.*, 2016), the hypotheses were contrasted as follows. The basic hypotheses regarding the UTAUT relationships with respect to the intention to purchase online were validated (figure 2), with the exception of hedonistic motivations (H4: B=-0.006) and effort expectancy (H2: B=0.036). The variables with the greatest influence on the intention to purchase online in Colombia are, in order, performance expectancy (H1: B=0.370), facilitating conditions (H8: B=0.214), habit (H6: B=0.109), trust (H10: B=0.078), social influence (H3: B=0.071), orientation to low prices (H5: B=0.066) and perceived risk (H11: B=0.048) (Table 6), (Figure 11). With regards to the constructs of the use of e-commerce, the intention to purchase is shown to be decisively validated (H12: B=0.430), followed by habit (H7: B=0.087), and the effect of facilitating conditions was not validated (H9: B=0.005). Finally, the three constructs of the e-commerce trust variable demonstrate that Colombian consumers consider information security on the websites where they shop to be positive (H14: B=0.472), also positively influencing information quality (H13: B=0.360); perceived privacy remains at a very low level that is not considered to be significant (H15: B=0.037) (Table 18).

Table 18. Summary of the structural validity of the model

Hypothesis	Effect	Original Sample (O)	R squared	Standard Deviation (STDEV)	T Statistics (|O/STDEV)	P Values
H1 supported	performance expectancy -> intention to purchase	0.370*	Intention to purchase: RSq=0.619	0.043	8.682	0.000
H2 not supported	effort expectancy -> intention to purchase	0.036		0.040	0.890	0.373
H3 supported	social influence -> intention to purchase	0.071*		0.025	2.803	0.005
H4 not supported	hedonistic motive -> intention to purchase	-0.006		0.031	0.188	0.851
H5 supported	low prices -> intention to purchase	0.066**		0.037	1.802	0.072
H6 supported	habit -> intention to purchase	0.109*		0.033	3.310	0.001
H7 supported	habit -> electronic purchase	0.187*		0.056	3.363	0.001
H8 supported	facilitating conditions -> intention to purchase	0.214*		0.036	6.013	0.000
H9 not supported	facilitating conditions -> electronic purchase	0.005		0.046	0.109	0.913
H10 supported	trust -> intention to purchase	0.078*		0.029	2.705	0.007
H11 supported	perceived risk -> intention to purchase	0.048*		0.023	2.148	0.032
H12 supported	intention to purchase -> electronic purchase	0.430*	Purchase use: RSq=0.587	0.055	2.364	0.018
H13 supported	information quality -> trust	0.360*	Trust:	0.049	7.404	0.000
H14 supported	perceived security -> trust	0.452*	RSq=0.634	0.045	10.097	0.000
H15 not supported	perceived privacy -> trust	0.037		0.027	1.389	0.165

* p <0.001, **p <0.005

Figure 11. Validated Model



5.6 DISCUSSION

Theoretical contribution

The objective of this study has been to describe the adoption of e-commerce within Colombia, applying the UTAUT model and aggregating three variables considered to be predictors of trust in electronic purchasing, as stated in the literature, with the aim of better understanding this dynamic. As a principal contribution, the model has been able to explain to a great extent the relationships between the intention and use of electronic purchasing in Colombia; this is confirmed with the R-squared test for each variable explained, 0.610 for intention to purchase and 0.587 for use of purchasing, which is similar to previous studies (Al-Qeisi *et al.*, 2015; Riffai *et al.*, 2012; San Martín & Herrero, 2012; Venkatesh *et al.*, 2012; Escobar-Rodríguez & Carvajal-Trujillo, 2014; Agudo-Peregrina, 2014). Adoption in general or for specific purchases using e-commerce has been described, confirming the relationships between the constructs that impact this relationship, which is of great importance to better understand the development of this commercial channel in Colombia, given the lack of scientific study in this line of research for Colombia and similar countries (Mesías *et al.,* 2011; Sánchez-Torres & Arroyo-Cañada, 2016). Thus, this study confirms that in the case of Colombia, the performance expectancy is validated as being one of the most important variables and contrasts the most with previous studies (Çelik & Yilmaz, 2011; Kim *et al.,* 2009). Another classic construct, effort expectancy, was not validated and exhibited a very low influence value. This result has appeared in previous analyses, suggesting that it is only significant when adoption of the technology is new and the users have very little or scarce experience with it, such that as electronic consumers gain experience with an innovation, this factor loses importance (Venkatesh et al., 2003; 2012). In the Colombian case, according to the sample data, 67% of consumers have more than a year of experience purchasing online, thus explaining why this variable is not significant (Table 2); that is, the Colombian population is in a state of early development in e-commerce, generating that this variable is not significant, something that also ocurred in studies carried out in developing countries of this commercial channel, like Pakistan (Abbassi *et al.,* 2011), Malaysia (Delafrooz *et al*., 2011), Thailand

(Kanchanatanee *et al.,* 2014), Jordan (Al-Qeisi & Abdaliah, 2013), Oman (Riffai *et al.,* 2012) and Nigeria (Ayo *et al.,* 2011).

Subsequently, social influence, a variable identified in various empirical relationships in the literature (Al-Maghrabi & Dennis, 2011; Kim *et al.,* 2009; Musleh *et al.,* 2015), has been positively validated in this study as impacting electronic purchasing. However, the value of the impact is low, possibly also due to what Sánchez-Torres & Arroyo-Cañada (2016) proposed: this construct will tend to lose importance as the consumer gains experience. Thus, the same reason explained in the previous example may also hold as the Colombian electronic consumer already has a certain degree of experience in purchasing online. For their part, facilitating conditions have been validated for the intention to purchase in various studies on electronic purchasing (Tan *et al.,* 2013; Escobar-Rodríguez & Carvajal-Trujillo, 2014; Venkatesh *et al.,* 2012). For this study in particular, the direct relationship to the intention to purchase is in accordance with previous literature, demonstrating that Colombian consumers have a mastery of the technology that refers to the necessary conditions to make internet purchases. A direct relationship to the use of internet purchasing has been insignificant, with the same result occurring in previous studies without an explanation for the cause (Agudo-Peregrina, 2014). One factor that some authors consider, which is not adequate to measure the adoption of e-commerce, is habit, due to internet purchasing behavior not being something that can be simplified to an automatic behavior (Agudo-Peregrina, 2014). Nevertheless, and validated by Venkatesh *et al.* (2012), in the Colombian context, habit has been positively validated both for the intention to purchase and for the purchase itself. This may be due again to the Colombian consumer already having experience in the use of this commercial channel and considering it to be useful. This analysis is endorsed by Rogers (1995), relating experience and common use of a new technological innovation within a society. Subsequently, the factors specific to the nature of non-physical purchasing, such as perceived risk and trust, were positively validated. First, Colombian consumers perceive risk in internet purchasing, but they do not consider risk as a negative factor, possibly because they may believe it to be minimal. Therefore, the results obtained are contrary to what the literature suggests in terms of risk being a negative effect confronting the intention to purchase electronically (Wei *et al.,* 2011; Agudo-Peregrina, 2014). With regard to trust, the results are in

accordance with prior empirical studies (San Martín & Herrero, 2012; Escobar-Rodríguez & Carvajal-Trujillo, 2014). With regard to the three additional variables that compose the perception of trust in the use of e-commerce, characterized by a high predictive level according to the R-squared value (R=0.634) of the dependent variable, the information quality and perceived security were validated in accordance with the study of a Colombian zone conducted by Mesías *et al* (2011), with perceived privacy not being significant in generating trust in electronic purchasing. This could be because although commercial websites in Colombia are prepared to offer adequate online sales and post-sales services, users distrust the use of their confidential information. A novel factor in the UTAUT models is the low-price aspect of purchasing as a possible construct of e-commerce (Escobar-Rodríguez & Carvajal-Trujillo, 2014; Bukhari *et al.,* 2013), due to the consumers having the ability to find better prices compared to other commercial channels. For the Colombian case, this was positively validated; thus, it can be concluded that low online prices positively impact electronic purchasing in the country. To finalize the theoretical contrast of the model tested, the factor of hedonistic motivations—sensations associated with online purchasing that allow the consumer to increase his/her knowledge of his/her tastes, which generates a sense of enjoyment (Agudo-Peregrina, 2014)—was determined to be neither significant nor strong in this study. This may be due to e-commerce being novel in this country, and therefore, it does not yet offer all the possibilities of the sales and diversity offered in more developed countries such as those in North America, Europe or Southeast Asia and China, which are experiencing disruptive actions in terms of innovative business models in online environments (Wang *et al.,* 2012).

Practical, business and theoretical contribution

This study presents very valuable information about consumer behavior in Colombia at the country level. Governments can use the results for each of the constructs that influence e-commerce with the aim of invigorating the sector and fomenting its use among a nation's entire population. However, because demographic data show current e-commerce users to be young people with a high level of income and education, this is an indication that not all population groups have access to e-commerce platforms, as evidenced

by poverty and digital gaps (Table 2). Additionally, actions such as developing policies to improve the security of electronic purchases, diversifying online payment methods and establishing standards for e-commerce are greatly needed to generate more trust in the use of this commercial channel.

With regards to businesses, this study allows them to establish a strategy for the needs of the electronic consumer, developing a clear profile of consumers who use this commercial channel; thus, businesses should consider, as commercial objectives, offering websites that are easy to use, that complement the purchasing experience, that offer a variety of products and services at competitive prices compared to traditional channels and that improve the perception of trust, especially in what relates to managing clients' confidential information. Furthermore, it is relevant to consider that technology also functions as a social system, insofar as it may use algorithms to recommend products and services to the consumer (Wang *et al.,* 2015).

Finally, for the research line in e-commerce adoption, this study has allowed to present a grouping of the majority of technological adoption variables derived from the UTAUT and UTAUT 2 model, broadly analyzing the adoption of e-commerce in a developing country and one of the most representative of the Latin American region in development of this commercial channel.

Limitations and future lines of research

The principal limitation of this study was that the sample did not include adequate proportions of the population that were middle- and senior-aged; thus, it was not possible to know whether this older segment of the population shares the same characteristics as the younger people who compose the majority of the participants of this study. Similarly, there is another possible bias related to the economic and education level of participants, as the data collection was conducted at universities with a high participation rate of people who belong to these communities and share the same type of characteristics (Table 2).

Finally, In future studies, the model requires evaluation of the influence of other apparently exogenous needs and variables, such as the anxiety that online purchasing environments can generate (Çelik, 2016). Additionally, it is pertinent for future research to approach the differences between the

purchase of products and services in this context, given their differences (Moon & Hwang, 2016). Furthermore, the role of technology should be investigated, as it is a system of recommendation that can also play a social role within the model (Wang *et al.,* 2015).

Annex 2. Questionary adoption B2c

Construct	Ítem	Author
(AU) Use of adoption (purchase on the internet)	AU1. AU1. How many times during the last year have you bought online	Venkatesh (2012) Escobar & Carvajal (2014)
(BI) Purchase intent on the internet	BI1. I intend to use the internet to buy something in the next days BI2. In the future, I would buy something online. BI3. I prefer to buy online than traditional channels	Venkatesh (2012) Venkatesh (2012) Escobar & Carvajal (2014)
(PE) Performance expectations	PE1.In general, I think buying online is very useful. PE2. In general, I think that buying online gives me advantages over traditional ways of buying (physically buying from a store) PE3. In general, I think that buying online does not take away much time when I do the operation.	San Martín & Herrero (2012) Venkatesh (2012) Escobar & Carvajal (2014)
(EE) Expectations of effort	EE1 In general, I think buying online is easy and simple. EE2. In general, I think buying online allows me to do it my way, I am the one who handles the purchase (time, moment, etc.) EE3. Overall, I think buying online does not require a lot of learning to do it.	San Martín & Herrero (2012) Venkatesh (2012) Escobar & Carvajal (2014)
(SI) Social influence	SI1. Important people in my life like my family and friends recommend me to buy online. SI2. Other people I know (like my	Venkatesh (2012) San Martín & Herrero (2012)

	colleagues or bosses, for example) recommend that I buy online. SI3. If a leader or influential person suggests I buy online, I probably will.	
(FC) Faciliting conditions	FC1. I have what it takes (computer, internet connection, credit card or other payment method, etc.) to make an online purchase. FC2. I have the necessary knowledge to carry out the entire process of buying online (enter the web, browse, buy and pay online) FC3. Usually, on the websites where I buy, I have help or support when there are problems during the purchase.	San Martín & Herrero (2012) Venkatesh (2012) Escobar & Carvajal (2014)
(HM) Hedonic motivations	HM1. Overall, I think shopping online is fun HM2. In general, I think buying online is pleasant HM3. Overall, I think shopping on the internet is amusing	Venkatesh (2012) Escobar & Carvajal (2014)
(PO) Prices-saving orientation	PO1. Overall, I can save money if I buy online for a cheaper price than anywhere. PO2. I like to find the cheapest price when I make an online purchase PO3. In general, I prefer to buy online when the price is cheaper than buying it in a store	Escobar & Carvajal (2014)
(HT) Habit	HT1. The use of the internet to make purchases begins to be habitual for me HT4. Internet use for shopping is normal for me. HT3. The use of internet to make purchases is necessary for me.	Venkatesh (2012) Escobar & Carvajal (2014)
(TI) Innovative personality	TI1. When a new technology comes out I like to know about it, and if I can, I will use it TI2. I consider myself always of the	San Martín & Herrero (2012)

	firsts to know and use new technologies	
	TI3. I always like to know about new technology launches	
		Agudo-Peregrina (2014)
(PR) Perceived risk	PR1. In general, I think buying online is risky	
	PR2. In general, I think paying with electronic means (credit and debit cards) is dangerous	
	PR3. In general, I think that there is a possibility that buying online can cause problems with the outcome of the purchase	
		Agudo-Peregrina (2014)
(PT) Perceived trust	PT1. In general, I think internet sellers are trustworthy	Escobar & Carvajal (2014)
	PT2. In general, I think that internet sellers keep their promises and commitments.	
	PT3. In general, I think internet technology is reliable to make a purchase.	
(IQ) Web quality	IQ1. In general, I consider that online sellers inform me in a complete way about the purchase process and my final purchase.	Agudo-Peregrina (2014) Escobar & Carvajal (2014)
	IQ2. In general, I consider that the websites where I have bought online are easy to navigate, and its content allows me to know in a detail and precise way all the information of their products and services.	
	IQ3. In general, I consider that online sellers offer me true and updated information about their products or services.	
(PS) Perceived security	PS1. In general, I consider that online sellers have a secure website to make the purchase (secure payment methods)	Agudo-Peregrina (2014) Escobar & Carvajal (2014)
	PS2. In general, I believe that online sellers guarantee on their website that during the purchase process does not interrupt or not lose the	

	information of the purchase, allowing you to finish it successfully. PS3. In general, I believe that internet sellers securely store and handle my personal information.	
(PP) Perceived privacy	PP1. I am aware that internet sellers will not use my personal information for their business interests without my authorization. PP2. I am aware that internet sellers will exchange my personal information with others with my authorization. PP3. I have knowledge that I may be a victim of misuse of my personal data on account of hackers, due to the use of the internet.	Agudo-Peregrina (2014)

Source: by authors

CHAPTER 6. ADOPTION OF E-GOVERNMENT IN COLOMBIA: THE IMPORTANCE OF GOVERNMENT POLICY IN CITIZENS' USE OF E-GOVERNMENT ‡‡

‡‡ Artículo en revisión en: Journal Technology in Society (Dec. 2017)

6.1 ABSTRACT

Purpose – This article aims to describe the key e-government adoption factors for the citizens of Colombia to determine whether government policies aimed at the use of the Internet as a mechanism for direct communication between citizens and the state are effective.
Design/Methodology – A comprehensive model based on the technology acceptance model theory is proposed, while also introducing the variable of government support. A total of 445 surveys were collected across the country using the Internet; the data analysis was conducted through structural equation modelling using PLS 3.0 software.
Results – The results show that performance expectations, as well as governmental support and trust, have a great influence on the adoption of e-government; the results confirm that citizens value the policies on virtual connectivity with their public institutions that are being implemented, though the construct of effort expectancy is not validated.
Implications of the research / limitations – This research is one of the first studies in Latin America on the adoption of e-government that proposes a model adapted from technology acceptance theories, and therefore, it is of an exploratory nature.
Practical implications – This research is a contribution to public officials and politicians in helping understand the needs of citizens regarding the use of government Internet platforms.
Innovation/Value – A model adapted from the unified theory of the acceptance and use of technology (UTAUT), with the addition of the government support variable, is presented, generating an important model for examining the development of this public virtual channel.

Paper type – research article

Keywords – Service operation management, citizen, e-government, e-marketing, UTAUT, Colombia

6.2 INTRODUCTION

E-government can be defined as a phenomenon that combines the use of information technologies and the Internet with a virtual system of interaction between leaders and citizens (Córdoba-pachón & Orr, 2009). The recent improvements in information and communication technologies (ICTs) have enabled governments to take advantage of these resources to optimize services and communication with citizens and companies, generating benefits such as reduced processing times, direct payment of taxes, and reduced time on information campaigns for citizens, among others (Nasri & Abbas, 2015).

The studies on the adoption of e-government are new, with various lines of research related to digital government development. Choi et al. (2016) propose five factors on which research should focus. The first is “strategy", referred to as the process in which a government sets objectives for on-line government development; hence, political commitment is a factor that directly influences the possibility of applying and achieving the implementation strategy. The second line of research is "technology", given that the information system must be supported by a specific technological capability; in this regard, an analysis of aspects such as information quality, security, and privacy will be conducted. Similarly, the third line of research is "organization", namely, how the nature of public administrations influences the manner in which on-line government is implemented; aspects such as the formal and informal relations within and outside the organization are key factors in the development of such government. The fourth factor to consider is "people", studying their behaviour or willingness to adopt and use the system as well as their special characteristic as citizens that enables them to influence the sustainability of online government and improve its effectiveness. Finally, the "environment" of each country must be considered because the development of the physical and institutional infrastructures are different for each country and the internal digital gap significantly affects the development of on-line government (Al-sharafi, 2014).

Therefore, the behavioural factors of the individual such as perceived trust, security, or the tools and benefits that users hope to obtain (effort and performance expectancy), in addition to extrinsic factors such as government

policy, the environment, and the system, motivate the use of G2C (Alghamdi, Nguyen, & Jones, 2013; Faaeq, Alqasa, & Al-Matari, 2014; Fakhoury & Aubert, 2015; Gilbert, Balestrini, & Littleboy, 2004; Meftah, Gharleghi, & Samadi, 2015).

The latest reports from the Ministry of Information and Communications Technologies in Colombia indicate the development of a strategy called "online government", which is designed to "contribute to the construction of a more efficient, transparent, and participatory state that provides better services through the use of information and communications technologies" (Hernandez & Arenas-Pinto, 2014; Nations United, 2014). The data show that 100% of public entities have a web page that at least provides basic information to citizens, placing Colombia within the top 50 countries worldwide in e-participation, that is, with a government that provides online information of interest to citizens, web-based educational resources, access to online services, and virtual citizen participation (Nations United, 2014).
However, there is little evaluation of how citizens are adopting online government. Therefore, the main objective of this study is to describe the adoption of online government by Colombian citizens, with the purpose of verifying what variables have a positive effect on its use; more precisely, the following objectives are presented:

1) To examine, based on the basic unified theory of the acceptance and use of technology (UTAUT) model, the context of the intention and use of online government by the citizens of Colombia; and
2) To test in an exploratory manner whether government policy has a positive effect on the intention or use of online government in this country.

6.3 MODEL CREATION

Technology acceptance models

The study of the adoption of online government is new and has focused on identifying which are the crucial elements that make a citizen use online government (Meftah et al., 2015). The most used predictive models have

been the theories of technology usage behaviour. The technology acceptance model (TAM) (Davis, 1993) integrates the perceived usefulness variables as precedents of the perceived ease of use, and both have a direct effect on attitude, which affects usage intention. Venkatesh et al. (2003) integrate the theories of technology acceptance under the UTAUT and ultimately propose seven antecedents that affect the intention to use Internet technologies: performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivations, low prices, and habit (Venkatesh et al., 2012).

Several authors have applied the UTAUT model to study the adoption of online government by citizens at the country level; it makes it possible to know in more detail the factors that mostly influence the adoption of a new technology (Kiwanuka 2015; Williams, Michael-D., Rana, Nripendra-P., & Dwivedi 2015). This model has been validated specifically for online government in countries such as Iraq, where the variables of trust and social influence are highly validated in the adoption of online government (Faaeq et al., 2014), and India, where the variable of web customization is also proposed as a factor that generates e-government use (Krishnaraju, Mathew, & Sugumaran, 2016).

Based on the above, the following hypotheses are proposed:

Trust perception

According to Gilbert et al. (2004), trust perception is one of the major precedents of the adoption of e-government due to the public nature of the services offered on the governmental web pages. The reason is that citizens convey their trust in the government to the perception of trust in the use of online government, which then affects the value of the security in handling confidential information, the quality of information, and privacy that citizens may perceive (Fakhoury & Aubert, 2015).

H1: Trust perception has a positive effect on e-government usage intention in Colombia.

Effort Expectancy

This factor is defined by Viswanath Venkatesh et al. (2003) as the degree of ease associated with a system. In the case of online government, it can be defined as the citizens' perception of the ease of Internet government services (Nasri & Abbas, 2015), and it is one of the major precedents of online government usage intention in various studies (Faaeq et al., 2014; Fakhoury & Aubert, 2015; Nasri & Abbas, 2015; Suki & Ramayah, 2010)

H2: Effort expectancy has a positive effect on online government usage intention in Colombia.

Performance expectancy

Performance expectancy is defined as the perception of the future benefits of using a technology that is held by the user (Venkatesh, V., Thong, James. Y., Xu, 2012). In the case of online government, in several studies on the adoption of online government, it has been extensively validated that citizens believe that the use of online government provides benefits to them (Nasri & Abbas, 2015; Suki & Ramayah, 2010).

H3: Performance expectancy has a positive effect on online government usage intention in Colombia.

Social influence

This factor is defined as the extent to which an individual is influenced by other members of society in regard to his or her intention to use a system (Venkatesh et al., 2012). This variable shows this behaviour when the technological system is new in society, and as a result, its dissemination is accelerated though this channel (Rogers, 1995). However, there are studies in which its significance is lost when such innovation ceases to be novel and becomes known or common within society, at which point individuals may disregard the views of others with regard to its use (Sánchez-Torres & Arroyo-Cañada, 2016). In the e-government adoption study in Kuwait, social influence is significant in intention and usage (Nasri & Abbas, 2015).

H4: Social influence has a positive effect on online government usage intention in Colombia.

E-government usage intention

Behavioural theories have directly related use intention to the ultimate usage behaviour, though the intentions arise from the individual's attitude towards something, which leads to a certain behaviour (Fishbein & Ajzen, 1975b).

H5: E-government usage intention has a positive effect on online government use in Colombia.

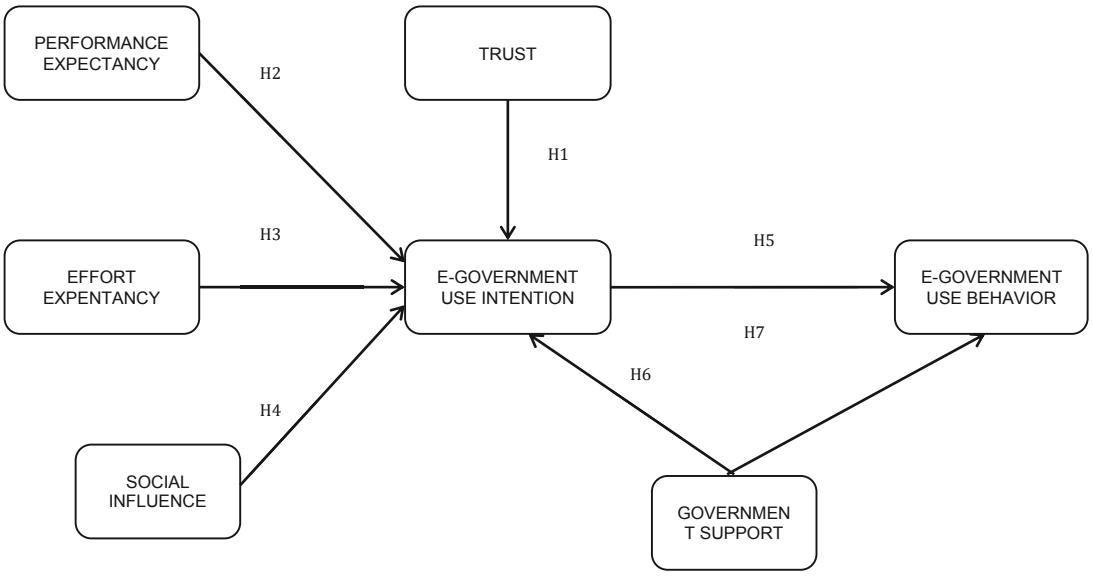
Government policy

Government policy refers to citizens' perception of the effect of government policies aimed at promoting Internet and ICT use and its positive effect on the intention to use the Internet for shopping, transactions, etc. (Ghobadi & Ghobadi, 2013; Landau, 2012; White et al., 2011). No empirical studies on its direct influence on the adoption and use of e-government have been found; however, there are studies from Southeast Asia on its effect on electronic banking, such as the study by Tan and Teo (2000; Chong et al., 2010). Additionally, the public nature of e-government requires governments to establish sectoral policies that allow the development and dissemination of the Internet within their society (Nations United, 2014), and consequently, the positive or negative perception of these actions held by citizens can directly influence e-government participation and use.

H6: Government policy has a positive effect on online government usage intention in Colombia.

H7: Government policy has a positive effect on online government usage in Colombia.

Figure 12. Proposed model



6.4 METHODOLOGY

Sample and data collection

An empirical study was conducted for the entire territory of Colombia. The data collection mechanism was an electronic survey because it is a mechanism that has been effectively validated in other studies (Agudo-Peregrina, 2014; Escobar-Rodríguez & Carvajal-Trujillo, 2014). To facilitate responses for each construct, the multi-item methodology was followed, using Likert scales for the answers to the survey; the scales range from 1 (="I strongly disagree") to 7 (="I very much agree") to effectively measure the variables that are not directly observable (Churchill & Iacobucci, 2004).
The data collection occurred from November 2015 to May 2016. To achieve the fieldwork objectives, a national team was formed, with coordinators in each of the central cities to manage the distribution of the survey. A total of 490 surveys were collected, of which 45 had consistency problems in the answers, thus leaving a final sample of 445 valid surveys. The most important characteristics of the sample are as follows: it was distributed equitably between men and women; 70% of the respondents were between 18 and 34

years of age; 88% had a high school or undergraduate degree; and 79% had an income level of medium or higher (Table 19).

Table 19. Sample characteristics

Demographic profile				Internet and e-commerce acceptance profile
Gender:		Age:		Experience using the Internet:
Male	56%	18-34 years		
Female	44%	66%		More than 10 years 55%
		35-44 years		Between 5 and 10 years 45%
		22%		
		45-55 years		
		12%		
Education level:		Economic		Location:
Primary	0%	status		Zone 1
High School	11%	(income[§§]):		(Antioquia, Caldas, Quindío, Risaralda)
Technical	27%	Very low	3%	23%
Undergraduate	40%	Low	18%	Zone 2
Graduate	22%	Medium		(Bogotá, Boyacá, Cundinamarca)
		45%		44%
		Medium-High		Zone 3
		20%		(Cauca, Valle del Cauca)
		High		26%
		12%		Zone 4
		Very High		(Atlántico, Bolívar, Cesar, San Andrés,
		2%		Magdalena, Santander) 5%
				Zone 5
				(Arauca, Caquetá, Huila Meta, Nariño,
Marital Status:				Tolima, Vaupés) 2%
Single, separated, widowed	61%			
Married, civil union	39%			

[*] Adapted from the stratification used in Colombia according to public sources.

Data analysis and results

The regression analysis of the latent variables used in this study was conducted using Smart-plus 3.0 PLS software, which is based on the optimization of the partial least squares (PLS) method, a multivariate technique for testing structural models that is recommended in exploratory models (Escobar-Rodríguez & Carvajal-Trujillo, 2014; Kiwanuka, 2015; Matute Vallejo et al., 2015). The data analysis was conducted in two stages: the first stage estimated the measurement model, whereas the second stage examined whether the structural model is valid.

Table 20. Indicator loading

Indicator	Loading	t-value*
(B15) <- e-government usage intention	0.937	226.804
(BI25) <- e-government usage intention	0.960	109.565
(BI35) <- e-government usage intention	0.965	172.376
(EE15) <- effort expectancy	0.961	162.282
(EE25) <- effort expectancy	0.953	62.156
(EE35) <- effort expectancy	0.957	83.988
(PE15) <- performance expectancy	0.954	63.207
(PE25) <- performance expectancy	0.949	51.748
(PE35) <- performance expectancy	0.958	136.743
(PT15) <- trust	0.948	136.360
(PT235) <- trust	0.958	87.439
(PT25) <- trust	0.941	246.806
(SI15) <- social influence	0.934	213.168
(SI25) <- social influence	0.938	210.118
(SI35) <- social influence	0.832	122.314
GS12 <- government policy	0.902	104.844
GS2 <- government policy	0.942	198.713
GS3 <- government policy	0.875	55.464

*All items were significant at p-value <0.001.

Validation of the measurement model

The validation process of the measurement instrument was performed through an exploratory analysis; the first step was to establish the convergent

and discriminant validity of the constructs as well as the reliability of each item. Because all constructs have loadings of more than 0.505, the convergent validity of each was acceptable (Table 20) (Hair *et al.,* 2014). The reliability of each item was measured by the correlations of the loading of each item against each variable; Table 21 shows that the loading of each indicator was significant, validating all of them. The internal consistency of the measurement of all of the indicators in relation to their corresponding variables was measured using Dillon-Goldstein's rho, which is known as the composite reliability coefficient, and all of the values were greater than the minimum acceptable value of 0.70 (Gefen et al., 2000); the test of Cronbach's alpha was also applied (Table 21), obtaining values above 0.7, which is the minimum allowable value for confirmatory studies (Churchill & Iacobucci, 2004). Finally, the convergent validity was analysed once more taking into account the variance; that is, there needs to be a similar variance between the indicators and their construct, and therefore, it must be greater than 0.50 of the variability explained by the indicators (Fornell & Larcker, 1981).

The discriminant validity was verified by comparing the average variance extracted (AVE) value of each variable with the correlation of each construct of each variable squared, and the values obtained from the square root of the AVE were higher than those of the constructs; consequently, it can be considered that each variable is related more strongly to its own items than to those of the other variables (Fornell & Larcker, 1981) (Table 22).

Table 21. Convergent validity of the indicators

Variables	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
trust	0.945	0.964	0.900
effort expectancy	0.954	0.970	0.916
performance expectancy	0.950	0.968	0.910
social influence	0.887	0.930	0.815
e-government usage intention	0.951	0.968	0.910
government policy	0.892	0.933	0.822

Table 22. Discriminant validity of the indicators – Fornell & Larcker test

	trust	effort expectancy	performance expectancy	social influence	e-government usage intention	government policy	e-government use
trust	**0.949**						
effort expectancy	0.726	**0.957**					
performance expectancy	0.714	0.728	**0.954**				
social influence	0.665	0.645	0.579	**0.903**			
e-government usage intention	0.650	0.598	0.793	0.517	**0.954**		
government policy	0.319	0.340	0.308	0.261	0.304	**0.907**	
e-government use	0.123	0.146	0.123	0.186	0.075	0.131	**1.000**

6.5 RESULTS

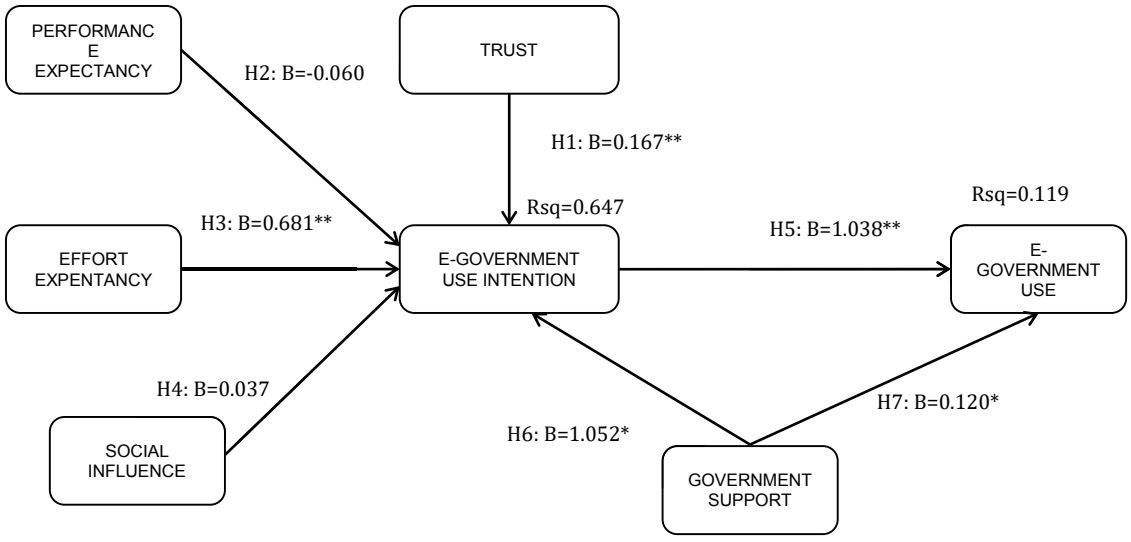
Continuing with the structural model, a resampling was performed using the bootstrapping technique and 1,000 sub-samples from the survey data to contrast the significance of the model parameters; all of this was performed on the basis that the model has achieved its predictive capacity because the R squared values were greater than 0.10 for the two explained variables (Hair et al., 2014). Thus, Hypothesis 1 (H1: R=0.167) is positively validated, and therefore, perceived trust directly affects online government usage intention. Hypothesis 2 (H2: B=-0.060) is not validated because effort expectancy has no impact on online government usage intention. Hypothesis 3 (H3: B=0.681) is accepted, with a high positive effect of performance expectancy on online government usage intention. Hypothesis 4 (H4: B=0.037) is not significant for social influence on online government usage intention. Hypothesis 5 (H5: B=0.138) is positively validated, and therefore, online government usage intention directly affects the ultimate use of online government. Hypothesis 6 (H6: B=1.052) is significant, and government policy has a positive effect on online government usage intention. Hypothesis 7 (H7: B=0.120) is positively validated, with government policy having a positive effect on online government use (Table 23).

Table 23. Summary of the structural validity of the model

	Hypothesis	Effect	Original Sample (O)*	R squared	Standard Deviation (STDEV)	T Statistics (|O/STDEV)	P Values
H1	Accepted	Trust -> e-government usage intention	0.167**	e-government usage intention:	0.062	2.694	0.007
H2	Rejected	Effort expectancy -> e-government usage intention	-0.060	R=0.647	0.057	1.053	0.292
H3	Accepted	Performance expectancy -> e-government usage intention	0.681**		0.049	13.909	0.000
H4	Rejected	Social influence -> e-government usage intention	0.037	e-government use	0.041	0.898	0.369
H5	Accepted	E-government usage intention -> e-government use	0.138**	R=0.119	0.049	2.784	0.013
H6	Accepted	Government policy -> e-government usage intention	0.152*		0.031	1.969	0.049
H7	Accepted	Government policy -> e-government use	0.120*		0.050	2.398	0.017

Notes: Significant at *p<0.05, t-value 1.960; **p<0.01, t-value 2.576

Figure 13. Validation of the model



6.6 CONCLUSIONS

The objectives of this study were, first, to examine, based on the basic UTAUT technology acceptance model, the context of the intention and use of online government and, second, to test in an exploratory manner whether government policy has a positive effect on the intention or use of online government.

The results of the empirical model show that although the UTAUT technology acceptance model has two variables (effort expectancy and social influence) that were not significant, the model made it possible to positively validate the variables that, in the previous literature, have a direct impact on the adoption of e-government. Consequently, because citizens perceive that they can obtain subsequent benefits for using government portals on the Internet, the performance expectations are highly validated. In the Colombian case, it is affirmed that users perceive that the use of these tools is beneficial because it allows governmental bodies to have other channels of contact, relationship, and action with citizens. With regard to perceived trust, the results confirm that citizens trust the government web pages; this finding may be because public agencies offer web portals that provide citizens with the required levels of information quality, support in the processes, and a confidential and secure management of information.

In regard to the invalid results, there is a non-significant and also a negative result between effort expectancy and online government usage intention; contrary to most previous studies, this finding may be because citizens have difficulties using government web pages due to the web architecture or not being trained in how to use them, consequently leading to these results.

Following this line of non-significance, the social influence variable is also not significant; in this case, there are indeed other non-significant results in the literature for this variable in regard to models of adoption, given that it is mainly linked to the type of users. The non-significance is attributed to the profile of the users (when they are young people, they do not need the opinion of others to adopt) and also to the nature of e-government because, given that it is a public service and, in some cases, mandatory to perform procedures with the state, it can make social influence irrelevant.

Finally, this study has explanatorily tested the direct relationship between government policies for the development of the Internet and ICTs as well as the use and the adoption of online government by the citizens of Colombia; the result is that for both usage intention and the use of online government, users consider that government policies have a direct and positive effect. This result confirms that government programmes, such as the so-called "online government" that has been implemented over the last decade in Colombia, are recognized by citizens as being positive and influential for the adoption of online government.

The practical contribution of this article, first, lies in the fact that this exploratory model can initially describe to governments how online government is perceived by their citizens and inform them of possible major problems regarding government web pages to resolve. In this particular case, the Colombian government will need to pay attention why its citizens do not have an ease of use perception as an influential factor for the intention and use of online government. Second, it proposes the importance of examining citizens' perceptions of whether government policies to support the Internet and ICTs are being effective as influential factors in the adoption of online government.

The limitations of this study may be found in the exploratory model proposed because some variables that can more comprehensively predict the adoption of online government have been excluded. Similarly, whether the government web pages are actually performing successful processes in their services cannot be analysed. Because our model only describes the adoption of usage, the use of models for measuring web service quality, such as the SERVIQUAL model, is proposed as a future line of research (Zeithaml, Parasuraman, & Malhotra, 2002).

CHAPTER 7. CONSTRUCTION OF A DIGITAL DIVIDE INDEX FOR THE STUDY OF LATIN AMERICAN COUNTRIES[***]

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7.1 ABSTRACT

The digital divide is the inequality between individuals of a country in relation to Internet access and the use of information and communications technology. This article aims to analyse the digital divide in a number of Latin American countries to diagnose the weaknesses of the region and to identify the elements requiring improvement. Through the joint use of fuzzy subsets and distances, an index is proposed to measure the digital divide, which allows the ordering of the countries studied, from a set of variables related to the digital divide taken from the literature. The results confirm the dispersion of the digital divide in Latin America. The paper encourages governments in the region to look at their strategic policies to reduce the distance to the ideal level.

Keywords

Digital divide, fuzzy subsets, distances, Latin American, index

7.2 INTRODUCTION

For the first time in human history, since economic leaders have had to overcome multiple sources of friction to become the dominant economic force today, the development of trade is the story facilitating interaction and reducing costs (Zwillenberg, Field, & Dean, 2014); however, in this process not all regions develop in the same way, generating inequality, and different levels of economic development have a number of consequences for the global imbalance (Alex, Rodrigo, & Garabet, 2016). One of these gaps, the digital divide, is related to the disparities between regions and countries in the use of new technologies of communication and the Internet (TICs) and the differences in opportunities for the adoption of information and communication technologies presented by countries worldwide (Chang, Kim, Wong, & Park, 2015). In the most advanced countries, the common use of the Internet depends on individual preferences, interests or generational limits, while, in countries with low socioeconomic levels, it is the digital

divide that determines access to these technologies (Landau, 2012). The current acceleration of technological change and the slowdown of the regional economy presents a scenario called the second economy (digital), in which the full revolutions in consumption and production are becoming different (Katz, Agudelo, Bello, & Rojas, 2015).

Measurements of the digital divide are not unified. International organizations, such as the Organisation for Economic Co-operation and Development (OECD) or the International Telecommunication Union (ITU), take into account indicators of Internet use by the population under the effect moderator of socioeconomic levels, basically income and educational level (Peral-Peral, Arenas-Gaitán, & Villarejo-Ramos, 2015). However, the digital divide is a broader concept, which not only measures access to knowledge on the use of technology but also gives priority to measuring more fully the differences in access to and use of the Internet, having physical, economic, and social aspects (Jordán, Galperin, & Peres, 2010).

The last report by the Economic Commission for Latin America and the Caribbean (CEPAL) on information technology and the Internet by 2015 in Latin America indicated alarm about the disparity between regions regarding the adoption of the Internet. In the area Nicaragua has the lowest number of Internet users per capita and Chile the largest, with a gap between these two countries that increased from 31% in 2006 to 55% in 2013 (Katz et al., 2015). Other countries in the area, such as Paraguay, El Salvador, Honduras, and Guatemala, despite having high growth rates, remain at the bottom of the distribution, showing a large distance from the best-positioned countries, which are Chile, Argentina, and Uruguay. Only Ecuador, Colombia, the Bolivarian Republic of Venezuela, and the Plurinational State of Bolivia are maintained in media terms, but the growth of the whole area is poor, with five countries in which the population using the Internet does not exceed 30%, eight countries in which it does not exceed 50%, and only six countries in which the figure is greater than 50% (NU. CEPAL, 2015).

Other relevant information about Internet access in the area concerns access to the Internet via a fixed connection. In all of the above countries in 2014, the gap between access in urban areas and access in rural areas exceeded 10% on average; it was the largest in Brazil, Colombia, and Panama with over 30% followed by Chile, Costa Rica, Ecuador, Paraguay, Peru, and Uruguay with 20%. Highlighting another disturbing fact regarding the gap

between countries in the area, the percentage of rural households with Internet access in Costa Rica and Uruguay is greater than the percentage of urban households with access in the Plurinational State of Bolivia, Guatemala, and Salvador. Meanwhile, inequality in Internet access shows Ginni coefficient difference values between 0.1 and 0.5 (total households with Internet/total households), the lowest being in Uruguay with only 0.13 points and the highest being in Colombia with 0.46. A driving factor of Internet use in the region is the high growth rate of mobile broadband, because of its diversity and affordability with the use of mobile telephony, which introduced in 2013 an average of 30% penetration in Latin America, with annual growth of 22% compared with 5% for fixed broadband. The gap between countries in the area is small, and the largest difference, between Uruguay (highest penetration) and Honduras (lowest penetration), is 20.2% (NU. CEPAL, 2015). In terms of unequal access to the Internet due to the socioeconomic level, it is apparent that within each country the number of households with Internet access in the richest quintile of the population (quintile V) is greater than 5 to the equivalent number of households in the poorest quintile (quintile I) in countries like Argentina, Brazil, Colombia, Uruguay, and the Bolivarian Republic of Venezuela. As worrisome cases, this figure is 14 times worse in Ecuador or Bolivia and more than 50 times worse in Paraguay and Peru (Katz et al., 2015). To end this scenario, it is emphasized that in recent years Latin American governments have encouraged informal access to ICT services and the Internet, focusing on policies for broadband infrastructure, market liberalization and changes in the regulation of the sector with the objective of promoting a reduction in the digital divide.

This paper aims to propose an index to measure the international digital divide in aggregate, offering a model of international indicators that can provide an overview of the distances between Latin American countries and the distances between these and the rest of the world. More specifically, it is intended, firstly, from the aggregate indicators proposed in the literature, to generate an index of international Internet adoption and, secondly, by applying the fuzzy theory, to propose a method for calculating the digital divide by assigning weights to each item value of the index, offering an alternative method of analysis.

7.3 MEASURES OF THE DIGITAL DIVIDE

Several authors in the literature have evaluated the digital divide, but the methods have varied in the measurement variables and concepts used. Early studies analysed the digital divide through four concepts: motivational access, material access, skill access, and usage access (van Deursen & van Dijk, 2013; van Dijk & Hacker, 2003). Motivational access refers to the wish to have a computer and to be connected to information technology (IT) (Ghobadi & Ghobadi, 2013); material access concerns the lack of technological infrastructure and possibilities to access it; skill access includes operational skills (software and hardware), information skills (the ability to process information), and strategic skills (strategic applicability of use for the individual and social good); and, finally, usage access is largely linked to the demographic characteristics of users and connections (van Dijk, 2006). The model of "access gaps" should be taken into account. Subsequent authors grouped the analysis of the digital divide into three states (Dewan & Riggins, 2005; Wei, Teo, Chan, & Tan, 2011). The first initial level of access to IT is software and hardware access; from this perspective the digital divide is caused by two types of factors, technological access and social access. First is the degree of access that a person has to computers and the Internet, while, social access refers to the involvement in the socioeconomic condition for the use of IT (Warschauer, 2003). The second level, degree of skill in the use of IT, means that, to participate in the digital society, one should at least have basic IT knowledge and ability to use computers and be connected to the Internet (Chang et al., 2015). Finally, to evaluate the achievement of outcomes in its use, the final stage is online participation, referring to any general user behaviour to participate and interact with other people through various Internet services (Chang et al., 2015). With this model some authors have proposed casual interrelations between various indicators, concurring with the concept of dynamic interactions between access gaps (Barzilai-Nahon, 2006; Wei et al., 2011). In these aggregate studies, taking a country as a unit of measure, the digital divide can be examined as the sum of the other gaps (Zwillenberg et al., 2014), in which the macroeconomic indicators that are most commonly used are those that concern the access to and use of ICTs (factors of the technological gap) or the level of income and wealth distribution (social gap) (Ramírez & Gutiérrez, 2008). Most of the institutions dedicated to the study and improvement of the digital divide have

had an impact on the methods of collecting statistical information and generating indicators, which are used today to build international indices, such as the ICT Development Index (ITU) or the Index Information Society (ISI).

This paper proposes a new index to measure the digital divide of several countries based on multiple indicators. The literature contains particular studies on some indicators, for example the study by Hilbert (2016), which examined two digital divide access indicators and concluded that it is necessary to consider indicators that measure each of the possible levels of the digital divide from physical access to usability and web production (Pick, Sarkar, & Johnson, 2015). According to the study by Ghobadi and Ghobadi (2013), four dimensions are proposed to group all the items used in the analysis of the digital divide.

Context Country (Context-Related)

Regarding the sources of adoption, such as trade barriers, access to capital, and regulations, these concepts contribute to the digital divide by influencing motivational issues (Ghobadi & Ghobadi, 2013; Zwillenberg et al., 2014). For example, the availability of scientists and engineers is positive in the use of ITCs and the Internet (Pick & Nishida, 2015).

Aptitude (Motivation-Related)

This group refers to the wish to have a computer and to be connected to ICTs (Ghobadi & Ghobadi, 2013); the factors explaining motivational access are social, cultural, and human behaviours. These are directly related to the digital divide, especially for Latin America, and are determinants between technologies.

Competency (Skills-Related)

This includes the capacity to work with hardware and software, the capacity to use a computer, and all the indicators of physical access (Ghobadi & Ghobadi, 2013); for example, the indicators "subscription to mobile cellular and/or fixed broadband Internet" and "fixed quality and mobile broadband download speed measured by mean" were evaluated as feasible, suitable, and very relevant to measuring the digital divide (Hilbert, 2016).

Outcomes (Usage-Related)

This group is about the differential use of ICTs: active or creative use, regarding contributions to the Internet by users themselves; and passive use, receivers of that software and hardware from active users (Ghobadi & Ghobadi, 2013). The indicators concern the use of the Internet and relate to the usability of the network, and different authors have grouped them into categories like instrumental, creative, and networking skills (Lee, Park, & Hwang, 2014)(Table 24).

TABLE 24. MEASUREMENT INDEX

Context Country-Related (Context Access)	Aptitude- Related (Motivational Access)	Competency -Related (Skill Access)	Outcomes-Related (Usage Access)
Labour***: - Availability of qualified engineers (0-7) (WEF) - Availability of research and training services (0-7) (WB) Availability of scientists and engineers (0-7) (WB)	Ability***: - Quality of education system (0-7) (WEF) - Availability of latest technologies (0-7) (WB) - Secondary Education gross enrolment rate (%) UNESCO - Tertiary Education gross enrolment rate (%) UNESCO	Access***: - Individuals using internet (%) (WB) - Internet users (per 100 people) (WB) - Fixed broadband internet subscriptions /100 people - Mobile telephone subscriptions/100 people Mobile broadband subscriptions/100 people - Mobile network coverage, % pop.(ITU) - Households w/ personal computer, % (ITU)	Social Usage**: - Use of virtual social networks, 1-7 (best) (WEF) - E-Participation Index, 0–1 (UNDESA) Governance Usage*: - Government Online Service Index, 0–1 (UNDESA)
Capital*: - Availability of financial services (0-7) (WB) - Affordability of financial services (0-7) - Ease of access to loans (0-7) (WB)	Access chindren***: - Internet access in schools (0-7) Trust*: Secure Internet servers (per 1 million people)	- Households w/ Internet access, % (ITU) Speed*: - International internet bandwidth, kb/s per user	ICT Usage*: - PCT patents, applications/million pop. (WEF) - ICT PCT patents, applications/million pop. (WEF)
Infrastructure***: - Quality of overall infrastructure (0-7) WEF		Price*: - Prepaid mobile cellular tariffs, PPP $/min. - Fixed broadband Internet tariffs, PPP $/month - Internet & telephony competition, 0–2 (best) WEF	Business Usage***: -Business-to-business Internet use, 0-7 (WFE) -Business-to-consumer Internet use, 1-7 (WEF)

* Low importance, ** Medium importance, *** High importance

7.4 Methodology

To construct an index to measure the digital divide in a number of countries and compare them, the joint use of fuzzy logic and distances is proposed.

The weighted Hamming distance (WHD) is a useful tool to compare a set of countries with the ideal based on a set of indicators (Figueira, Greco, & Ehrgott, 2005; Gil-Aluja, 1999; Gil-Lafuente, 2001; Merigo, 2013; Merigo & Gil-Lafuente, 2007; Zavadskas & Turskis, 2011).

First, fuzzy subsets are used to describe each of the countries. These subsets fuzzy are composed of 33 indicators of the digital divide, which are grouped into 3 dimensions related to the country context (labour, capital, and infrastructure), 3 related to skills (ability, access, and trust), 3 related to skills (Internet access, speed, and price), and 4 related to the results of use (social, ICT, B2B, and governance).

$$A_i = \begin{array}{|c|c|c|c|} \hline C_1 & C_2 & \dots & C_{33} \\ \hline \mu_{C1}^{(i)} & \mu_{C2}^{(i)} & \dots & \mu_{C33}^{(i)} \\ \hline \end{array} \quad (1)$$

Second, because the information available is in different units of measurement, we proceed to normalize the data matrix to work with comparable data using the following formula:

$$n_{ij} = \frac{x_{ij}}{\sqrt{\sum_{j=1}^{m} (x_{ij})^2}} \quad (2)$$

$$i = 1, \dots, m;\ j = 1, \dots, n$$

Third, the fuzzy subsets described above are used to complete the membership characteristic functions of each of the countries that make up benchmark set A (Kaufmann & Gil-Aluja, 1986). For this we use the normalized information obtained from secondary sources such as the World Economic Forum, the World Bank, and the United Nations. Referential set A is composed of seventeen Latin American countries: Argentina, Brazil, Colombia, Costa Rica, Chile, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay, Puerto Rico, Peru, Uruguay, and Venezuela. In addition, a fictional country is introduced to collect the ideal levels of indicators to avoid the digital divide. It represents the case of a country in which all the levels of the indicators are maximums, that is, a country with a digital divide of 0, although this situation may not be true for any country.

$$A = \{A_1, A_2, A_3, \ldots, A_{17}, A^*\} \quad (3)$$

Fourth, the weights of each of the indicators are obtained. From the information in previous studies (Dewan & Riggins, 2005; Ghobadi & Ghobadi, 2013; Hilbert, 2016; Lee et al., 2014; Pick et al., 2015; Ramírez & Gutiérrez, 2008; van Dijk & Hacker, 2003; Wei et al., 2011), an importance level is assigned to each sub-dimension and dimension to obtain a weighting coefficient for each of the indicators that make up the fuzzy subset. To avoid sub-indicators in size with a larger number of items, the use of a diluted importance convex weighting coefficient (Arroyo-Cañada & Gil-Lafuente, 2012) is proposed. This requires taking the level of importance assigned to existing previous studies in the literature on the digital divide and, through an expert opinion, proposing the importance of each of the indicators (p_{ij}). From these average levels of importance for each of the dimensions, (k_j) is obtained as follows:

$$k_j = \frac{\sum_{n=1}^{i} p_{ij}}{n_j} \quad (4)$$

From the average size (k_j), the importance of the main dimensions (K_j) is obtained, such that:

$$K_j = \frac{k_j}{\sum_{j=1}^{n} k_j} \quad (5)$$

From the importance of the main dimensions (K_j), the coefficient of convex weighting is obtained for each of the items of different dimensions (ω_{ij}), weighting the average importance of each of the items within the dimension of the importance of each of the dimensions:

$$\omega_{ij} = k_j \times \frac{p_{ij}}{\sum_{n=1}^{i} p_{ij}} \quad (6)$$

In this case it is based on uncertain information about the importance of each of the dimensions used, as it was collected through linguistic indicators of three degrees of importance (low, medium, and high). Therefore, it is necessary to transform these linguistic indicators into triangular fuzzy numbers through a process of defuzzification to obtain:

Low importance = (0, 0.167, 0.333)
Medium importance = (0.334, 0.5, 0.667)
High importance = (0.668, 0.834, 1)

Given the expert opinion, and to simplify the analysis, it is proposed to use the average values of these triangular numbers, so (0.167, 0.5, 0.834) will be used as weighting values for the three grades of importance (low, medium, and high), respectively.

Finally, the distances are calculated for the ideal level (digital divide 0) using the characteristics of membership functions. For this we choose the Hamming distance, since none of the countries have ideal levels of indicators and because we can easily solve the exercise raised in this research using characteristic membership functions as values.

$$dH_i(A_i, A^*) = \sum_{i=1}^{n} \omega_{ij} \left|\mu_{A_i}(x_{ij}) - \mu_{A^*}(x_{ij})\right| \quad (7)$$

where $x \in \forall i = 1,2,\dots,n; x \in \forall j = 1,2,\dots,k; \sum_{i=1,j=1}^{n,k} \omega_{ij} = 1$

TABLE 25. FUZZY SUBSETS OF COUNTRIES

	Context Country-Related (Context							Aptitude-Related (Motivational Access)							Competency-Related (Skill Access)												Outcomes-Related (Usage Access)						
	Labour			Capital			Infraestructure	Ability				Access		Trust	Access								Speed	Price			Social usage		ICT Usage		B2B usage		Governance Usage
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32	C33
Argentina	0,25	0,25	0,25	0,16	0,15	0,17	0,19	0,25	0,20	0,27	0,37	0,24	0,14	0,19	0,32	0,32	0,34	0,32	0,15	0,25	0,34	0,36	0,20	0,25	0,23	0,25	0,21	0,26	0,14	0,12	0,21	0,23	0,24
Brazil	0,21	0,26	0,21	0,28	0,23	0,29	0,20	0,23	0,24	0,29	0,21	0,22	0,23	0,24	0,27	0,28	0,25	0,27	0,48	0,26	0,28	0,29	0,20	0,40	0,11	0,25	0,27	0,26	0,38	0,22	0,24	0,27	0,26
Chile	0,30	0,26	0,30	0,29	0,31	0,28	0,30	0,29	0,29	0,26	0,35	0,30	0,30	0,45	0,35	0,36	0,30	0,27	0,33	0,25	0,33	0,34	0,26	0,16	0,32	0,25	0,36	0,26	0,74	0,33	0,28	0,27	0,35
Colombia	0,25	0,24	0,25	0,25	0,24	0,21	0,22	0,25	0,23	0,27	0,21	0,24	0,23	0,17	0,27	0,26	0,23	0,21	0,07	0,26	0,24	0,24	0,35	0,16	0,19	0,25	0,34	0,24	0,14	0,08	0,25	0,25	0,34
Costa Rica	0,31	0,29	0,31	0,23	0,19	0,24	0,23	0,32	0,26	0,30	0,22	0,28	0,31	0,35	0,24	0,24	0,24	0,29	0,67	0,18	0,30	0,32	0,34	0,05	0,13	0,21	0,31	0,26	0,15	0,14	0,27	0,25	0,26
El Salvador	0,24	0,26	0,24	0,22	0,25	0,23	0,29	0,26	0,22	0,20	0,12	0,24	0,25	0,08	0,12	0,15	0,11	0,27	0,06	0,25	0,13	0,09	0,19	0,16	0,19	0,24	0,23	0,23	0,01	0,00	0,25	0,26	0,23
Guatemala	0,23	0,26	0,23	0,28	0,26	0,29	0,29	0,22	0,27	0,19	0,09	0,20	0,26	0,06	0,10	0,12	0,04	0,28	0,04	0,26	0,11	0,06	0,05	0,35	0,34	0,25	0,07	0,24	0,01	0,00	0,26	0,26	0,06
Haiti	0,19	0,16	0,19	0,16	0,20	0,17	0,14	0,18	0,19	0,20	0,17	0,15	0,16	0,01	0,06	0,06	0,00	0,14	0,00	0,13	0,05	0,03	0,00	0,13	0,56	0,25	0,07	0,20	0,00	0,00	0,19	0,19	0,05
Honduras	0,23	0,23	0,23	0,27	0,25	0,24	0,22	0,22	0,25	0,21	0,10	0,21	0,26	0,04	0,09	0,09	0,02	0,19	0,11	0,24	0,12	0,11	0,05	0,21	0,22	0,25	0,13	0,24	0,00	0,00	0,26	0,24	0,17
Mexico	0,25	0,25	0,25	0,23	0,21	0,21	0,27	0,22	0,25	0,25	0,14	0,22	0,24	0,12	0,23	0,22	0,28	0,17	0,06	0,26	0,21	0,21	0,10	0,07	0,13	0,25	0,23	0,23	0,20	0,12	0,25	0,23	0,28
Nicaragua	0,20	0,19	0,20	0,20	0,24	0,22	0,21	0,20	0,20	0,20	0,09	0,18	0,20	0,04	0,08	0,09	0,05	0,22	0,01	0,26	0,06	0,06	0,15	0,60	0,30	0,24	0,04	0,20	0,02	0,04	0,21	0,19	0,04
Panama	0,25	0,25	0,25	0,30	0,34	0,31	0,32	0,27	0,29	0,24	0,20	0,31	0,25	0,42	0,23	0,22	0,19	0,32	0,23	0,25	0,23	0,21	0,25	0,12	0,11	0,25	0,19	0,26	0,23	0,72	0,26	0,27	0,16
Paraguay	0,17	0,18	0,17	0,23	0,25	0,21	0,17	0,18	0,20	0,20	0,16	0,17	0,24	0,09	0,20	0,21	0,04	0,21	0,04	0,26	0,18	0,18	0,06	0,19	0,24	0,25	0,10	0,22	0,00	0,00	0,21	0,22	0,10
Peru	0,21	0,23	0,21	0,25	0,27	0,24	0,22	0,21	0,24	0,26	0,20	0,22	0,21	0,10	0,21	0,20	0,13	0,19	0,03	0,26	0,19	0,15	0,08	0,18	0,23	0,25	0,27	0,22	0,03	0,04	0,24	0,23	0,27
Puerto Rico	0,34	0,33	0,34	0,29	0,24	0,30	0,31	0,28	0,31	0,23	0,41	0,28	0,33	0,46	0,39	0,39	0,40	0,17	0,15	0,18	0,35	0,41	0,63	0,07	0,15	0,25	0,32	0,28	0,24	0,41	0,29	0,28	0,31
Uruguay	0,22	0,24	0,22	0,23	0,24	0,24	0,26	0,27	0,24	0,26	0,30	0,36	0,29	0,34	0,31	0,30	0,52	0,31	0,30	0,26	0,39	0,36	0,28	0,21	0,10	0,13	0,37	0,26	0,30	0,32	0,23	0,23	0,37
Venezuela	0,21	0,18	0,21	0,19	0,20	0,22	0,17	0,22	0,19	0,25	0,37	0,21	0,09	0,04	0,29	0,28	0,18	0,20	0,03	0,24	0,24	0,21	0,05	0,13	0,08	0,25	0,22	0,26	0,03	0,01	0,21	0,21	0,24

TABLE 26. NORMALIZED DATA MATRIX

	Context Country-Related (Context Access)						Aptitude-Related (Motivational Access)						Competency-Related (Skill Access)										Outcomes-Related (Usage Access)					
	Labour			Capital			Infraestructure			Ability			Access		Trust	Access				Speed		Price			Social usage		ICT Usage		B2B usage		Governance Usage
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32	C33
Argentina	3,81	4,21	3,81	3,05	1,73	2,92	3,00	3,79	3,83	91,94	78,63	4,12	1,92	52,72	59,90	64,70	13,86	159,03	16,20	94,10	59,20	53,90	44,31	0,46	37,91	2,00	0,55	5,97	1,25	0,30	4,08	4,32	0,55
Brazil	3,31	4,45	3,31	5,22	2,67	4,99	3,11	3,38	4,71	98,73	44,92	3,62	3,06	68,63	51,60	57,60	10,08	135,31	51,46	99,98	48,80	42,40	42,95	0,73	18,51	2,00	0,71	6,00	3,48	0,52	4,62	5,12	0,60
Chile	4,63	4,46	4,63	5,54	3,67	4,87	4,74	4,41	5,72	89,01	74,39	5,05	4,05	127,63	66,50	72,35	12,25	134,28	35,59	95,00	57,00	49,60	56,33	0,30	53,40	2,00	0,94	6,14	6,77	0,79	5,34	5,12	0,82
Colombia	3,84	4,14	3,84	4,76	2,77	3,61	3,41	3,74	4,53	92,81	45,02	4,01	3,10	47,14	51,70	52,57	9,29	104,08	7,87	100,00	42,17	35,66	76,05	0,30	31,41	2,00	0,88	5,50	1,29	0,18	4,81	4,65	0,79
Costa Rica	4,76	4,86	4,76	4,38	2,21	4,14	3,55	4,77	5,01	103,61	46,74	4,67	4,09	99,42	45,96	49,41	9,72	145,97	72,06	69,50	51,01	46,71	73,49	0,09	21,59	1,63	0,82	5,98	1,33	0,33	5,14	4,77	0,61
El Salvador	3,69	4,50	3,69	4,12	2,99	3,95	4,57	3,89	4,23	69,24	25,45	4,02	3,39	22,10	23,11	29,70	4,45	136,19	6,04	95,00	22,29	12,70	40,49	0,30	32,08	1,87	0,61	5,34	0,10	0,00	4,69	4,93	0,54
Guatemala	3,55	4,40	3,55	5,32	3,06	5,05	4,46	3,32	5,30	65,14	17,88	3,45	3,49	17,55	19,70	23,40	1,80	140,39	4,42	100,00	19,70	9,30	10,83	0,63	57,39	2,00	0,20	5,63	0,09	0,00	4,89	4,86	0,15
Haiti	2,88	2,75	2,88	3,03	2,33	2,93	2,18	2,71	3,65	68,10	36,62	2,56	2,18	1,70	10,60	11,40	0,00	69,40	0,00	47,47	8,00	3,70	0,23	0,24	92,53	2,00	0,18	4,72	0,00	0,00	3,54	3,48	0,11
Honduras	3,55	3,96	3,55	5,05	2,91	4,22	3,47	3,29	4,80	73,09	20,40	3,47	3,45	11,43	17,80	19,08	0,84	95,92	11,72	89,93	20,10	16,40	9,95	0,39	36,56	2,00	0,33	5,61	0,00	0,00	4,90	4,55	0,40
Mexico	3,95	4,33	3,95	4,34	2,42	3,73	4,22	3,37	4,91	85,68	28,99	3,72	3,14	34,11	43,46	44,39	11,14	85,84	6,27	99,90	35,79	30,74	22,57	0,12	21,14	2,00	0,61	5,32	1,80	0,28	4,69	4,22	0,66
Nicaragua	3,14	3,27	3,14	3,73	2,85	3,85	3,31	3,01	3,94	68,91	18,95	3,00	2,63	11,31	15,50	17,60	2,17	111,98	1,27	100,00	10,90	9,40	32,60	1,09	49,45	1,88	0,10	4,68	0,17	0,08	3,90	3,48	0,09
Panama	3,88	4,22	3,88	5,68	3,96	5,48	5,01	4,06	5,61	84,05	41,78	5,15	3,39	116,61	42,90	44,92	7,71	162,97	25,22	96,00	39,30	31,50	54,29	0,23	18,80	2,00	0,49	6,04	2,10	1,71	5,01	5,13	0,37
Paraguay	2,59	3,03	2,59	4,25	2,95	3,67	2,68	2,64	3,98	69,60	34,51	2,88	3,21	24,11	36,90	43,00	1,58	103,69	4,76	99,70	31,80	26,60	12,66	0,34	40,05	2,00	0,25	5,23	0,04	0,00	3,92	4,11	0,23
Peru	3,31	3,87	3,31	4,72	3,22	4,13	3,50	3,17	4,63	89,78	42,64	3,65	2,81	28,06	39,20	40,20	5,18	98,08	2,91	96,97	32,00	22,10	18,14	0,32	39,00	2,00	0,71	5,21	0,32	0,11	4,65	4,28	0,63
Puerto Rico	5,31	5,62	5,31	5,50	2,80	5,29	4,91	4,17	6,08	78,32	86,46	4,79	4,39	127,95	73,90	78,78	16,27	83,65	15,82	68,40	60,00	60,70	136,87	0,13	24,30	2,00	0,83	6,46	2,22	0,99	5,47	5,24	0,72
Uruguay	3,37	4,06	3,37	4,25	2,83	4,12	3,99	4,03	4,59	90,34	63,15	6,05	3,84	95,34	58,10	61,46	21,13	154,62	31,94	100,00	67,60	52,70	59,94	0,38	16,85	1,00	0,98	6,02	2,79	0,75	4,36	4,34	0,85
Venezuela	3,26	3,10	3,26	3,65	2,31	3,92	2,60	3,32	3,75	85,37	78,11	3,49	1,22	12,18	54,90	57,00	7,31	101,61	3,73	90,00	41,00	31,50	10,18	0,23	13,77	2,00	0,57	6,07	0,29	0,02	3,91	3,99	0,55

7.5 RESULTS

First, Table 2 describes each of the countries by fuzzy subsets from the 33 selected indicators of the digital divide. Second, the normalized data matrix (Tables 25-26) is obtained.

To obtain the weights of each of the indicators, the average of each dimension (k_j) is obtained. An example of the resolution of the first dimension is described as follows:

$$k_j = \frac{\sum_{n=1}^{i} p_{ij}}{n_j} = \frac{8.34+8.34+8.34+1.67+1.67+1.67+8.34}{7} = 5.48 \quad (8)$$

The average importance to the four main dimensions would be k_j = (5.48, 7.39, 6.12, 4.53). Thus, the importance of each of the dimensions is obtained by dividing each of these averages by the total amount, such that if the first dimension is:

$$K_j = \frac{k_j}{\sum_{j=1}^{n} k_j} = \frac{5.48}{5.48+7.39+6.12+4.53} = 0.233 \quad (9)$$

the major vector of the main dimensions K_j = (0.233, 0.314, 0.260, 0.193) is obtained.

From the importance of the main dimensions (K_j), the convex weighting coefficient for each of the items of different dimensions (ω_{ij}) is obtained. In the case of the first indicator the following is obtained:

$$\omega_{ij} = k_j \times \frac{p_{ij}}{\sum_{n=1}^{i} p_{ij}} = 0.233 \times \frac{8.34}{8.34+8.34+8.34+1.67+1.67+1.67+8.34} = 0.05 \quad (10)$$

In the same way, one can obtain the 33 coefficients composing the convex weighting vector:

$$\omega = (0.05, 0.05, 0.05, 0.01, 0.01, 0.01, 0.05, 0.05, 0.05, 0.05, 0.05, 0.05, 0.05, 0.01, 0.03, 0.03, 0.03, 0.03, 0.03, 0.03, 0.03, 0.03, 0.03, 0.01, 0.01, 0.01, 0.01, 0.01, 0.01, 0.03, 0.03, 0.05, 0.05, 0.01) \quad (11)$$

Finally, Hamming distances are obtained with respect to the ideal level (digital divide 0) using the characteristic functions of belonging to each of the countries analysed. In the case of Argentina (A_1), the following is obtained:

$$dH_1(A_1, A^*) = 0.757 \quad (12)$$

If we calculate the distances for each country considered for this investigation and order them from major to minor, a ranking of the countries is obtained depending on their level of the digital divide, as shown in Table 27.

TABLE 27. RANKING OF COUNTRIES BY DIGITAL DIVIDE INDEX

Country	Distance
Haiti	0,866
Nicaragua	0,841
Paraguay	0,829
Honduras	0,819
Guatemala	0,811
Venezuela	0,805
El Salvador	0,802
Peru	0,800
Mexico	0,780
Colombia	0,770
Argentina	0,757
Brazil	0,744
Panama	0,730

Costa Rica	0,726
Uruguay	0,717
Puerto Rico	0,690
Chile	0,685

The distances indicate how away from the ideal each of the countries analysed is, so that the countries occupying the first positions are those with a greater digital divide, while those countries in the last positions of the ranking indicate a lesser digital divide. In view of the results, we can say that Haiti is the country with the largest digital divide, while Chile is the country with the lowest digital divide (Table 4).

Making a more specific analysis, we examine the ranking for each of the groups of the proposed indicators. First, for the group of indicators called Context, only Puerto Rico is close to the desired level, 0.675 away, 13 countries have distances nearing to 0.7, and the farthest away are Venezuela, Paraguay, and Haiti. These results are of special concern because of their importance in relation to the technical conditions that support the development of ICT and the Internet, especially the conditions that encourage investment on the one hand and indicators of investment in infrastructure, and qualified professionals in the sector on the other (Table 28).

For the pillar called Aptitude, Puerto Rico is again the first country to approach the optimum point with 0.688; again it is followed by a homogeneous group of 14 countries within the margin of 0.7 points and finally by the 3 countries Paraguay, Nicaragua, and Haiti. As in the previous case, in this group of indicators the Latin American countries are far from the ideal, given that the aspects that these indicators measure are related to the quality of education, adding more specific indicators of training in ICT and

the Internet in school and university students as well as factors that motivate its use, such as security policies on Internet use (Table 28).

The third group of indicators, called Competency, shows the best Latin American countries in relation to the desired optimum, because seven countries are in the range of 0.5 points, headed by Uruguay and followed by Puerto Rico, Costa Rica, Chile, Argentina, Brazil, and Panama. These are followed by eight countries led by Colombia in the range of 0.6 and 0.69, and the farthest away are Nicaragua and Haiti. In this pillar the classic indicators of the digital divide are analysed, as are access, the Internet speed, and the cost of use (Table 28).

Finally, regarding the outcome-related indicators, concerning the social use of ICT and Internet-related recreational uses, services, commerce, government and others, the results show that only three countries are within 0.6 points of the optimal value (Chile, Panama, and Puerto Rico), followed by five countries in the range of 0.7 points and finally nine countries in the range of 0.8 points, starting with Argentina and ending with Haiti; thus, the Latin American region is very far from the optimum point for this group of indicators (Table 28).

TABLE 28. Ranking by Indicators Dimensions

Context		Aptitude		Competency		Outcomes	
Countries	Distances	Countries	Distances	Countries	Distances	Countries	Distances
Haiti	0,831	Haiti	0,829	Haiti	0,729	Haiti	0,885
Paraguay	0,821	Nicaragua	0,826	Nicaragua	0,707	Nicaragua	0,874
Venezuela	0,806	Paraguay	0,810	Honduras	0,699	Paraguay	0,865
Nicaragua	0,795	Guatemala	0,799	Guatemala	0,694	Venezuela	0,846
Argentina	0,777	Honduras	0,799	El Salvador	0,679	Guatemala	0,842
Peru	0,776	El Salvador	0,789	Paraguay	0,665	Honduras	0,840
Brazil	0,773	Venezuela	0,784	Peru	0,661	El Salvador	0,828
Honduras	0,768	Mexico	0,783	Mexico	0,635	Peru	0,823
Uruguay	0,767	Peru	0,781	Venezuela	0,624	Argentina	0,804
Colombia	0,761	Brazil	0,764	Colombia	0,607	Mexico	0,787
Mexico	0,747	Colombia	0,763	Panama	0,598	Colombia	0,785
Guatemala	0,746	Argentina	0,755	Brazil	0,539	Costa Rica	0,773
El Salvador	0,745	Panama	0,735	Argentina	0,535	Brazil	0,728
Costa Rica	0,726	Costa Rica	0,717	Chile	0,520	Uruguay	0,728
Panama	0,726	Uruguay	0,712	Costa Rica	0,516	Puerto Rico	0,699
Chile	0,709	Chile	0,694	Puerto Rico	0,512	Panama	0,677
Puerto Rico	0,674	Puerto Rico	0,688	Uruguay	0,504	Chile	0,634

7.6 CONCLUSIONS

This article was first intended to propose an index to group a number of related measures of the digital divide indicators. The results have generated a robust index composed of 33 indicators that represent the 4 main pillars of the digital divide. Therefore, the index presented manages to integrate the different forms and scales on the digital divide, from the basic digital divide and access to the digital generation gap usability, content, and software.

Second, using this index the digital divide was measured for seventeen Latin American countries, reaching the major conclusion that the country that best approaches the ideal situation of a zero digital divide, taking into account the four pillars, is Chile. The first level of countries where the gap is smaller contains Chile and Puerto Rico are the only countries that are at the range (0.6, 0.69). This result is consistent with the development of the Internet and TICs for these two countries. Chile is one of the countries leading the development of the Internet and telecommunications in South America, especially regarding the adoption of the Internet, with coverage of 70% for 2013 (Katz et al., 2015). Puerto Rico is a country that for the last 5 years has been following a special regime, supported by the US, to implement an action plan to reduce the level of the digital divide, and this is reflected in the results. In the subsequent range (0.7, 0.79) are Uruguay, Costa Rica, Panama, Brazil, Argentina, Colombia, and Mexico. Costa Rica and Colombia stand out and show that their current policies to reduce the digital divide are effective, while Mexico is in contrast, since for some items it could be a country with a high digital divide (for accessibility it had only 10% broadband penetration in 2013) while in other aspects it has advanced development, such as Internet tariffs in relation to the per capita GDP (Breu, Guggenbichler, & Wollmann, 2012). Finally, the group of countries with a greater digital divide (0.8, 0.89) are Peru, El Salvador, Venezuela, Guatemala, Honduras, Paraguay, Nicaragua, and Haiti. These countries have serious problems in the availability and use of ICT. Managers of the technological and social areas of the governments of these countries should take action to reduce the digital divide.

The set of fuzzy logic and weighted Hamming distance usage was effective in measuring the digital divide based on information from secondary sources. The digital divide is important on the social, economic,

and political levels, so this paper sheds light for decision makers in those areas to adapt their policies to the global technological reality. The proposed index allows the different indicators used for free public access to be updated annually, so it is a dynamic tool that enables the monitoring of countries to meet their level of the digital divide and to correct the necessary aspects depending on each of the groups of indicators. It also enables international companies and organizations to have an overview of the development of the Internet and ICT in each country to make investment decisions and monitor trade favourably to their interests in the area. While this index applies to countries where this information is collected, and excluded important countries of the region as Ecuador, the results have proved that the measurement is reliable and approaches the reality of the context in the area.

Future research may undertake longitudinal studies to develop the knowledge of the impact of government policies on reducing the digital divide and to determine which aspects are more related to changes in the index.

CHAPTER 8. CHARACTERISTICS OF C2C ADOPTION: THE ROLE OF INTERMEDIATION IN MARKETPLACES IN COLOMBIA[†††]

[†††] Artículo en revisión en: Journal of Theoretical and Applied Electronic Commerce Research (Dec. 2017)

7.7 ABSTRACT

This study analyses the factors that users of consumer-to-consumer (C2C) commerce value as direct influences in the intention to use and the acceptance of a marketplace. An empirical model is formulated, which integrates three variables that evaluate trust and, in turn, other variables that influence C2C intention and purchases, taking a sample of 686 surveys gathered using the Internet in Colombia.

The results show that trust is a fundamental factor in this type of electronic commerce in Colombia, given that C2C users seek intermediation pages with third-party recognition (TPR) and high web quality; similarly, key variables in the adoption of this type of commercial platform include finding low prices and social influence. The perception of trust in this type of electronic commerce is a broader concept that requires the analysis of psychosocial factors. For companies that manage marketplaces, this study allows them to focus on key actions and tools in their web sites. This study allows one to get to know the users of this transactional system, specifically for the Latin American region, highlighting the variables that they most consider when engaging in direct commerce between people. The results show that C2C requires marketplaces that guarantee the necessary conditions for a purchase/sale transaction with trust and quality.

Key words – web; electronic purchase; C2C; adoption; UTAUT; Colombia; marketplace

8.1 INTRODUCTION

Electronic commerce between individuals, denominated “C2C”, has become one of the most widely used virtual commerce platforms in the world in terms of social and commercial relationships since the Internet revolution. Data are important for electronic commerce between people, given that commercial intermediation pages, also denominated “marketplaces”, companies such as eBay, Alibaba, MercadoLibre, and Amazon, enable people to sell new and used products to other people regardless of distances or boundaries, even performing an intermediation process that integrates the entire logistical process of shipping, payments, and post-sale services and returns.

In Latin America, C2C has been the preferred type of electronic commerce by Internet users over commerce between businesses and people (B2C), given that marketplaces are among the 10 most important web pages in terms of visitor traffic and users; in 2014, the MercadoLibre portal had over 45 million visitors per month, and Amazon.com is among the 100 most visited sites in the region (Katz, Agudelo, Bello & Rojas, 2015).

Studies on C2C adoption that are specifically related to user intention and usage as buyers or sellers are scarce (Leonard & Jones, 2010), which is paradoxical given the characteristics of these types of virtual commerce transactions between people and the problems of security and trust generated by distance purchasing agreements because the buyer assumes that the acquired product will reach its destination in the agreed upon conditions, without the agreement being fulfilled by both parties in many cases (Lu, Wang, & Hayes, 2012). Recent studies conducted in Asia, particularly in countries such as China, have analysed the cause-effect relationships between the recommendations of the virtual community regarding their experience with marketplaces, highlighting the importance of perceived quality and credibility in products and sellers (Zhu, Chang, & Luo, 2015); these studies support the notion that social influence through comments, suggestions, and experiences of the community directly affect the purchase intention in C2C (Jing & Peng, 2010). In turn, another study states that the satisfaction level of purchases in C2C marketplaces is related to factors such as price and seller reputation (Du, Yu, Fang, & Wang, 2012); with respect to seller reputation, the perception of trust is a key factor in the use of C2C

marketplaces, highlighting the perceived security of the website as an aspect that influences people's purchase intention (Lu *et al.,* 2012). Regarding this aspect, marketplaces are adopting the use of third-party recognition (TPR) to offer the client an image of security surrounding the commercial transaction (Jones & Leonard, 2014).

Given that it is clear that it is the leading business model on the American continent and the most widely electronic commerce format in Latin American countries, the development of C2C in the marketplace has found an avenue that best favours and promotes this type of buying and selling because it meets the needs of sellers, who are mostly people who sell used products or small companies that do not have an electronic platform for selling their products and that find these types of pages to be economic and efficient platforms, and of buyers, who search for products based on the characteristics of price and use offered in C2C but who are exposed to the uncertainty of buying remotely from unknown people or businesses.

The evolution of commercial intermediation web pages has generated better security tools for trading conditions, not only regarding the protection of confidential information or payment methods but also with respect to tracking shipment and post-sale processes, such as returns and warranties.

Against this backdrop and having few studies on C2C buyers in the Latin American region, this study focuses on the C2C market of Colombia, a leading country in this type of business in the region (Katz *et al.,* 2015).

Therefore, as a general objective, we propose to evaluate whether clients of C2C marketplaces make decisions about using this type of electronic commerce based on a set of variables that have been supported in previous studies, which are grouped into a model proposed in this article. Thus, the specific objectives are as follows: a) to examine whether factors such as trust perception, risk perception surrounding buying from third parties, social influence, and the search for low prices influence the adoption of C2C; and b) to confirm whether the perception of trust in C2C is, in turn, related to factors that precede it such as web quality and TPR as well as personality traits (propensity to trust and interpersonal trust).

8.2 METHODOLOGY

This paper was developed in the following manner. First, a model was proposed based on a review of the research developed to date on the adoption of C2C electronic commerce, proposing the most influential variables for this type of commercial relationship (Figure 1); then, we present how the empirical research was developed and how the information was analysed.

Theories of technological acceptance and electronic purchases

Acceptance models surrounding innovation or technology have been developed to understand the behaviour of electronic buyers given the characteristics of this platform. The Diffusion of Innovations theory proposed by (Rogers, 1995) is the first theory that analyses populations from a macro perspective using a cyclic model of acceptance, the moments and characteristics of acceptance of an innovation in a population group. In addition, social, cognitive, and behavioural psychology have developed different theories that explore in depth the relationships between the attitudes, intentions, and behaviours of individuals (Agudo Peregrina, 2014). First, we present the theory of reasoned action (TRA), which establishes a model in which intention is the factor that generates a behaviour; such intention is affected by the attitude towards the behaviour and the subjective norm (Fishbein & Ajzen, 1975). Second, social cognitive theory (SCT) presents a behavioural model based on the influence of personal and environmental factors and on the behaviour of the individual himself, recognizing self-efficacy as an important concept (Bandura, 1977); the theory of planned behaviour (TPB) also adds the concept of perceived control to the theory of reasoned action (TRA); finally, the most widely applied theory in the study of e-commerce is the technology acceptance model (TAM), which predicts behaviour prior to the intent of conduct through the attitude of the individual, which is affected by perceived utility and perceived ease of use (Mohamed Fadel Bukhari *et al.,* 2013). All technology acceptance theories have been grouped by (Venkatesh *et al.,* 2012; 2003) in the unified theory of acceptance and use of technology (UTAUT), which determines that five constructs (performance expectation, effort expectation, social influence, facilitating conditions, and intention of use) affect the intention

and use of all types of electronic purchases, among them C2C. Thus, the first hypothesis is as follows:

H1: The C2C purchase intention in a marketplace directly influences C2C purchases.

Social influence

This concept is recognized in consumer behaviour as a subjective norm (Venkatesh *et al.,* 2003; 2012); it relates the influence of social factors and image and is supported in e-commerce studies (Dass & Kumar, 2014; Tomás Escobar-Rodríguez & Bonsón-Fernández, 2016; Kim, Kim, & Shin, 2009). Some studies have shown contradictory data because in e-commerce, factors such as Internet use maturity and the socioeconomic level, among others, may cause the buyer to not place value on social influence as an influencing factor in electronic purchases (Sánchez-Torres & Arroyo-Cañada, 2016; Tan, Chong, & Lin, 2013). Considering this possible variable, we propose the following:

H2: Social influence in the use of C2C in a marketplace positively affects the C2C purchase intention.

Low price buying personality trait

This trait is interpreted as the favourable price opportunity cost perceived by the client compared to other traditional trading platforms (Escobar-Rodríguez & Carvajal-Trujillo, 2014); it has been supported in several studies on the adoption of electronic commerce. (Bonera, 2011; Bukhari *et al.*, 2013) find that in C2C, clients search for used items with much lower prices than those found in B2C sales portals; in this respect, (Duan, 2010) analyses that marketplaces offer a ranking of all prices to promote the selection of the lowest prices. Therefore, the following hypothesis is proposed:

H3: The low price buying personality trait in the use of C2C in a marketplace positively affects the C2C purchase intention.

Perceived risk

Perceived risk is the subjective belief that there is the possibility of suffering a loss in the final desired result in a C2C transaction; therefore, it increases expectations in a negative sense regarding attitude and the use of this platform (Luo, Lin, & Wang, 2010). Although there are few studies on the perceived risk of C2C purchases, the study by (Wu, Vassileva, Noorian, & Zhao, 2015) validates the negative influence on purchases in C2C marketplaces. Therefore, we formulate the following hypothesis:

H4: The perceived risk in the use of C2C in a marketplace negatively affects the C2C purchase intention.

C2C Trust perception and its background

Perception of web trust

Trust in Internet purchases consists of a person's having an established expectation within contextual parameters and restrictions of good faith on the actions performed by another person after an interaction between both parties (Yoon & Occeña, 2015). Trust in Internet purchases is a factor that has focused on the study of B2C purchases, in which the client, based on previous purchasing experiences, tends to believe that, in general, conditions of security, privacy, and warranty exist, encouraging the client to trust in his web vendors (Al-dwairi, 2013; Al-Maghrabi & Dennis, 2011; Al-sharafi, Arshah, Abu-shanab, Fakhreldin, & Elayah, 2016; Kaplan & Nieschwietz, 2003; Venkatesh *et al.*, 2003; 2012). For purchases in C2C marketplaces, the same does not occur. In this case, the client generally does not create a connection with the vendor, who in many cases is incognito; in addition, in many cases, the product cannot be tested or examined, and there is no environment that favours complete trust (Yoon & Occeña, 2015). Thus, it is very important that the trust generated by the buyer positively affects C2C purchases:

H5: The perception of trust in the use of C2C in a marketplace positively affects the C2C purchase intention.

Web quality of the marketplace

The web quality of the marketplace is defined as the positive evaluation of the marketplace characteristics by the user (Yoon & Occeña, 2015); several scales have been developed to measure this aspect in web pages (Lee & Shin, 2014; Zalatar, 2012; Zeithaml, Parasuraman, & Malhotra, 2002); for the case of C2C, its direct effect on intention of use has been confirmed (Zalatar, 2012). Therefore, the following hypothesis is proposed:

H6: The web quality of the marketplace positively affects trust in the use of C2C.

Propensity to trust personality trait

Trust begins with the individual's personality, starting with personal experience as well as cultural characteristics. From there, individuals may vary their ability to trust others, which may influence their trust in Internet purchases (Gong, 2009). Latin American culture exhibits characteristics that make it prone to trust due to polychromic societal characteristics, being more flexible in the face of the uncertainty generated by electronic purchases (Lee, Tan, & Hameed, 2005); a high degree of communication among its members also occurs, which increases trust in the use of electronic commerce (Gong, 2009). Therefore, we propose the following:

H7: The propensity to trust personality trait positively affects trust in the use of C2C.

Third-party recognition (TPR) of the marketplace

Buyers in a C2C web site seek sites that offer warranties and third-party recognized security measures that serve as guarantors of fulfilment or site certification; when buyers see this type of security seal, it is more likely that they will enter a purchasing transaction even if the vendor is unknown (Jones & Leonard, 2008, 2014). Third-party recognition for C2C may also involve the utilization of external payment systems such as PayPal, offering the buyer security in the sense that if there is dissatisfaction in the purchase for any

reason, the third party will be responsible for refunding the money if necessary. In the study by (Yoon & Occeña, 2015), this variable is found to be significant when analysing trust in C2C electronic commerce. Therefore, we propose the following:

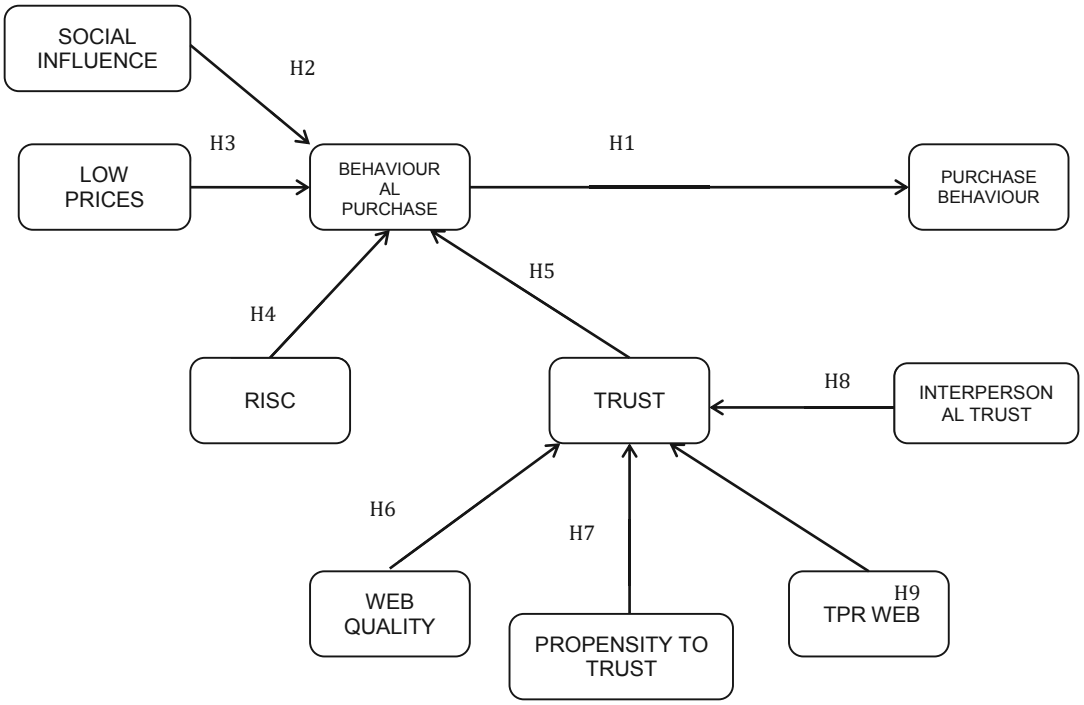
H8: The TPR of the marketplace web site positively affects trust in the use of C2C.

Interpersonal trust

Another important factor in C2C electronic commerce is the trust of clients in the information that they may receive from other buyers about the products that they will purchase or the reputation of sellers. The asymmetry of the information generated due to the separation of buyers and sellers by time and space does not allow the buyer to feel certain in regard to the product, the transaction, and its fulfilment; thus, they will seek information related to it (Utz, Matzat, & Snijders, 2009). Doing so requires that marketplaces offer spaces to evaluate the seller and to establish buyer validation and other aspects that allow clients to transfer information by word of mouth because this constitutes a very important factor that affects trust in C2C purchases (Yoon & Occeña, 2015). Therefore, we propose the following:

H9: Interpersonal trust positively affects trust in the use of C2C.

Figure 14. Proposed model C2C



8.3 CALCULATION

Sampling and data collection

Data collection was based on an electronic questionnaire, given that this mechanism has been effectively validated in other studies (Agudo Peregrina, 2014; Escobar-Rodríguez & Carvajal-Trujillo, 2014). To facilitate the responses, a multi-item per construct methodology was followed using Likert-type scales ranging from 1 (="strongly disagree") to 7 (="strongly agree") for the questionnaire responses to effectively measure variables that are not directly observable (Churchill & Iacobucci, 2004). Similarly, a preliminary test was performed on a group of experts composed of 30 university professors in Colombia to verify that the questions were understood in the same manner and that there were no semantic problems (Annex 1). To define the sample, it was decided to use demographic quotas

because doing so is the most widely used method in this type of study for large populations, targeting the main population regions of Colombia, namely, the principal cities of Bogotá, Medellin, and Cali, and grouping intermediate cities into these based on their geographic proximity (Table 1). The data collection period occurred from November 2015 to May 2016. To achieve the fieldwork objectives, a national team was established, with coordinators in each of the main cities, to manage the administration of the survey. A total of 702 questionnaires were collected, of which 26 exhibited problems regarding answer consistency, leaving a final sample of 686 valid questionnaires. The sample was characterized as follows: more men (55%) than women (45%) say that they use C2C; socioeconomics is also a strong factor for this sample because 78% of buyers exhibit an income that is equal to or greater than the mean income. Similarly, they exhibit high education levels, with 84% of them having degrees that are more advanced than high school diplomas. Age is also a factor to highlight: 66% belong to younger generations in the range of 18 to 34 years of age. In addition, experience using the Internet amounted to five years or more for 91% of buyers. Finally, the sample was concentrated in the country's capital, with 40% of the data coming from there (Table 29).

Table 29. Sample Characteristic

Demographic profile				Profile of Internet and e-commerce adoption	
Gender:		Age:		Experience with Internet Use:	
Men	55%	18-34 years	66%		
Women	45%	35-44 years	22%	More than 10 years	56%
		45-55 years	12%	Between 5 and 10 years	36%
				Between 1 and 5 years	9%
Education level:		Economic level		Location:	
Primary		(income‡‡‡):		Zone 1	
1%		Very Low	3%	(Antioquia, Caldas, Quindío, Risaralda)	
Secondary	15%	Low	19%	23%	
Technical		Medium		Zone 2	
24%		48%		(Bogotá, Boyacá, Cundinamarca)	
University	20%	Medium-High		40%	
Graduate	40%	17%		Zone 3	
		High			

	10%	(Cauca, Valle del Cauca)
	Very High	29%
	3%	Zone 4
		(Atlántico, Bolívar, Cesar, San Andrés,
		Magdalena, Santander) 7%
		Zone 5
		(Arauca, Caquetá, Huila Meta, Nariño, Tolima,
		Vaupés) 1%
Marital Status:		
Single, separated, widower		
69%		
Married, civil union		
31%		

* Adapted from the stratification used in Colombia based on public sources.

Analysis of data and Results

The method of latent variable regression analysis used in this study was performed using the program Smart-plus 3.0 PLS, which is based on the partial least squares (PLS) optimization technique. This is a multivariate technique for testing recommended structural models in exploratory models such as that in this study. It was also used because the model have a large number of items (Escobar-Rodríguez & Carvajal-Trujillo, 2014; Kiwanuka, 2015; Matute Vallejo, Polo Redondo, & Utrillas Acerete, 2015). Data analysis was conducted in two stages: The first stage estimated the significance of the measurement model, and the second examined the validity of the structural model.

Table 30. Loads of the indicators

Indicator	Load	t-value*
IT1	0.884	61.645
IT2	0.928	78.437
IT3	0.892	62.584
IT4	0.838	42.144
WQ1	0.933	109.203
WQ2	0.936	66.838

WQ3	0.897	56.272
WR1	0.922	74.988
WR2	0.934	96.400
WR3	0.941	95.317
B13	0.927	111.388
B23	0.915	94.233
B33	0.904	79.650
NT1	0.880	62.148
NT2	0.916	78.254
NT3	0.924	102.278
PO13	0.933	91.148
PO23	0.906	74.251
PO33	0.916	74.352
PR13	0.931	23.818
PR23	0.943	30.430
PR33	0.935	19.662
PT13	0.910	69.510
PT23	0.940	146.212
PT33	0.916	105.323
S23	0.933	111.439
SI13	0.917	94.716
SI33	0.830	32.930

* All items had significance with p-value < 0.001.

Validation of the measurement model

Initially, the validation process for the measuring instrument was performed based on convergent validity; then, the discriminant validity of the constructs and the reliability of each item were evaluated. The convergent validity of each construct was acceptable because all items had loads that were greater than 0.505 (Hair, Hult, Ringle, & Sarstedt, 2014); the individual reliability of each item was measured by the correlation loads of each item compared to each variable, finding that the loads for each indicator were significant in their entirety (Table 30). To measure the internal measurement coherence of all indicators in relation to their corresponding variables, Dillon-Goldstein's ρ, also known as the composite reliability index, was determined; all resulting values were higher than the minimum acceptable value of 0.70 (Gefen, Straub, & Boudreau, 2000). The Cronbach's alpha value was also determined (Table 31), obtaining values greater than 0.7, the minimum allowable value for confirmatory studies (Churchill & Iacobucci, 2004). Finally, the convergent validity was analysed again considering the variance, that is,

determining whether the variance that exists between the indicators and their construct is similar, which means that it must be greater than 0.50 of the variability explained by the indicators (Fornell & Larcker, 1981).

Table 31. Convergent validity of indicators

Variable	Cronbach's Alpha	Composite reliability	Average Variance Extracted (AVE)
Web quality	0.912	0.945	0.850
Trust	61.645	0.945	0.850
Interpersonal Trust	78.437	0.929	0.813
Social influence	62.584	0.923	0.800
Purchase intention	42.144	0.940	0.838
Tendency towards low prices	109.203	0.942	0.844
TPR web	66.838	0.952	0.869
Natural propensity to trust	56.272	0.939	0.793
Risk	74.988	0.958	0.883

In the second stage, discriminant validity was evaluated through a comparison between the average value for each variable and the correlation of each construct of each variable squared, finding that the values obtained for the square root of the average are higher than the constructs. Thus, it can be said that each variable is more highly related to its own items than with those of the remaining variables, and therefore, the discriminant validity of the measuring instrument is defined (Fornell & Larcker, 1981) (Table 32). Similarly, a test used by (Henseler, Ringle, & Sarstedt, 2014) (Table 33) was conducted, finding that all values are below 0.90, therefore confirming that the variables exhibit an acceptable level of discriminant validity (Henseler et al., 2014).

Table 32. Discriminant validity of indicators - Fornell & Larcker test

Web quality	**0.922**									
Use c2c	0.140	**1.000**								
Trust	0.690	0.147	**0.922**							
Interpersonal Trust	0.688	0.095	0.597	**0.902**						
Social influence	0.465	0.169	0.556	0.512	**0.895**					
Purchase intention	0.584	0.272	0.518	0.467	0.598	**0.916**				
Tendency towards low prices	0.696	0.171	0.538	0.591	0.562	0.655	**0.918**			
TPR web	0.824	0.130	0.706	0.695	0.519	0.596	0.712	**0.932**		
Natural propensity to trust	0.705	0.180	0.773	0.618	0.549	0.505	0.548	0.695	**0.890**	
Risk	0.331	-0.021	0.181	0.340	0.190	0.145	0.276	0.277	0.250	**0.940**

Table 33. Discriminant validity of indicators – Test Henseler and Ringle

	Web quality	Use c2c	Trust	Interpersonal Trust	Social influence	Purchase intention	Tendency towards low prices	TPR web	Natural propensity to trust
Use c2c	0.146								
Trust	0.754	0.154							
Interpersonal Trust	0.767	0.101	0.663						
Social influence	0.512	0.180	0.621	0.578					
Purchase intention	0.643	0.284	0.568	0.523	0.658				
Tendency towards low prices	0.765	0.178	0.590	0.659	0.616	0.722			
TPR web	0.897	0.136	0.767	0.769	0.566	0.652	0.776		
Natural propensity to trust	0.773	0.187	0.746	0.689	0.617	0.553	0.602	0.757	
Risk	0.360	0.022	0.197	0.375	0.205	0.157	0.303	0.298	0.271

8.4 RESULTS

Continuing with the analysis, the structural model test was performed, and re-sampling was conducted using the bootstrapping technique, with 1,000 sub-samples from the study's data and comparing the significance of the model parameters. All of this was done because the model fulfilled its predictive capacity by obtaining R squared values greater than 0.10 for the

explained variables (Hair et al., 2014). The R squared value was 0.658 for intention to use C2C and 0.520 for C2C trust.

In terms of confirming or disproving the hypotheses, we found that hypothesis 1 is significant (B = 0.272**), with a positive effect of intention to use C2C on purchasing in a marketplace, meaning that it is also a good predictor of the C2C purchasing decision process in Colombia. In turn, hypothesis 2 is positively supported (B = 0.290**), showing that for buyers, social influence is important when using C2C; Colombian buyers consider the recommendations of their immediate community when using and buying in a C2C marketplace. Hypothesis 3 is supported (B = 0.437**), showing a positive effect of searching for low prices on the use of C2C, which confirms that buyers highly value finding low prices in this type of electronic commerce, which, in turn, influences its adoption. Hypothesis 4 (B = -0.055) is not supported, which means that, in this case, buyers do not perceive risk as a decisive aspect for buying in C2C. The result for hypothesis 5 is significantly positive (B = 0.132**), validating trust as a precursor for the intention to use C2C marketplaces. On this basis, we can examine the hypotheses based on influencing factors. The first variable, which is marketplace web quality, is supported in hypothesis 6 (B = 0.111*); buyers trust in marketplaces that offer an easy to use and accessible web page that allows them to conduct transactions without interruptions, confirming the entire process and providing online help. Similarly, the outcome of hypothesis 7 is significant (B = 0.504**); the propensity to trust as a personality and cultural trait in Colombia is a relevant factor when buying through C2C electronic commerce. In turn, TPR is also supported as a precedent of trust in the marketplace; in other words sites that offer third-party support regarding quality assurance, warranty, payments, and other resources valued by users of these types of transactions will promote trust in their use, and therefore, hypothesis 8 is accepted (B = 0.232**). Finally, hypothesis 9 (B = 0.047) is not significant, given that Colombian C2C buyers do not consider interpersonal trust to be relevant when conducting these types of purchases. This result can be due to the reasons that occurred with risk perception; clients overestimate the dangers to which they are exposed when buying from others in C2C marketplaces and may thus associate these types of transactions with negative outcomes. Therefore, they do not grant importance to factors that they take for granted in the inherent nature of C2C marketplace transactions. It may also be due to the incorrect use of eWom

(electronic word of mouth) tools, which allow clients to comment and rate a seller and are not considered when deciding to buy or sell to another person in this country (Table 34).

Table 34. Summary of the validity of the structural model

Hypothesis		Effect	Original Sample (O)*	R squared	Standard Deviation (STDEV)	T Statistics (|O/STDEV)	P Values
H1	Accept	Purchase intention -> Use c2c	0.272**	Intención compra R= 0,658	0.050	5.381	0.000
H2	Accept	Social influence -> Purchase intention	0.290**		0.050	5.846	0.000
H3	Accept	Tendency low prices -> Purchase intention	0.437**		0.055	7.879	0.000
H4	Reject	Risk -> Purchase intention	-0.055		0.043	1.278	0.201
H5	Accept	trust -> Purchase intention	0.132**		0.050	2.631	0.009
H6	Accept	Web quality -> trust	0.111*		0.073	1.994	0.128
H7	Accept	Propensity to trust -> trust	0.504**		0.052	9.720	0.000
H8	Accept	TPR web -> trust	0.232**	Confianza R= 0,520	0.057	4.057	0.000
H9	Reject	Interpersonal Trust -> trust	0.047		0.064	0.744	0.457

Notes: Significant at: *p<0,05 t-value 1,960; **p<0,01, t-value 2,576

8.5 DISCUSSION AND CONCLUSIONS

The objectives of this study were a) to examine whether factors such as perception of trust, risk perception, social influence, and the search for low prices influence the adoption of C2C; and b) to verify whether the perception of trust to buy in C2C is, in turn, related to factors that precede the purchase, such as web quality and TPR as well as personality traits (propensity to trust and interpersonal trust). As the results show, marketplace users consider the following aspects as positive factors for buying/selling in this type of commercial platform: social influence, meaning they will consider comments and recommendations from close friends and family when buying/selling in a C2C site; in addition, they will use these types of places to search for a product at the lowest price available in the market (used or new); and, finally, they will conduct these transactions in marketplaces that offer optimal of conditions trust. As a result, this study provides detailed information on which aspects of trust users require to trust in the marketplace; the first is that the site exhibits basic web quality conditions, such as the platform design and whether its architecture works effectively; in addition, it should have TPR with respect to support, warranty, payment options, and quality, allowing the

user to generate the perception of trust required for these types of transactions, which have a high degree of danger regarding fraud and lack of fulfilment of purchasing conditions. This study has demonstrated that trust is also a cultural factor and that, in these types of countries with a Latin culture, people will tend to trust these types of transactions despite the risk that they entail, which may explain why C2C development and growth are high compared to other regions of the world. Finally, interpersonal trust, understood as positively valuing the comments and recommendations of other buyers when making decisions, has not been supported by our study, but it continues to be necessary for marketplaces to offer these spaces for communication between users because they are another source of trust that has been confirmed in previous studies.

Our study has been one of the first conducted in a Latin American country, specifically in Colombia, a leading country on the continent in the use of C2C; therefore, the findings provide a contribution to this line of research worldwide. We have verified that the main variables proposed in other studies in Asia and the USA were supported in our study; therefore, marketplaces must consider them in management guidelines to improve their commercial intermediation services and, in turn, to correct failures that arise, particularly regarding issues of support, security, and assurance of processes through third parties (TPR) in transactions.

The limitations of our research are basically centred on the generalization of marketplaces in our study, given that there are differences between them, and therefore, specific studies could be conducted for each of these (eBay, deremate, MercadoLibre, Amazon, etc.). Similarly, not including other countries in the region where C2C is very well developed, such as Argentina or Brazil, does not allow client behaviour to be extrapolated to the entire region or to Latin American countries in general.

Finally, more specific analyses can be conducted as future lines of research to complement this study. For example, the scales of e-quality for C2C purchases, proposed by (Zalatar, 2012) as the next step in the development of this line of research for these types of countries, can be measured to better analyse marketplace characteristics.

Annex 3. Questionary adoption C2c

Construct	Item	Literature support
Purchasing behaviour (AU)	AU3. How many times during the last year have you purchased or exchanged products or services with other people using a commercial intermediation web site (eBay type)?	Venkatesh (2012) Escobar & Carvajal (2014)
Purchase intention (BI)	BI13. I have the intention to use a commercial intermediation web site (eBay type) to buy or sell something in the coming days. BI5. In the future, I would buy or sell something using a commercial intermediation web site (eBay type). BI6. Do you prefer to buy or sell using a commercial intermediation web site (eBay type) compared to using traditional platforms?	Venkatesh (2012) Venkatesh (2012) Escobar & Carvajal (2014)
Social influence (SI)	SI1. The important people in my life such as family and friends recommend buying or selling to other people using a commercial intermediation Internet web site (eBay type). SI2. Other people I know (such as colleagues or supervisors) recommend buying or selling from other people using a commercial intermediation Internet web site (eBay type). SI33. If a leader or person who is publicly influential suggests buying or selling to other people using a commercial intermediation Internet web site (eBay type), it is probable that I will do so.	Venkatesh (2012) San Martín & Herrero (2012)
Tendency towards low prices (PO)	PO1. In general, I can save more money if I buy or sell to other people using a commercial intermediation Internet web site (eBay type) than anywhere else. PO2. I enjoy searching for the lowest price when purchasing from other people using a commercial intermediation Internet web site such as eBay. PO3. In general, I prefer to buy or sell to other people using commercial intermediation Internet web sites such as eBay because I can earn or save more money than through any other medium.	Escobar & Carvajal (2014)
Third-party recognition (TPR)	TPR1. I consider that third-party recognition seals work correctly in commercial intermediation Internet web sites such as eBay.	Yoon & Occeña, (2015).

	TPR2. In general, I think that the support of commercial intermediation Internet web sites such as PayPal is adequate for the protection of the interests of buyers/sellers. TPR3. I feel confident when I find the seal of third parties in commercial intermediation Internet web sites as guarantors of quality in the purchase/sales transactions I conduct.	
Perceived risk (PR)	PR1. In general, I think that buying from other people using the Internet is risky. PR2. In general, I think that paying other people by electronic means (credit or debit cards) is dangerous. PR3. In general, I think there is a possibility that buying or selling to other people using the Internet may generate problems for me as a result of the transaction.	Agudo-Peregrina (2014)
Trust (PT)	PT1. In general, I think that people who sell or buy in a commercial intermediation Internet C2C web site can be trusted. PT2. In general, I think that people who sell or buy in a commercial intermediation Internet C2C web site fulfil their promises and commitments. PT3. In general, I think that the technology of a commercial intermediation Internet C2C web site is reliable enough to buy or sell through it.	Agudo-Peregrina (2014) Escobar & Carvajal (2014)
Natural propensity to trust (NT)	NT1. In general, I think that people genuinely care about the wellbeing of others. NT2. In general, I think that the majority of people keep their promises NT3. In general, I think that the majority of people are honest in their relationships with others. NT4. I normally trust people unless they give me a reason not to trust them.	Yoon & Occeña, (2015).

CHAPTER 9. DIFFERENCES BETWEEN E-COMMERCE BUYERS AND NON-BUYERS IN COLOMBIA : THE MODERATING EFFECT OF EDUCATIONAL LEVEL AND SOCIOECONOMIC STATUS ON ELECTRONIC PURCHASE INTENTION[§§§]

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9.1 ABSTRACT

This study explores the differences between buyers and non-buyers in the adoption of electronic purchase intention in Colombia. Based on the Unified Theory of Acceptance and Use of Technology (UTAUT), a theoretical model that includes a set of five variables is established: performance expectations, effort expectations, social influence, facilitating conditions, and risk. The empirical results obtained from a final sample of 1,836 surveys emphasize the importance of performance expectations for both groups. Social Influence is another determinant of electronic purchase as well. In addition, an exploratory study of the moderating effect of the educational level and socioeconomic status for each group was performed, finding strong evidence of the influence of these demographic variables, which suggests that, as a conclusion that makes a great contribution to this country, access to electronic shopping is strongly related to educational level and socioeconomic status.

Keywords: e-commerce; UTAUT; purchase; Colombia; moderators; socioeconomic status; educational level.

9.2 INTRODUCTION

The rapid growth of services associated with the Internet has dramatically changed the role of technology in business because the web has redefined the parameters for conducting business in general (Faqih, 2016). Through the Internet, inefficient markets are now more efficient, allowing small businesses the opportunity to engage with large businesses in a more competitive environment. From these changes, e-commerce appears as the final stage in the evolution of the Internet as a direct commercial channel changing traditional commercial marketing schemes (Sánchez-Alzate & Montoya-Restrepo, 2016).

Various studies have been conducted to measure the adoption of electronic commerce geographically or by countries; most of these have focused considerable attention on factors that either facilitate or inhibit it (Cui & Pan, 2015). These include the study conducted by (Tan *et al.*, 2013), comparing the adoption of e-commerce in South Korea and Malaysia; (Lee & Chang, 2011) for Taiwan; (Çelik *et al.*, 2011) for Turkey; (Capece *et al.,* 2013) in Italy; (Abbasi *et al.*, 2011) who compares the countries of Pakistan, Portugal, and Austria; (Sheng & Zolfagharian, 2014) for the US; (Al-Maghrabi & Dennis, 2011) in Saudi Arabia; (Garin-Munoz & Perez-Amaral, 2011; Agudo Peregrina, 2014) in Spain; and (Riffai *et al.,* 2012) in Oman.

There are studies in Latin America such as that in Chile (Andrews & Bianchi, 2013), however; the studies in this region are scarce. More research on e-commerce can be found in Colombia, and those completed by (Tavera-Mesías et al., 2011), which identify the antecedents of the intended use of e-commerce in the country, stand out. Meanwhile, (Sánchez-Alzate, 2015) analyses how trust affects the intention to make online purchases and identifies which factors affect such trust in buyers and non-buyers at the local level, and (Sánchez-Alzate & Montoya-Restrepo, 2016) measure the perception of the service quality of internet shoppers.

Given this context, the difficulties in determining the optimal conditions for the adoption of e-commerce, and the scarcity of research (Cui & Pan, 2015), this study aims to provide an analysis of how the intention of e-procurement is generated for buyers and non-buyers in Colombia through the empirical application of the Unified Theory of Acceptance and Use of Technology (UTAUT). Furthermore, two moderating variables, “socioeconomic status”

and “educational level”, are included as direct influencers of the relationship between extrinsic variables and purchase intention. In conclusion, this article intends to contribute to the study of electronic shopping in general in the following ways:

1) By establishing what are the variables involved in electronic purchase intention for Colombian electronic buyers and non-buyers, detecting their differences in the perception of this commercial channel.

2) By performing an exploratory analysis of the possible moderating effect of the variables of “socioeconomic status” and “educational level” for buyers and non-buyers on online purchase intention in general for a country with these characteristics.

This study is organized as follows: the first part reviews the related literature and proposes the hypotheses. It is followed by a section that specifies the methodology of the empirical study and its results. Finally, a section discusses the results and proposes future research.

9.3 THEORETICAL BACKGROUND AND HYPOTHESES

The Unified Theory of Acceptance and Use of Technology Model (UTAUT)

Due to the diversity of the technology acceptance models with similar theoretical foundations, initiatives to develop unifying models have emerged, including the UTAUT proposed by (Venkatesh et al., 2003). The UTAUT was formulated from a conceptual and empirical synthesis of the above-mentioned models, providing a coherent theoretical perspective in the study of the adoption of online shopping (Çelik, 2016). The main concepts that group all of the adoption theories in the UTAUT are the following: performance expectation, expectation of effort, social influence, and enabling conditions; all of these influence the intention and use of technology behaviour (Table 1). Since its original publication, the UTAUT has served as a guiding model and has been applied to the study of a variety of technologies in both organizational and non-organizational contexts (Venkatesh *et al.,* 2012). According to (Williams, Michael-D., Rana, Nripendra-P., and Dwivedi, 2015), UTAUT is a model that can be very useful in describing the

adoption of e-commerce in its initial development because, in more mature developments, many concepts lose significance. In addition, there is a lack of studies that use this model in countries where e-commerce is less developed (Sánchez-Torres & Arroyo-Cañada, 2016).

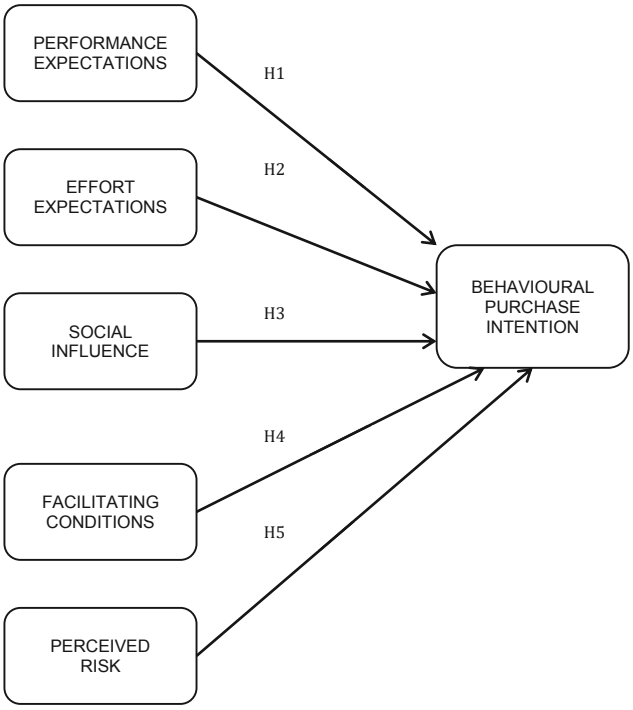
Table 35. Theories unified in the UTAUT

Theory / Model	Construct	Correspondence /Construct UTAUT
Theory of Reasoned Action (TRA)	Subjective norm	Social influence (SI)
Technology Acceptance Model (TAM)	Perceived performance Ease of use Subjective norm	Performance expectations (PE) Effort expectations (EE) Social influence (SI)
Motivational Model (MM)	Extrinsic motivation Intrinsic motivation	Social influence (SI) Efforts expectations (EE)
Theory of Planned Behaviour (TPB)	Subjective norm Perceived control	Social influence (SI) Facilitating conditions (FC)
Diffusion of Innovations Theory (DIT)	Relative advantage Ease of use Image Visibility	Performance expectations (PE) Effort expectations (EE) Social influence (SI) Facilitating conditions (FC)

Adapted from (Sánchez-Torres & Arroyo-Cañada, 2016)

Therefore, the following model hypotheses are proposed (Figure 15):

Figure 15. Proposed model from the UTAUT



Performance expectations

Performance expectations are understood as the degree to which the use of the system generates some benefits (Kim *et al.*, 2009; Tan *et al.,* 2013; Tavera-Mesías *et al.*, 2011; Escobar-Rodríguez & Carvajal-Trujillo 2014; Venkatesh *et al.*, 2003; 2012).

H1a: Performance expectations affect the intended use of electronic commerce by electronic buyers.

H1b: Performance expectations affect the intended use of electronic commerce by non-electronic buyers.

Effort expectations

These resemble the perceived ease of use concept and are the degree to which a buyer considers online buying easier and not very complex. (Escobar-

Rodríguez & Carvajal-Trujillo, 2014; Tan *et al.,* 2013; Kim *et al.,* 2009; Venkatesh *et al.,* 2003; 2012):

H2a: Effort expectations affect the intended use of electronic commerce by electronic buyers.
H2b: Effort expectations affect the intended use of electronic commerce by non-electronic buyers.

Social influence

Part of the subjective norm concept correlates the influence of social factors regarding intention and electronic shopping (Kim *et al.,* 2009; Escobar-Rodríguez & Carvajal-Trujillo, 2014; Venkatesh *et al.,* 2003; 2012; Agudo Peregrina, 2014):

H3a: Social influence affects the intended use of electronic commerce by electronic buyers.
H3b: Social influence affects the intended use of electronic commerce by non-electronic buyers.

Facilitating conditions

These group together the perceived behaviour control of technology and compatibility, referring to the degree perceived by the electronic buyer with respect to the support and infrastructure of the electronic channel (Agudo-Peregrina, 2014; Escobar-Rodríguez & Carvajal-Trujillo, 2014; Tan *et al.,* 2013).

H4a: Facilitating conditions affect the intended use of electronic commerce by electronic buyers.
H4b: Facilitating conditions affect the intended use of electronic commerce by non-electronic buyers.

Perceived risk

Perceived risk is the possible negative consequences arising from the use of purchase (Agudo Peregrina, 2014; Gunawan et al., 2008; Choon Ling et al., 2011; Chang & Zhu, 2011).

H5a: Perceived risk affects the intended use of electronic commerce by electronic buyers.
H5b: Perceived risk affects the intended use of electronic commerce by non-electronic buyers.

Probing new moderating variables of purchase intention

The UTAUT model makes use of moderating variables such as gender, age, the mandatory use of computer equipment, and the previous experience of users (Venkatesh *et al.*, 2012). However, the adoption of electronic commerce can also be affected by other factors such as socioeconomic status and educational level (Agudo Peregrina, 2014), especially in countries where the digital gap is high (Landau, 2012).
Socioeconomic status determines the purchasing power of buyers. It is important because it has been estimated that innovations traditionally break into society via subjects of high socioeconomic status (Rogers, 1995), and although there are no studies that analyse the moderating effect of socioeconomic status on models of e-commerce adoption, it has been found that users of e-commerce tend to have higher income levels (Agudo Peregrina, 2014).
Educational level is another traditional marketing variable, just like socioeconomic status. Adoption studies (Garin-Munoz & Perez-Amaral, 2011; Chen & Barnes, 2007; Chen & Dhillon, 2003) show greater levels of buyers with high levels of education (Porter & Donthu, 2006; Bellman *et al*., 1999; Soopramanien & Robertson, 2007; Allred *et al.,* 2006). In this same approach, other authors find that higher levels of education convey more information to shop online. Therefore, educational level may affect variables such as effort expectations and ease of use, and perceived risk versus electronic shopping may be reduced (Agudo Peregrina, 2014; Dennis et al., 2009).
From the above, the following hypotheses are proposed:

Moderating effects of socioeconomic status

H6a: Socioeconomic status exerts a moderating effect on performance expectations and its relation with to the electronic purchase intention of online shoppers in Colombia.

H6b: Socioeconomic status exerts a moderating effect on performance expectations and its relation with to the electronic purchase intention of non-online shoppers in Colombia.

H6c: Socioeconomic status exerts a moderating effect on effort expectations and its relation with the electronic purchase intention of online shoppers in Colombia.

H6d: Socioeconomic status exerts a moderating effect on effort expectations and its relation with to the electronic purchase intention of non-online shoppers in Colombia.

H6e: Socioeconomic status exerts a moderating effect on social influence and its relation with to the electronic purchase intention of online shoppers in Colombia.

H6f: Socioeconomic status exerts a moderating effect on social influence and its relation with to the electronic purchase intention of non-online shoppers in Colombia.

H6g: Socioeconomic status exerts a moderating effect on facilitating conditions and its relation with to the electronic purchase intention of online shoppers in Colombia.

H6h: Socioeconomic status exerts a moderating effect on facilitating conditions and its relation with to the electronic purchase intention of non-online shoppers in Colombia.

H6i: Socioeconomic status exerts a moderating effect on perceived risk and its relationship with to the electronic purchase intention of online shoppers in Colombia.

H6j: Socioeconomic status exerts a moderating effect on perceived risk and its relation with to the electronic purchase intention of non-online shoppers in Colombia.

Moderating effects of educational level

H7a: Educational level exerts a moderating effect on performance expectations and its relation with to the electronic purchase intention of online shoppers in Colombia.

H7b: Educational level exerts a moderating effect on performance expectations and its relation with to the electronic purchase intention of non-online shoppers in Colombia.

H7c: Educational level exerts a moderating effect on effort expectations and its relation with is related to the electronic purchase intention of online shoppers in Colombia.

H7d: Educational level exerts a moderating effect on effort expectations and its relation with is related to the electronic purchase intention of non-online shoppers in Colombia.

H7E: Educational level exerts a moderating effect on social influence and its relation with is related to the electronic purchase intention of online shoppers in Colombia.

H7F: Educational level exerts a moderating effect on social influence and its relation with is related to the electronic purchase intention of non-online shoppers in Colombia.

H7g: Educational level exerts a moderating effect on facilitating conditions and its relations with is related to the electronic purchase intention of online shoppers in Colombia.

H7h: Educational level exerts a moderating effect on facilitating conditions and its relation with is related to the electronic purchase intention of non-online shoppers in Colombia.

H7i: Educational level exerts a moderating effect on perceived risk and its relation with to the electronic purchase intention of online shoppers in Colombia.

H7j: Educational level exerts a moderating effect on perceived risk and its relation with to the electronic purchase intention of non-online shoppers in Colombia.

9.4 METHOD

Measuring Tool

Because the goal is to compare two groups of Internet users differentiated in terms of being non-users and users of electronic commerce, as explained when we built the model, a unique analysis of the basic variables that affect the electronic purchase is presented to use the same evaluating tool for the two groups. To test the hypotheses of the proposed model, items acquired from previous literature were used, choosing the measurement scale adapted from the Spanish study for the general adoption of electronic commerce in Spain (Agudo Peregrina, 2014). Similarly, to avoid comprehension problems with regard to the questions when using the language, a pre-test was performed using a group of 50 Internet users representing various cities in Colombia to evaluate each of the questions, without major changes in the proposed final tool (Annexed 5).

Table 36. Sample characteristics of Internet non-buyers

Demographic profile				Adoption of Internet and e-commerce profile	
Gender:		Age:		Frequency of Internet use:	
Male	46%	18-34 years old	76%	Once per month	1%
Female	54%	35-44 years old	12%	Sometimes per month	1%

		45-55 years old	12%	Once per week	3%
Educational level:		Economic level		Sometime per week	14%
Elementary	1%	(Income****):		Daily use	82%
High school	29%	Very low	17%		
Technical	32%	Low	32%		
University	35%	Medium	32%		
Postgraduate	2%	Medium-high	13%		
		High	5%		
		Very high	1%		
Civil Status:		People cohabitating in the household:		Experience with Internet use:	
Single, separated, widower	17%	1 person	6%	More than 10 years	31%
Married, civil union	83%	2 persons	15%	Between 5-10 years	41%
		3 persons	29%	Between 1-5 years	28%
		4 persons	27%	Less than 1 year	1%
		5 persons	22%		

Location:	
Zone 1 (Antioquia, Caldas, Quindío Risaralda)	17%
Zone 2 (Bogota, Boyacá, Cundinamarca)	26%
Zone 3 (Cauca, Valle del Cauca)	48%
Zone 4 (Atlántico, Bolivar, Cesar, San Andres, Magdalena, Santander)	8%
Zone 5 (Arauca, Caquetá, Huila Meta, Nariño, Tolima, Vaupes)	2%

* Adapted from the stratification used in Colombia according to public sources

Table 37. Sample characteristics of Internet buyers

Demographic profile				Adoption of Internet and e-commerce profile	
Gender:		Age:		Frequency of Internet use:	
Male	49%	18-34 years	75%	Sometimes per week	3%
Female	51%	35-44 years	17%	Daily use	97%
		45-55 years	8%		

Educational level:		Economic level (income[††††]):		Experience with Internet use:	
Elementary	0%				
High school	17%	Very low	5%	More than 10 years	50%
Technical	26%	Low	21%	Between 5-10 years	40%
University	41%	Medium	44%	Between 1-5 years	10%
Postgraduate	15%	Medium-high	19%	Less than 1 year	0%
		High	10%		
		Very high	2%		

Civil Status: Single, separated, widower	17%	People cohabitating in the household: 1 person	9%	Experience with e-commerce use: More than 2 years	40%
Married, civil union	83%	2 persons	18%	Between 1 and 2 years	27%
		3 persons	28%	Between 6 months and 1 year	33%
		4 persons	55%		
		5 persons	16%		

Location:	
Zone 1 (Antioquia, Caldas, Quindío Risaralda)	25%
Zone 2 (Bogota, Boyacá, Cundinamarca)	38%
Zone 3 (Cauca, Valle del Cauca)	31%
Zone 4 (Atlántico, Bolivar, Cesar, San Andres, Magdalena, Santander)	6%
Zone 5 (Arauca, Caquetá, Huila Meta, Nariño, Tolima, Vaupes)	1%

[*] Adapted from the stratification used in Colombia according to public sources

Sample and data collection

Because this is an exploratory study for the entire Colombian territory and given that the population in this country is mostly concentrated in large urban areas, it was decided to select Internet users in the major cities of the country, such as Bogota, Medellin, Cali, and Barranquilla, as the target population. Correspondingly, each city generated an area that geographically and culturally integrated other nearby cities. From this point, it was determined to create a quota sampling (Escobar-Rodríguez & Carvajal-Trujillo, 2014; San Martín & Herrero, 2012), taking into account the selection of

proportional data from each area as a first condition. The subsequent guidelines were for gender to be equitable and to disseminate the survey to all socioeconomic statuses of the population to avoid any possible bias (Tables 36, 37).

The mechanism of data collection was performed through an electronic questionnaire validated in other studies for this type of research (Agudo Peregrina, 2014b; Escobar-Rodríguez & Carvajal-Trujillo, 2014). To facilitate the responses, the methodology that was followed entailed the use of a questionnaire with multiple items per construct; to provide their answers, the respondents used a Likert scale ranging from 1 (= "I strongly disagree") to 7 (= "I strongly agree") to effectively measure variables that are not directly visible (Churchill & Iacobucci, 2004).

The period for data collection occurred from November 2015 to May 2016. To achieve the objectives of the fieldwork, a national team with coordinators in each of the central cities was created to manage the distribution of the questionnaire.

A total of 1,836 forms were obtained, of which 1,245 corresponded to online shoppers; 309 had consistency problems in the responses, and therefore, a final sample of 936 valid questionnaires for this group was obtained. Regarding the non-buyers, 875 forms were collected, and by eliminating 284 containing erroneous or inconsistent data, a final sample of 591 surveys for this group was obtained.

Results

Latent variable regression analysis used in this study was conducted with the SmartPLS 3.0 program, which is based on the optimization technique of partial least squares (PLS). This is a multivariate technique for testing structural models that are exploratory in nature, and it has also been used to test the UTAUT model due to the large number of latent variables that it contains (Escobar-Rodríguez & Carvajal-Trujillo, 2014; Kiwanuka, 2015; Matute Vallejo, Polo Redondo, & Utrillas Acerete, 2015). The analysis of the data was performed in two phases; the first assessed the measurement model, and the second examined whether the structural model was valid for both groups.

Table 38. Indicator's loads for both groups

Non-buyers			Buyers		
Indicator	Load	t-value*	Indicator	Load	t-value*
BI12	0.851	57.528	BI12	0.848	76.714
BI22	0.879	95.585	BI22	0.881	111.111
BI32	0.852	63.067	BI32	0.863	87.471
PE12	0.888	87.923	PE12	0.921	177.598
PE22	0.870	67.914	PE22	0.913	143.587
PE32	0.843	45.680	PE32	0.846	68.631
EE12	0.895	91.458	EE12	0.890	92.928
EE22	0.882	69.323	EE22	0.922	153.962
EE32	0.816	36.610	EE32	0.851	70.504
FC12	0.793	30.560	FC12	0.917	156.641
FC22	0.810	35.851	FC22	0.891	107.040
FC32	0.839	43.040	FC32	0.856	71.951
PR12	0.888	37.557	PR12	0.888	17.642
PR22	0.889	42.376	PR22	0.892	17.554
PR32	0.902	37.303	PR32	0.924	20.855
SI12	0.888	90.234	SI12	0.884	88.513
SI22	0.904	81.974	SI22	0.908	135.664

* All items had significance with p-value <0,001.

Validation of the measurement model

The validation process of the measuring instrument was performed from the exploratory analysis. The first step was to establish the convergent and discriminant validity of the constructs and the reliability of each item. The convergent validity of each construct was acceptable because they all had loads higher than 0.505 (Hair *et al., 2014)*. The individual reliability of each item was measured by the correlation between their loads and each variable. Table 38 verifies that the loads for each indicator were significant and validated.

To calculate the internal measurement consistency of all indicators in relation to their corresponding variables, Dillon-Goldstein's test, known as the compound reliability coefficient, was applied; all values were higher than the acceptable minimum of 0.70 (Gefen et al., 2000). In addition, the Cronbach's alpha test was applied, obtaining for both groups values above 0.7, the

minimum value allowed for confirmatory studies (Churchill & Iacobucci, 2004).

Finally, the convergent validity was analysed by once again taking into account the variance. In other words, there had to be a similar variance between the indicators and their construct, which must be greater than 0.50 of the variability explained by the indicators (Fornell & Larcker, 1981), being greater in the two groups (Table 39). The discriminant validity was verified by comparing the value of the average variance extracted (AVE) of each variable with the squared correlation of each construct's variable. The values obtained from the square root of the AVE were higher than those in the constructs, and therefore, it can be considered that each variable is more strongly related to their own items than to those of other variables, which is acceptable for both groups (Fornell & Larcker, 1981)(Tables 40 - 41).

Table 39. Convergent validity of the indicators

	Non-buyers		
Variables	Cronbach's Alpha	Compound reliability	Average variance extracted (AVE)
Facilitating conditions	0.750	0.855	0.663
Effort expectations	0.832	0.899	0.748
Performance expectations	0.835	0.901	0.752
Social influence	0.842	0.905	0.760
Purchase intention	0.825	0.895	0.740
Perceived risk	0.876	0.922	0.798
	Buyers		
Variables	Cronbach's Alpha	Compound reliability	Average variance extracted (AVE)
Facilitating conditions	0.866	0.918	0.789
Effort expectations	0.875	0.923	0.799
Performance expectations	0.866	0.918	0.789
Social influence	0.845	0.906	0.763
Purchase intention	0.831	0.898	0.747
Perceived risk	0.887	0.929	0.813

Table 40. Discriminant validity of the indicators – Fornell and Larcker Test

	Non-buyers					
	Facilitating conditions	Effort expectations	Performance expectations	Social influence	Purchase intention	Perceived risk
Facilitating conditions	**0.814**					
Effort expectations	0.603	**0.865**				
Performance expectations	0.539	0.747	**0.867**			
Social influence	0.472	0.623	0.577	**0.872**		
Purchase intention	0.441	0.619	0.748	0.549	**0.860**	
Perceived risk	0.303	0.331	0.262	0.175	0.202	**0.893**
	Buyers					
	Facilitating conditions	Effort expectations	Performance expectations	Social influence	Purchase intention	Perceived risk
Facilitating conditions	**0.888**					
Effort expectations	0.656	**0.894**				
Performance expectations	0.648	0.769	**0.888**			
Social influence	0.410	0.490	0.507	**0.874**		
Purchase intention	0.646	0.638	0.728	0.464	**0.864**	
Perceived risk	0.144	0.059	0.046	0.062	0.098	**0.901**

Table 41. Discriminant validity of the indicators – Test 2

	Facilitating conditions	Effort expectations	Performance expectations	Social influence	Purchase intention
Effort expectations	0.761				
Performance expectations	0.673	0.798			
Social influence	0.586	0.743	0.686		
Purchase intention	0.549	0.744	0.797	0.657	
Perceived risk	0.133	0.026	0.043	0.014	0.091
	Facilitating conditions	Effort expectations	Performance expectations	Social influence	Purchase intention
Effort expectations	0.752				
Performance expectations	0.747	0.776			
Social influence	0.478	0.569	0.592		
Purchase intention	0.759	0.740	0.753	0.550	
Perceived risk	0.157	0.072	0.050	0.072	0.108

9.5 VALIDATION OF THE STRUCTURAL MODEL

To continue with the structural model, another sampling was made through the bootstrapping technique. Using 1,000 sub-samples from the data of the study, a significant contrast of the model parameters was performed, all of the above, on the basis that the model has fulfilled its predictive ability by obtaining R^2 values greater than 0.10 (Hair et al., 2014). The hypotheses have been verified as follows: for the group of e-commerce users, the performance expectations variable was validated as having the highest incidence (H1a: B = 0.457), followed by effort expectations (H2a: B = 0.071), social influence (H3a: B = 0.088), and facilitating conditions (H4a: B = 0.261); although it was positive, the perceived risk construct was the only construct that was not significant (H5a: B = 0.031). For the non-online shoppers group, it was found that the variable with the highest incidence on future electronic purchase intention is performance expectations (H1b: B = 0.597), followed by social influence (H3b: B = 0.160), and, finally, with low but valid incidence, effort expectations (H2b: B = 0.078). Conversely, for the non-users of e-commerce, the variables of facilitating conditions (H4b: B = -0.001) and perceived risk (H5b: B= -0.008) were not validated (Table 8) (Figures 16 and17).

Figure 16. Model for e-commerce non-users

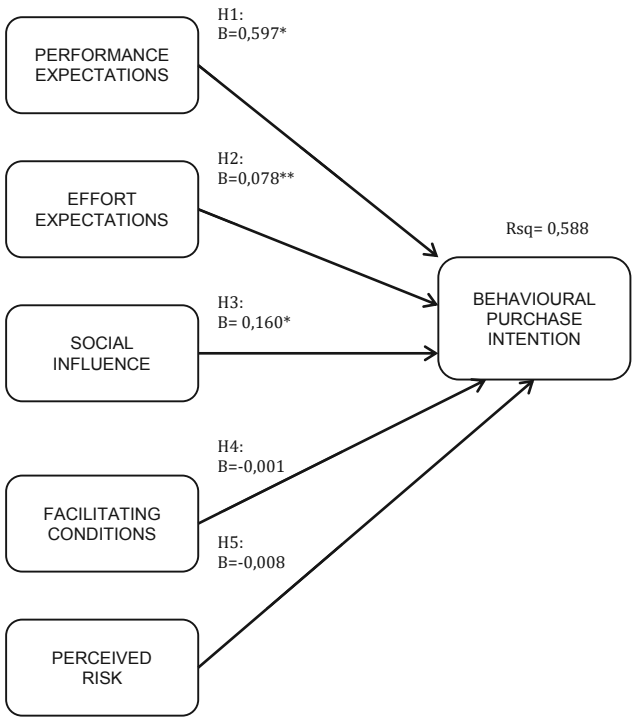
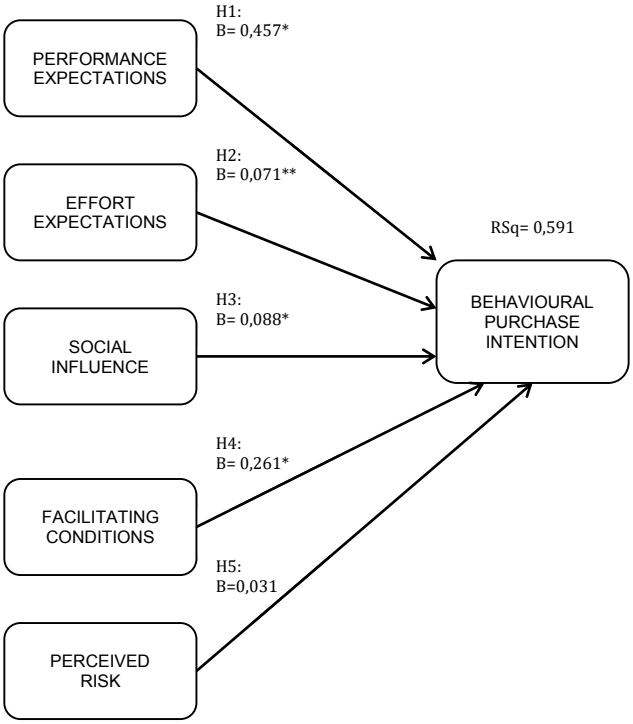


Figure 17. UTAUT model for e-commerce users



Analysis of the moderating effect of socioeconomic status

The moderating effect test for each of the model relations was applied, taking the socioeconomic status variable as the moderator. The results were that hypotheses H6g (B = 0.040) and H6h (B = 0.056) are significant for buyers, given that socioeconomic status exerts a positive moderating effect on the relationship between the facilitating conditions and purchase intention for both buyers and non-buyers. The remaining hypotheses are rejected (Table 42).

Table 42. Validation of moderating effects

Electronic non-buyers				
Effect	Original Sample (O)*	Standard Deviation (STDEV)	T Statistics (|O/STDEV)	P Values
economic->IS-PI	-0.010	0.045	0.056	0.564
economic ->ER-intention -> PI	0.016	0.051	0.326	0.745
economic ->risk-intention -> PI	0.002	0.029	0.061	0.952
economic -modera-facilitating cond. -> PI	0.056*	0.043	1.898	0.095
economic -modera-ee -> PI	-0.026	0.055	0.477	0.633
economic level_ -> PI	0.067	0.029	2.259	0.024
education->ER-intention-> PI	-0.111	0.042	0.618	0.239
education ->risk-intention -> PI	-0.007	0.029	0.229	0.819

education -modera-EE -> PI	0.097*	0.048	1.996	0.046
education -modera-Facilitating cond. -> PI	-0.010	0.039	0.265	0.791
education ->IS-IC	0.071*	0.046	1.850	0.043
education -> PI	0.019	0.028	0.684	0.494

Electronic buyers

Effect	Original Sample (O)*	Standard Deviation (STDEV)	T Statistics (|O/STDEV)	P Values
economic->CF-PI	0.040	0.019	0.032	1.890
economic ->Is-PI	-0.016	-0.017	0.026	0.626
economic ->ER-PI	0.031	0.031	0.039	0.798
economic -EE-PI	-0.026	-0.025	0.035	0.745
economic -R-PI	0.001	0.001	0.022	0.034
economic_ -> PI	0.060	0.001	0.198	0.020
education->CF-PI	0.065*	0.065	0.199	0.017
education ->EE-PI	0.022*	0.024	0.234	0.009
education ->ER-PI	-0.057*	-0.059	0.198	0.046
education ->Is-PI	0.032*	0.032	0.225	0.004
education ->PR-PI	-0.022	-0.020	0.032	0.864
education -> PI	0.043	0.013	0.221	0.021

* p < 0,001, **p < 0,005

Figure 18. Moderating effects of socioeconomic status on purchase intention for electronic buyers

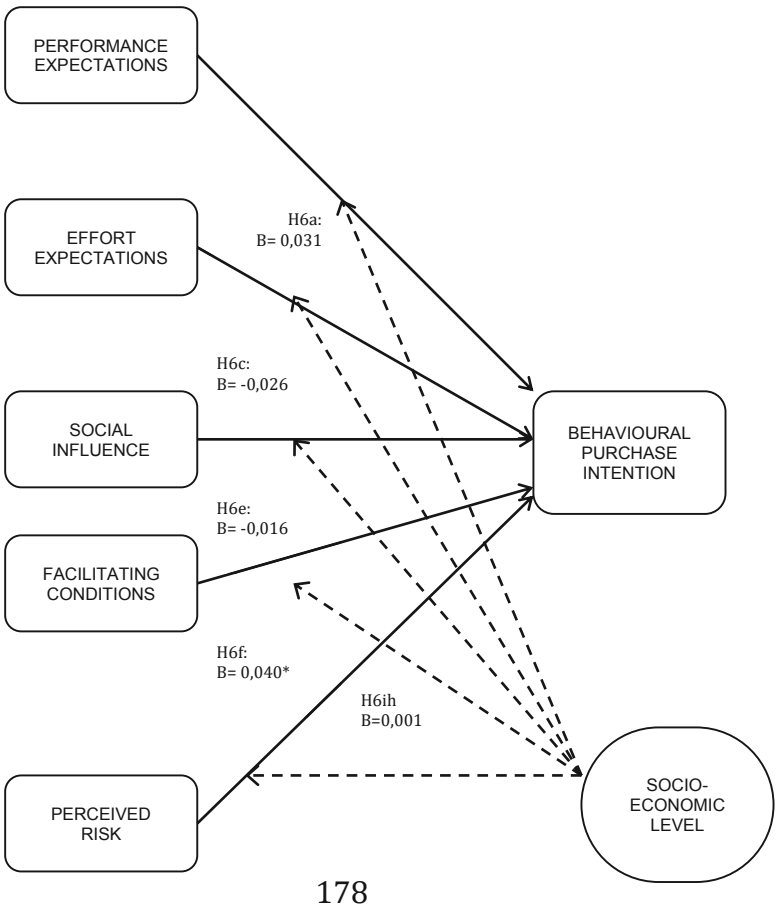
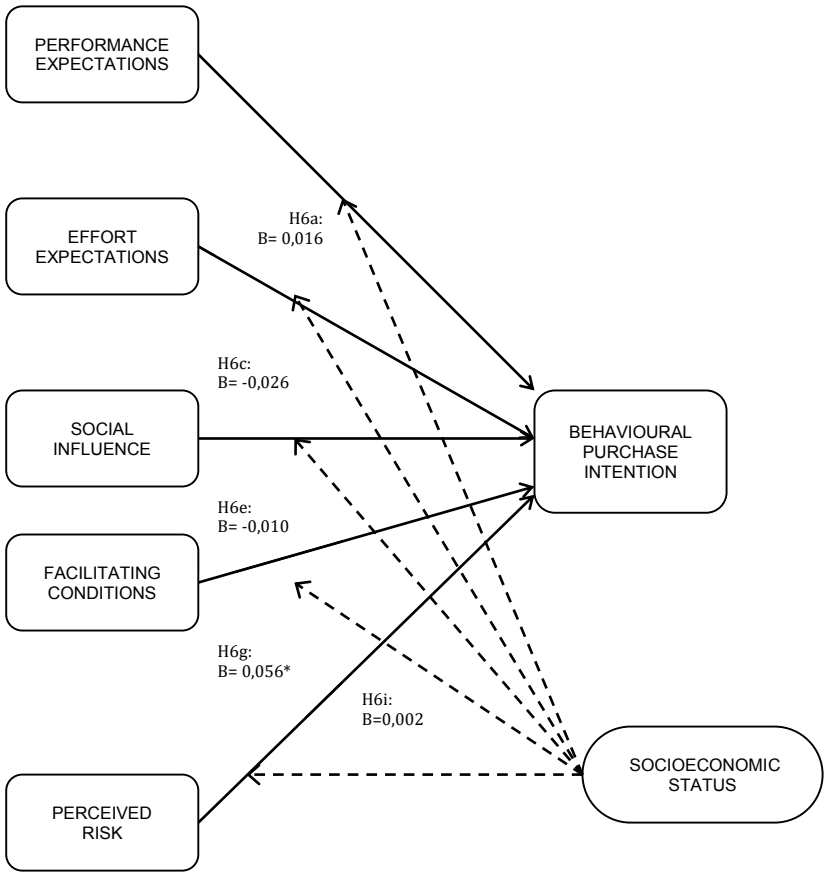


Figure 19. Moderating effects of socioeconomic status on purchase intention for electronic non-buyers



Moderating effect of educational level

In the case of the moderating effects of educational level on non-online shoppers, hypothesis H7d (B = 0.097) is validated; that is, educational level has an effect that increases the positive influence of effort expectations on electronic purchase intention. The same occurs with hypothesis H7f (B = 0.071) because a higher educational level generates a greater social influence, affecting electronic purchase intention.

In the case of buyers, the following hypotheses were validated: H7g (B = 0.065), i.e., the higher the educational level is, the greater the incidence of facilitating conditions in electronic purchase intention; H7E (B = 0.032), i.e., educational level's positive effect on the relationship between social influence and electronic purchase intention is validated; H7c (B = 0.022), i.e.,

educational level exerts a positive effect on the relationship between effort expectations and electronic purchase intention; Finally, H7a (B= -0.057), i.e., educational level exerts a negative effect on the significance of the relationship between performance expectations and electronic purchase intention (Table 21).

Figure 20. Moderating effects of educational level on purchase intention for electronic buyers

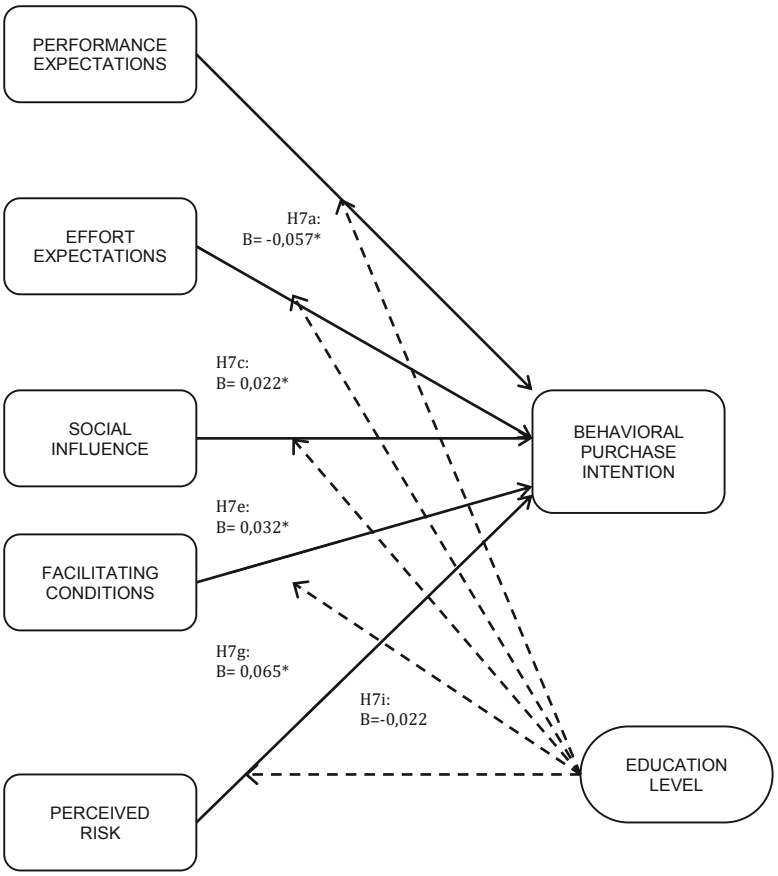
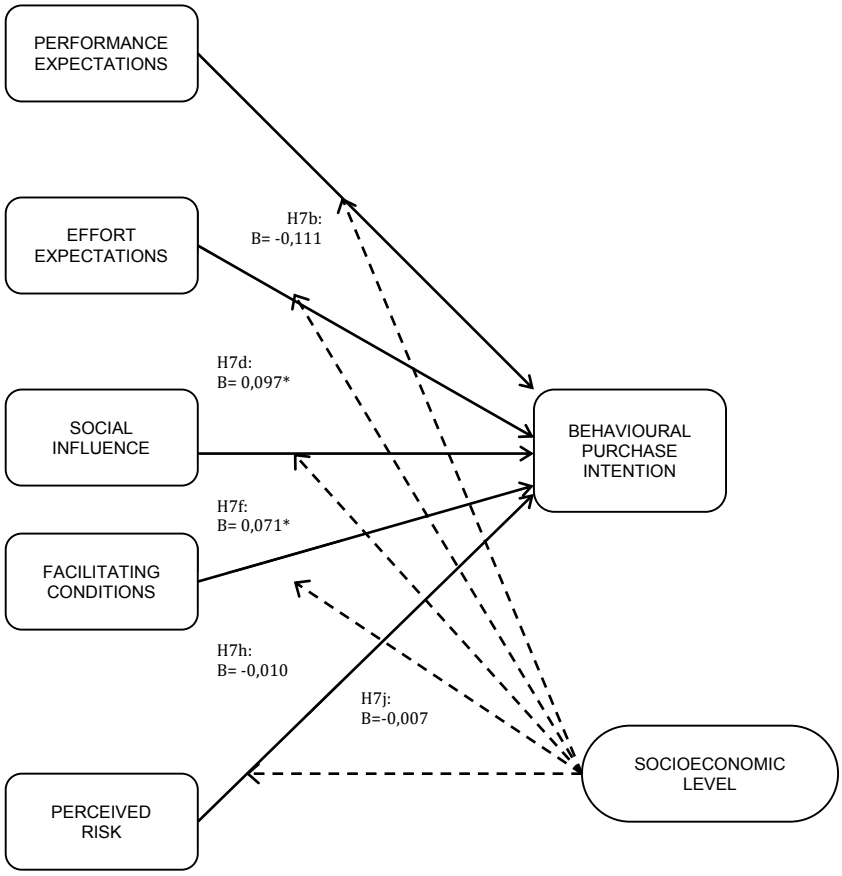


Figure 21. Moderating effects of educational level on purchase intention for electronic non-buyers



9.6 Discussion and Conclusion

Theoretical contribution

This article aims to perform a comparative analysis between electronic buyers and non-buyers in Colombia with regard to the factors that affect electronic purchase intention. Similarly, through an exploratory analysis, it whether there is a moderating effect of the variables of socioeconomic status and educational level for both groups is examined. The results confirm that there are differences in the adoption of electronic purchase intentions between the two groups.

As a first theoretical contribution, the basic variables proposed in the UTAUT model concerning the adoption of electronic purchase intention

*(*Venkatesh *et al.*, 2012; 2003) by electronic buyers have been validated, with a high incidence of performance expectations in both groups. This finding confirms one of the most important relationships in the literature for electronic consumers in other countries (Castañeda *et al.*, 2009; Escobar-Rodríguez & Carvajal-Trujillo, 2014; Lee & Chang, 2011; San Martín & Herrero, 2012).

In addition, effort expectations are another factor that influences the intended use of e-commerce in Colombia for the group of buyers and that corresponds to previous studies that require the buyer to have motives that are related to the positive utility generated by the use of this technology (Al-dwairi, 2013; Capece *et al.*, 2013; Castañeda *et al.,* 2009; Delafrooz *et al.*, 2011; Riffai *et al.,* 2012; Tan *et al.,* 2013). Conversely, in the case of non-buyers, this variable has a very low validation because they may not perceive a high utility in using this commercial cannel, which would be a major reason not to use it. This result can also relate to the DIT (Rogers, 1995), in which late adopters dislike using something new because they feel that adopting it will not be necessary.

Following this validation order for the variables in the UTAUT model, another important predictor of the intention to use e-commerce is social influence, which has been positively validated for both groups, with a significant difference between them. First, regarding buyers, this relationship has a low validation, indicating that, possibly, relying on the statistics of the sample of experience in the use of e-commerce (approximately 70% of the online shopping for more than one year) (Table 3) may explain these results. According to Rogers (1995), experience shows that buyers no longer take into account the opinions of others to make a utilitarian use of e-commerce. Additionally, for non-buyers, the experience is zero, which can therefore validate this relationship to a greater degree, given the same results in previous studies in which the adopters were beginners (Al-Maghrabi & Dennis, 2011; H. Kim et al., 2009; Sánchez-Torres & Arroyo-Cañada, 2016).

One variable linked to the tools facilitating the use of this technology is facilitating conditions, which have been validated for the group of buyers, confirming the proposal of the UTAUT model regarding electronic buyers' need to have technical conditions that enable them to make purchases effectively; however, this variable was not validated for non-buyers.

Finally, the perceived risk variable is not validated for the two groups. For buyers, although the perception of risk in online shopping is positive, it is not

significant, which can be attributed to the perception of risk in business to consumer (B2C) purchases, i.e., recognized websites and the security in banking system-related means of payment, leading to the rejection of this variable as a determinant of electronic purchase intention. In the case of non-buyers, this relationship is negative and very low; although this group is clearly distrustful of online shopping, the levels do not allow for verification.

To close this first analysis, the UTAUT model for the purchase intention of two groups of Internet users in Colombia (buyers and non-buyers) is verified. For buyers, the results consistently validate the relationships between the predictor variables and the dependent variable, noting that the R^2 is greater than 0.590 (Table 8), which reinforces that the model has measured a large proportion of the variables that a person takes into account to generate Internet purchase intention in general and according to previous studies of e-procurement in other countries (Al-Qeisi & Al-Abdallah, 2013; Escobar-Rodríguez & Carvajal-Trujillo, 2014; San Martín & Herrero, 2012; Tan *et al.*, 2013; Venkatesh *et al.,* 2012). For non-buyers, this study is one of the first to describe their intention to adopt e-commerce, equally validating the model as a good predictor of these relationships, with an R^2 of 0.588 (Table 8).

Regarding the exploration of the possible moderating effects of the socioeconomic status and educational level variables, this study has validated that socioeconomic status has a positive moderating effect on the relationship between the facilitating conditions and purchase intention variables for both groups (Figures 18, 19). The above can be related to the studies of (Rogers, 1995), who find that a higher economic level facilitates the access to and enjoyment of new technology, given that people with lower incomes are more affected by the cost of the goods that are necessary to connect to the Internet and, therefore, facilitating conditions are not be considered to be an influential and positive factor (Sánchez-Torres & Arroyo-Cañada, 2016). Hence, this finding may be related to the fact that, in the non-buyers, the facilitating conditions variable is not significant because 49% of buyers have lower income levels (Table 3).
In addition, it has been found that educational level has a moderating effect on both groups (Figures 20, 21), although this effect has been stronger for buyers in the following relationships: between social influence and purchase

intention, effort expectations and purchase intention, and facilitating conditions and purchase intention; there is a negative moderating effect on the relationship between performance expectations and purchase intention. The results regarding educational level and its moderating effect regarding social influence may be because, when adopters gain more knowledge, they tend to share information related to their experiences among each other (Rogers, 1995). Social influence has been validated as influential in purchase intention, and buyers have a high degree of educational levels, with 81% of them having completed the first, second, and third cycles of higher education (Table 3), which supports the exploratory results for this group.

The next moderating effect of educational level on the relationship between effort expectations and purchase intention has been proposed by (Rogers, 1995), given that the higher the knowledge acquired is, the easier it is to handle technology. This may also explain the positive moderation in facilitating conditions, given that, for people with higher education levels, it is easier to use e-commerce (Agudo Peregrina, 2014b; Garin-Munoz & Perez-Amaral, 2011).

The negative moderating effect of educational level has been validated for this group with regard to the relationship between performance expectations and purchase intention. This may occur because a higher acquired knowledge tends to generate a more advanced use of e-commerce and, therefore, high experience, which may decrease the expectations regarding the benefits of its use for this group of buyers and become negative.

Finally, in the case of non-buyers, it has been shown that there is a positive moderating effect of educational level on the relationship between effort expectations and purchase intention, which may be logical for this group of e-commerce non-adopters. Given that, in the scale proposed by Rogers (1995), people with higher levels of educational attainment are placed as innovative adopters because they are more knowledgeable, they tend to evaluate new technologies positively and as having high value (Rogers, 1995; Sánchez-Torres & Arroyo-Cañada, 2016). Furthermore, the moderating effect exerted by the education of non-buyers on the relationship between social influence and electronic purchase intention is valid. These results can be equally related to the buyers, given that people who have more information and knowledge tend to share it among the other members of the community (Rogers, 1995).

Practical and business contribution

This study contributes to describing the adoption of electronic purchase intention in a developing country, where studies related to this context are scarce (Kiwanuka, 2015; Sánchez-Torres & Arroyo-Cañada, 2016). The electronic consumer in Colombia considers e-commerce to be very valuable, which is reflected in their performance expectations, the strongest predictor of the intention to engage in electronic shopping. E-commerce is perceived as something useful that offers great benefits when used, which is a great opportunity for companies to market their products and services through this channel.

Limitations

The main limitation of this study was that, when conducting a nationwide study that is exploratory in nature in terms of understanding the dynamics of the adoption of e-commerce from a general perspective, products and services that have a different characteristic affecting the purchasing decision are ignored, and therefore, there could be a different adoption for each type of good or service marketed over the Internet in Colombia.

Suggestions for future research

It is recommended for future research on the adoption of e-commerce in other countries to conduct cross studies between buyers and non-buyers, especially in countries where the development of e-commerce is strongly conditioned by a digital gap (Landau, 2012; Sánchez-Torres & Arroyo-Cañada, 2016). Regarding the moderating effects discovered in an exploratory manner, it is necessary to examine whether they are similarly generated in other countries with the same level of e-commerce adoption or whether, instead, they have only been found in this study because it is possible that, in countries with a high development of e-commerce, the moderating effect of socioeconomic and educational level.

Annex 4. Questionary adoption B2c Buyer – Non buyer

Construct	Item	Support literature
(BI)	BI1. I intend to use the Internet to buy something in the next few days BI2. In the future, I would buy something using the Internet BI3. I prefer to shop using the Internet than traditional channels	Venkatesh (2012) Escobar & Carvajal (2014)
(PE)	PE1. In general, I think that buying online is very useful. PE2. In general, I think that buying online gives me advantages over traditional forms of purchase (physically in stores) PE3. Overall, I think that buying on the Internet does not take a long time when I perform the operation.	San Martín & Herrero (2012) Venkatesh (2012)
(EE)	EE1. In general, I think that buying online is easy and simple. EE2. In general, I think that buying online allows me to do it my way, and I am the one who manages the purchase (time, date, etc.) EE3. In general, I think that buying online does not require a lot of learning.	San Martín & Herrero (2012) Venkatesh (2012)
(SI)	SI1. The important people in my life, such as family and friends, recommend that I purchase online SI2. Other people I know (for example, my colleagues or bosses) recommend buying over the Internet.	Venkatesh (2012)
(FC)	FC1. I have what I need (computer, Internet access, credit card, debit card, or other means of payment, etc.) to make an online purchase. FC2. I have the knowledge to perform the entire buying process online (entering the web, browsing, shopping, and paying online) FC3. Typically, on the websites where I buy, I have help or support when there are problems during the purchase.	San Martín & Herrero (2012)
(PR)	PR1. In general, I think that buying online is risky PR2. Overall, I think that paying by electronic means (credit and debit cards) is dangerous PR3. In general, I think that there is a possibility that buying over the Internet can generate problems with the outcome of the purchase	Agudo-Peregrina (2014)

CHAPTER 10. CONCLUSIONS

10.1 GENERAL CONCLUSIONS

In response to the main objective of the research, which sought to identify the differences in the influence on the intention to buy and the actual purchase behavior of the Colombian electronic consumer and non-consumer and the effect of the digital divide on them.

From the point of view of the characteristics of the Colombian electronic buyer in general, it can be said that this study allowed me to validate several of the typical characteristics of this type of buyer for a developing country, being one of the first works of investigation at population level to date in a Latin American country. Likewise, moderating effects proposed in other similar studies have been ruled out, but two moderating effects have been demonstrated that had not been tested with the UTAUT model in an empirical way, until now. Likewise, this study was one of the first to analyse the behavior of non-electronic buyers with the characteristics of a developing country, providing results on their motivations regarding the electronic channel. The implications of these results will help governments and companies to better define the operation of this new commercial channel and consequently, the development and massification of its use (Development of web security, electronic payment methods, online purchasing processes, shipping methods, access to the network, etc.). Finally, this study has proposed a comprehensive index to measure the digital divide, allowing a complete analysis of this phenomenon using macroeconomic aggregation data. To be more specific, the conclusions are:

1. Determine factors that positively influence user acceptance behavior to be considered, other than those identified by existing technology acceptance models.

A review of the literature in which this study appears (Sánchez-Torres & Arroyo-Cañada, 2016) found that in most of the previous studies, the models used were mainly TAM, TAM2 and other behavioural models that did not examine all variables, so it was decided to apply the UTAUT 2 model, including more than five variables in most of the analyses performed in the different types of electronic commerce in Colombia. This research is one of the few that has proposed that in these types of countries, development policies in the ICT and Internet sector are key, although the results were specific to Colombia. The results verified the meaning of most of the

variables, reinforcing this line of investigation of the behavior of the virtual consumer in general.

Being more specific, in the case of electronic banking, three variables have been validated that strongly influence the confidence in the use of electronic banking. Firstly, the quality of the information, referring to the web architecture, electronic processes and attention to the client during the transactions on the Internet. Following that, the perceived privacy, since the financial information is of high importance to the user and they want to be sure that their personal data will be confidential. Finally, perceived security in electronic banking, an aspect where financial institutions show great development and preparation in their anti-fraud technology and secure access.

As for the classical variables of the adoption models in the case of electronic banking, the results were contradictory, with the variable expectations of effort being insignificant, which may be due to the novelty of this system within the country, suggesting that it is still challenging for users, and therefore the perception is the difficulty of use.
Analysing the adoption of electronic government, the variables trust and expectations of effort were validated, reinforcing the theoretical hypotheses that citizens adopt this channel when they have confidence in it. Since this is institutional, this variable is fundamental in citizen-government relationships; with regard to the expectations of effort, it has been verified that the greater the ease of use of the electronic channels to carry out citizen procedures and other operations for public institutions, the greater their intention and use. However, the results of variables such as performance expectations were not significant, given that the context of this country makes citizens not consider online government to be of benefit to them. This may be due to many factors, among those: the low level of development of processes and electronic services, their high cost of use, and that it is more beneficial to a citizen to carry out their governmental procedures in person.
Social influence, as well as non-significance, can be given because these types of relationships do not require the influence of third parties since they are necessary to perform in most cases, also because the sample of their psychosocial characteristics can be independent of external influences to adopt this type of service. The government support variable was also insignificant, something that can be associated with the fact that electronic

banking belongs to the private financial system and that the state's internet use programs are not directly linked to the use of electronic banking.

Finally, in the case of e-government, it was demonstrated in one of the first studies on the adoption of this type of e-commerce, that the variable government support is validated as influential in both the intention and the use of e-commerce. This makes its importance to that same government clear - when it makes Internet development policies, creates access to citizen benefits, or implements electronic government services.

In the case of the C2C, this study presents a model that also focuses on analysing the precedents of trust for this type of transaction. Due to their nature, they tend to generate more mistrust. This is why the proposed model has significantly validated the psychological and intrinsic factors: interpersonal trust and confidence propensity, as key factors in a buyer of this type of e-commerce, as well as extrinsic factors of the marketplace, Web quality and TPR web (Certificate of a third recognized mark). Likewise, social influence is also validated as influential for this type of shopping and the intrinsic factor of low price seeking.

With respect to electronic commerce in general B2c, Colombian electronic buyers behave in the same way that the UTAUT2 model predicts for most variables, social influence, performance expectations, orientation towards low prices, confidence, conditions facilitators and the perception of risk.

However, this study has found that the variable effort expectations were insignificant - a factor that may be due to the recent implementation of this type of purchases in this area, which may present that the web pages of purchases, the purchase process, and the payment process present many problems and suggest that to the buyer, it seems that this type of e-commerce does not generate ease of use.

Another factor that may lead to this deduction is that the previous factor of trust in electronic purchases, the perceived privacy variable, was not significant: i.e. the buyer thinks that the purchase information, for example a website’s shopping database records, will not be administered in a cautious manner, and this generates mistrust.

In general, for all types of e-commerce in Colombia, buyers highly value that the networks offer security, quality and privacy mechanisms. Likewise, this commercial channel is being used to search for low prices compared to traditional channels. It is worth considering that consumers still do not see e-commerce in general in Colombia as easy to use, as will be explained in the following conclusions, which may be linked to the level of digital divide presented by the region.

These results prove that the behavior of the virtual consumer will be governed first and foremost by a group of basic factors which have been widely approved in the line of research, and that without these the consumer loses interest in the use of e-commerce. These facts suggest that companies and governments should focus first on resolving these types of shortcomings, and then apply the other factors in their incentive to use this commercial channel.

Describe the general behaviour of users and non-users in the adoption of e-commerce.

Regarding the differences in the population that has already adopted the e-commerce B2c with respect to those who have not yet done so, it should first be pointed out that this country is in a state where the use of e-commerce is incipient (only 10 % of internet users were buying online by UN. CEPAL, 2015), then we have a small group of initial adopters that can be established within the Rogers diffusion model as the third stage, and we see that most of the population has not adopted e-commerce, therefore, for adopters, the factors that predispose them to the use of e-commerce are social influence, performance expectations, effort expectations, and facilitating conditions. For non-adopters, the facilitating conditions are not valid, demonstrating that there is no access to this commercial channel for various reasons that are linked to base necessities that would enable them to carry out this type of purchases; from knowing how to operate a computer to connecting to the Internet, the quality of their local Internet connection, as well as making the purchase and its payment through electronic means. For example, in Colombia, the use of credit cards is very low compared to other countries in the region and world.
Again, this study presents results that are related to the digital divide that affects this region.

Propose a model for measuring the digital divide that includes all indicators suggesting literature, to determine the level of digital divide in Colombia.

This study proposes a new index to measure the digital divide of several countries based on multiple indicators. Four dimensions are proposed to group all items used in the literature for the analysis of digital divide: Context Country (Context-Related), Aptitude (Motivational- Related), Competency (Skills-Related), Outcomes (Usage-Related). In order to construct an index to measure the digital divide in a number of countries and compare them, the joint use of fuzzy logic and distances is proposed; the weighted Hamming distance (WHD) is a useful tool to compare a set of countries with the ideal based on a set of indicators.
The results have generated a complete measurement system that groups the largest number of macroeconomic indicators that can be obtained in an open way, which allows one to evaluate if the governmental policies are effective for each country.

Determine whether the digital divide adversely affects the adoption of e-commerce in Colombia.

This study used the analysis of the moderating effect of socioeconomic variables, educational level and income level to establish if the digital divide interferes in making the decision for, or against the use of e-commerce in this country. Since the digital divide is the barriers to access to the Internet and ICTs, attention is focused on the barriers to access to physical technology. That is, the possibility of an individual having unrestricted access to the equipment and networks necessary to carry out the electronic purchase will be greater when there is a smaller digital divide, and on the contrary, the greater the digital divide, the greater the social excitement around the use of e-commerce. The results have shown that for this country, educational level in regards to the use of e-commerce have a strong moderating effect, that is to say, those with higher levels of education tend to validate the purchase model more than those who have lower levels of education. This is a latent symptom of the digital divide's effect on the adoption of e-commerce.
Regarding the level of economic income, the results were positive with respect to their moderating effect on the relationship between the expectations of effort with respect to the intention to use e-commerce and the

facilitating conditions with respect to the intention to use e-commerce. Again, the results show that the digital divide is latent since the less basic resources the individual has, the less they perceive e-commerce as easy to use, and the less access to technology they have, which prevents them from being able to make electronic purchases.

10.2 FUTURES LINES OF RESEARCH

This study has been one of the few studies that has amiably sought to examine the adoption of different types of e-commerce by the individual at a social level, that is, we did not want to analyse an isolated or specific behavior of a product, a company, a brand, but of the behavior of a group of inhabitants of a developing country such as Colombia, being therefore a study of great impact not only for this country but also for the region and for other Latin American, African, Asian and Oceanian developing countries that may present the same contexts regarding the diffusion and development of e-commerce.

This study leaves open two broad lines of research to continue: first, regarding the investigation of the adoption of e-commerce in Colombia and as discussed in each of the published works, specific analyses should be valued and differentiated with respect to specific purchase intentions by type of product, sector, etc.; since it can not be omitted that the bias of grouping the purchase decision in general into a single model may not reflect reality clearly; however, and being the valuable contribution of this study, the presented results are a correct diagnosis of this context at present and must be taken into account for those future studies.

Finally, the second line of research proposes extending the study to other countries in the region, or in other continents but that share certain developmental characteristics, as a comparative study to verify if the digital divide is affecting the development and diffusion of this commercial channel in other countries in the same way. Also, consideration should be given to analysing the moderating effects of educational level and socioeconomic level characteristics to contrast the findings of this research and to verify if they are involved in the relationships of e-commerce adoption models.

CHAPTER 11. REFERENCES

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