Abstract

Electronic commerce is the new technology that companies use to offer a variety of their products and services at low prices to consumers. Consumers exist that ask just how safe it is to give personal information at the time of making a commercial transaction. This research was geared towards determining possible factors that are most relevant and that affect the consumer's trust when using electronic commerce and what their perception is related to this. Issues such as, security, privacy, risk, experience using Internet, and the website quality were explored and a Trust model was applied. Two hundred (200) questionnaires were collected from a private university. The results showed that significant differences exist among consumers with high and low perceived security, perceived privacy, perceived risks, and the perception of website quality. However, the factor of experience using the Internet showed that no significant difference exists in consumer trust towards electronic commerce. The study suggests that virtual businesses should adopt innovative strategies in their infrastructure.

Keywords: Electronic Commerce, Perception, Trust, Privacy, Security.

JEL codes: L29, M30, M39, O39.
1. Introduction

Ever since man has existed, he has been concerned with the process of commerce, making it one of the oldest events known. The *Diccionario de la Lengua Española* (2001) defines the concept of commerce as *the negotiation that occurs when buying, selling or exchanging merchandise*. However, this event has evolved throughout time as a result of new technologies. The growth and development of companies, communication technologies, and the exchange of information, as well as how the ideas have provoked the use of Internet as a tool to carry out daily operations particularly electronic transactions that have benefitted everyone in society. Certainly, the Internet has been converted in the new vehicle for communication, so much so, that it has generated great opportunities on the market and the consumers benefit from the ease of access and the variety of products and services that are available without leaving their homes. Ruiz and Sanz (2007) point out that the growth of distance buying and the new technological tendencies open doors to the implementation of electronic marketing and promises new ways to impact and serve the consumers in the future.

The economy has adopted other elements to become more competitive in the global market. This is a digital economy, where the term is meant to describe the markets that are centered on digital technologies that facilitate the commerce of goods and services through electronic commerce. The digital economy has opened new paradigms for communication (Rufín & Medina, 2013). If the objective of online environments is, the same as traditional markets, establishing long term relationships with clients, then the hypermedia environments pose new challenges to establish long term bonds and links with clients due to the number of media and supports developed (Mukherjee & Nath, 2007; Rufín et al., 2013).

Porter (2001), states that electronic commerce provides products and services where competitors cannot imitate (within a short period) and allows the development of unique products, exclusive property rights, differentiated processes and personalized products and services. The Internet provides the opportunity to carry out extraordinary events never before imagined. The potential of the Internet for business to carry out electronic commerce has received major attention in related literature (Alba, Lynch, Welrtz, Janiszewsky, Lutz, Sawyer & Wood, 1997; Peterson, Balasubramanian & Bronnenberg, 1997; Lin & Yu, 2006). According to Reddy and Lyer (2002), electronic commerce is the process of buying and selling goods and services on the Internet. It represents the *business transactions that take place on the telecommunication networks and entails a process of buying and selling products, services, and information through computer networks* (Turban, King, Lee, Warkentin, & Chung, 2002; Sosa, 2005). However, these advances have generated concerns related to the use and availability of information on the part of consumers.

This article presents the results of research whose objective was to know the most relevant factors that influence the trust in using electronic commerce in Puerto Rico and the perceptions related to it. The principal objective was to develop a conceptual
framework that could determine the trust that consumers have in Puerto Rico when conducting transactions through electronic commerce.

2. Theoretical framework and hypothesis of the research

2.1. Determiners of consumer trust towards electronic commerce

Different investigators have taken the initiative of studying different models of trust on the web. The efforts made by the investigators in analyzing trust have centered on the determination of those factors capable of acting as precursors (Flavián & Guinalíu, 2007). Some researchers point out the importance of the perceived reputation of the website (Kollock, 1999; Jarvenpaa, Tractinsky, & Vitale, 2000; Walczuch, Seelen & Lundgren, 2001; Flavián et al., 2007). It has also been proposed that greater familiarity with the website favors a higher level of trust with it (Gefen, 2000; Walczuch et al., 2001; Flavián et al., 2007).

Other investigators have developed a variety of models to establish a relationship between trust and the electronic commerce, as is the case of the researchers Lee and Turban (2001) who through their research examined various aspects about trust and electronic commerce. They later designed a model of trust towards electronic commerce. According to this model, the level of trust can be determined under numerous variables, such as, security, privacy, and perceived risks, among others. The complexity of the model of trust and its relation to electronic commerce, is directed to B2C (Business to Consumer), sales or services of the company to the consumer.

Throughout the literature, the presence of multiple factors that affect the trust of the online consumer have been defined in the following manner:

Schiffmen and Kanuk (2007) define the perception as the process through which an individual selects, organizes, and interprets the stimuli within a significant and coherent scenario. Basically, it can be described as the way in which each individual sees the world around him.

Andaleeb (1996) defines trust as the desire of one party to depend on the behavior of others, especially when these behaviors have implications for the first party. Pavlou and Gefen (2004) point out, from the business perspective, trust is when a buyer has the desire to accept vulnerability based on the belief that the transactions with the vendor complies with the expectation of trust in a transaction in relation to the competition, the integrity, and benevolence of the vendor.

Cheung and Lee (2001) define security, from the perspective of electronic commerce, as the perception of Internet users that the Internet vendors have the capacity to provide all the required security. Security on the Internet is one of the critical issues that determines the successful implementation of electronic commerce operations (Chang, Torkzadeh, & Dhillon, 2004; Andoh-Baidoo, 2006).

A study presented by BURST Media (2005; cited in Laudon & Traver, 2007) reflects that the most relevant factor related to the reasons for which some Internet
users do not buy on the Web is security, with a 52%. This factor concerns the online consumer at the moment of providing his/her personal data and it is more important for the protection of these against constant cyber threats and a strong determination at the moment of buying online. Similarly, Yang and Jun (2002) in their study indicated that the security of information is considered the most important criteria for those who do not buy online. As a result, the following hypothesis is proposed:

**H1:** Significant statistical differences exist in the trust towards Electronic Commerce among the consumers with high and low Perceived Security.

Internet should provide a wide and extensive platform for marketing activities and promotions through privacy, in this way establishing a favorable environment between the companies and the consumers. However, the lack of privacy on the Internet has generated concerns among the users because of the perceived loss of control, as well as the use of personal information submitted to diverse portals, including the social networks.

Some researchers have found evidence that the lack of protection of privacy is the biggest barrier for consumers to participate in electronic commerce (Berman & Mulligan, 1999; Sheehan & Hoy, 1999; Brown & Muchira, 2004). For Internet users, privacy is defined as the ability to control the information that a client provides about him/herself to a merchant within an electronic commerce activity (Laudon et al., 2007). Privacy includes aspects such as the unauthorized distribution or use of personal information (Wang, Lee, & Wang, 1998) and its relevance is derived from the growing capacity of processing information of new technologies and their complexity (Flavián et al., 2007). Therefore, the following hypothesis is proposed:

**H2:** Significant statistical differences exist in the trust towards Electronic Commerce among consumers with high or low perceived privacy.

Bauer (1967) was the first author who utilized the term risk, indicating that consumer behavior implies risk in the sense that any action that is carried out will produce consequences that cannot be anticipated with any certainty, some of which could be undesirable (Bauer, 1967; Flavián et al., 2007).

It is the consumer who decides to make a purchase or any other cyber activity which will always expose him/her to some level of risk. According to Cheung et al., (2001), the term risk can be defined as the perception of Internet users about the possibility of results that are not expected with undesired consequences.

According to a study carried out by Pew Internet & American Life Project (2002), 74% of Internet users do not carry out purchases online for diverse reasons. Within this group the highest percentage (36%) indicated that the main reason for not buying online was to not venture to use credit cards online. These data are evidence that the perceived risk factor could grow or diminish the trust in purchasing on the Internet.
Pérez (2007) carried out a study whose objective was to analyze the perception of risk in the purchase of a certain group of goods and services and which category of product this perception is greater at the moment of purchasing. According to the author the value of risk was subjective, in other words, the risk that the consumer experiments when making a decision at the moment of acquiring certain goods and services can vary. The results demonstrated that goods have a higher perceived risk compared to services, totally contrary to the studies analyzed by the researcher that the risk is higher in acquiring services. Pérez (2007) concludes that the perception of higher risk will depend on the types of products and services involved.

A much broader research was carried out by Yung-Shen (2010) that examined how the perceived risk affects the relation of the changes in cost and consumer loyalty towards electronic commerce. Among the conclusions is mentioned that a higher perceived risk towards electronic commerce by consumers affects the relationship between changes in costs and consumer loyalty. Perceived high risk not only can destroy the consumer’s intention of purchasing towards websites, but it also increases the possibility of changing to other cyber sites. It also concludes that consumers can abandon Internet portals because of unsatisfactory experiences, as well as, the inappropriate responses because of faulty service and price problems, among other reasons. These situations affect the reduction of trust and increases the perceived risk towards the Internet. Therefore, the administrators or managers responsible for the electronic pages should adequately reduce the perceived risks. As a result, the following hypothesis is proposed:

**H3: Significant statistical differences exist in the Trust towards Electronic Commerce among the consumers with high or low Perceived Risk.**

The users’ experience, as well as, the consumer’s, is indispensable for new prospects for Internet. The time that is invested in the use of Internet determines their positive or negative experiences and this at the same time influences trust in the network.

One of the objectives of the research carried out by Bigné, Ruiz and Sanz (2009) was to identify variables that influence the behavior of purchasing through mobile units. The results identified that the age and experience of the buyer and user of Internet are the variables that best predict the behavior of the buyer through the mobile units and that the gender, dwelling, and the frequency of Internet use were not variables that determined the decision to buy through the mobile devices. The authors concluded that the experience as a user and Internet buyer have significant influence in the decision of buying using mobile devices.

According to Kiryanova and Makienko (2011), the general experience of purchasing through Internet influences the doubts that consumers have related to privacy and they tend to overestimate the knowledge that the experienced consumers have about technology. On the other hand, the less the perceived knowledge of unexperienced Internet users can result in more attention to the different signals of
information security (Kiryanova et al., 2011). This implies that the experience of purchasing online helps consumers to develop a structure of general knowledge of the typical online privacy protocols; as a result, the more experienced consumers tend to have more confidence in their evaluations and decisions contrary to those consumers with low or no experience. In addition, Kiryanova et al., (2011) points out that Internet consumers with less experience require additional guarantees related to security at the time of providing personal information on a given website. Therefore, the following hypothesis is proposed:

**H4: Significant statistical differences exist in Trust towards Electronic Commerce among consumers with high or low Experience on Internet.**

The quality of a website is another determining factor that the consumer uses to develop trust in the use of the Internet. This factor refers to the compliance of the electronic page with the user’s or consumer’s expectations. The initial appearance of the page plays a very important role for all those who benefit from it. Song and Zahedi (2001), classify the quality elements of a page within five categories according to its purpose: for promotion, the service, informal influence, its own effectiveness, and the ease of use of its resources. These researchers found that each of the five categories significantly reinforces the consumer’s perception that positively influences the behavior and attitudes of online consumers. On the other hand, other researchers made an attempt to evaluate the quality of the portals from the perspective of user satisfaction or non-satisfaction. These studies found that the attributes or characteristics of the portal’s design can be looked at as factor of hygiene and motivation that contribute to the satisfaction or non-satisfaction of the user (Zhang, von Dran, Small & Barcellos, 1999, 2000; Zhang & von Dran, 2000; Li & Zhang, 2002).

Satisfaction as a factor responds or tends to cover needs of the individual or consumers, whether it is in a traditional or virtual environment. According to Currás and Sánchez (2012), it is assumed that clients that feel more satisfied with a Web page that presents a higher predisposition to acquire or continue to acquire products and recommend them to others, but a high level of satisfaction does not always translate to higher client loyalty. Currás et al. (2012) carried out a study with the objective of analyzing the moderator effect of perceived risk in relation among the satisfaction with a web page and consumer loyalty. Their results showed that the analysis of the relation of satisfaction-loyalty has to take into account the moderating variables, as well as, the different components of loyalty (Behavioral and attitudinal) and, that the perceived risk is converted into an essential element for the success of the Website, also presenting an adequate explanatory capacity in the formation of loyalty online. The authors conclude that satisfaction exercises a stronger influence on the intent of purchasing on those individuals that perceive a higher risk associated to the purchase on the Web that in those that perceive that the risk is lower.

A study carried out by Prado, Blanco and Mercado (2013) had as one of its objectives to analyze the implications of the quality of the service over the level of
satisfaction and commitment, as well as, the level of loyalty shown by the consumers towards the companies that operate the tourist market online. The findings reflected that the level of satisfaction and the level of commitment that the consumer has towards the online tourist market, and the capacity to lend a high quality service are essential factors to ensure that the purchase of services offered by the company will be repeated and generate a high level of loyalty.

Al-Manasra, Zaid and TaherQutaishat (2013), carried out a study whose purpose was to examine the impact of the quality of the telecommunication companies portals in Jordan. The results showed that the interaction of the services and the usefulness were the most important factors that directly affected consumer satisfaction. On the other hand, Eid (2011) carried out another study and found that the quality of the user interface and the quality of the information of the web sites have a significant positive impact on consumer satisfaction and the perceived security and privacy risks are closely related to consumer trust. Therefore, the following hypothesis is proposed:

**H5: Significant statistical differences exist in the Trust towards the Electronic Commerce among the consumers with high of a low Perception on the Quality of Websites.**

### 2.2. The role of socio-demographic variables as moderators in consumer trust towards electronic commerce

San Martin, López and Ramón (2012) mentioned in their research that previous studies have considered that certain socio-demographic and contextual characteristics such as age (Yalch & Spangenberg, 1990), education (Gattiker, Perlusz & Bohmann, 2000; Tamimi & Sebastianelli, 2007), income level (Dawson, Bloch & Ridgway, 1990), gender (Zhang, Prybutok & Strutton, 2007; Kolsaker & Payne, 2002), reasons for the purchase (Eroglu & Machleit,1990), knowledge (Sirgy, Gre-wal & Mangleburg, 2000), cultural values (Overby, Gardial, & Woodruff, 2004) or the opinion of others are factors that influence the purchasing experience. Gattiker et al., (2000) and San Martin et al., (2012) say that the personal characteristics influence and interact with the mental processes such as perception, reasoning, making judgments and decision making. The socio-demographic characteristics can be moderators of the variables that influence the behavior of distance purchasing and the acceptance and implementation of the new information technologies (Zhang et al., 2007; San Martin et al., 2012). In this way, the literature considers the personal characteristics as variables that moderate the relation of a stimulus and a response (San Martin et al., 2012). Goldsmith and Flynn (2004) and San Martin et al., (2012) also found that gender, but not age nor rent, is related to the online purchasing of clothes (women buy more clothes online than men).

One of the objectives of a study carried out by Tamimi et al., (2007) was to analyze the differences among groups segmented by socio-demographic variables
such as, gender, age, income level, and education on the perception of: the trust, the security and credibility of Internet. The results demonstrated that significant differences exist in the perception based on gender on security and that women give more importance to the elements of privacy and security than men. As for age, the results demonstrated that people over 50 perceive that the factors being studied are more relevant in comparison to the younger groups. As for income, the study demonstrated that consumers with an income of $30,000-$49,999 perceive security as the most important factor. Although the study did not show significant differences in groups by academic preparation, it did evidence that the group with higher level of education (Bachelor’s Degree or higher) considered trust and credibility to be the most important factors. Therefore, the following hypotheses are proposed:

H6: Significant statistical differences exist in trust towards Electronic Commerce in Consumers taking into consideration Age.

H7: Significant statistical differences exist in trust towards Electronic Commerce in Consumers taking into consideration Gender.

H8: Significant statistical differences exist in trust towards Electronic Commerce in Consumers taking into consideration Marital Status.

H9: Significant statistical differences exist in trust towards Electronic Commerce in Consumers taking into consideration Current Academic Preparation.

From this point on, we will present Figure 1 that represents the conceptual model that summarizes Hypotheses: H1, H2, H3, H4, and H5 related to the perception of the factors that influence the trust of the consumer towards the electronic commerce and the Hypotheses: H6, H7, H8, and H9 on the moderating effect of age, gender, marital status, and current academic preparation with regard to the perception of these factors that influence consumer trust towards electronic commerce.
3. Methodology

3.1. Design, Procedure, and Sample

The research design that was used for this study was non experimental- descriptive transactional. According to other similar research (Cheung et al., 2001; Saeed, Hwang, & Yi, 2003; Yu-Wen, 2006) that studied consumer online trust, I used a questionnaire to obtain data. The questionnaire developed for this research was an adaptation of the instrument developed and used by the professors Cheung and Lee (2001). To validate the adapted instrument a panel of experts was consulted from different areas (Information Systems, Management, Marketing, Electronic Commerce, Research, and Writing) that was in charge of analyzing and evaluating the questionnaire. A pilot sample was also carried out using 5% of the determined sample.

The purpose of the instrument was to know the perception of the participants relating to the most relevant factors that influence the consumer’s trust towards electronic commerce in Puerto Rico, specifically security, privacy, risk, Internet experience, and the quality of the website. As well as, how age, gender, marital status, and academic preparation influence the consumer’s trust towards electronic commerce in Puerto Rico. The participants answered a Likert type scale of five points for all the variables, where 5 was totally agree and 1 was totally disagree.
The sample consisted of 200 participants of both genders from the universe of graduate students, employees, and full-time faculty of a private university in Puerto Rico. The sample represented 28% of the population and the index of answers was 73%. See Table 1 that follows with more detail of all the constructs and their elements.

Table 1.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived Security</strong></td>
<td>a) The Internet vendors implement security measures to protect purchases.</td>
</tr>
<tr>
<td></td>
<td>b) The Internet vendors ensure that the data from the transactions are protected from alterations or harm during the transmission.</td>
</tr>
<tr>
<td><strong>Perceived Privacy</strong></td>
<td>a) The Internet vendors worry about the privacy of the consumers.</td>
</tr>
<tr>
<td></td>
<td>b) The Internet vendors do not give out personal data of the consumers to third parties.</td>
</tr>
<tr>
<td></td>
<td>c) The Internet vendors give me confidence and security related to the control of privacy.</td>
</tr>
<tr>
<td><strong>Perceived Risks</strong></td>
<td>a) Buying online is risky.</td>
</tr>
<tr>
<td></td>
<td>b) Buying online is uncertain.</td>
</tr>
<tr>
<td></td>
<td>c) I find it dangerous to buy online.</td>
</tr>
<tr>
<td><strong>Internet Experience</strong></td>
<td>a) The use of the Internet is a good experience for me personally.</td>
</tr>
<tr>
<td></td>
<td>b) I have positive experiences using the Internet.</td>
</tr>
<tr>
<td></td>
<td>c) I enjoy a good experience using the Internet.</td>
</tr>
<tr>
<td><strong>Perception of the quality of the websites</strong></td>
<td>a) I consider that the information provided by the companies through the websites on products and/or services is reliable.</td>
</tr>
<tr>
<td></td>
<td>b) I consider that the design of the website is always clear and precise.</td>
</tr>
<tr>
<td></td>
<td>c) The websites help in selecting quality products.</td>
</tr>
<tr>
<td><strong>Trust in purchasing online</strong></td>
<td>a) The purchases online are secure.</td>
</tr>
<tr>
<td></td>
<td>b) Purchasing online is reliable because of the product information that is provided.</td>
</tr>
<tr>
<td></td>
<td>c) Internet vendors comply with the offers that they make.</td>
</tr>
<tr>
<td></td>
<td>d) In general terms, I can depend on the promises that are made by Internet vendors.</td>
</tr>
</tbody>
</table>

4. Analysis of Results

As part of the analysis of the research hypotheses, Consumer Trust towards Electronic Commerce was considered the dependent variable (see Figure 1). The independent variables were: Perceived Security, Perceived Privacy, Perceived Risk, Internet Experience, and the Perception of Website Quality. The moderating variables in this research were: Age, Gender, Marital Status, and Current Academic Preparation.

The tests that were used to prove and show the results of each hypothesis were: the t test, and non-parametric tests (U Mann-Whitney; Kruskal-Wallis). The
Non-parametric tests were applied because the distribution of the compared scores did not comply with the assumption of normality of the parametric tests.

The following presents each hypotheses and the tests carried out for them in the study.

4.1. Hypotheses

H1: Significant statistical differences exist in the trust towards Electronic Commerce among the consumers with high and low Perceived Security.

Hypothesis H1 is composed of two (2) premises. The U Mann-Whitney in Table 2 revealed differences between the consumers that have high or low perceived security in relation to the trust towards Electronic Commerce.

Table 2: Results of the test relating to the difference between Perceived Trust and Security

<table>
<thead>
<tr>
<th>Perceived Security</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Perceived Security</td>
<td>133</td>
<td>** .000</td>
</tr>
<tr>
<td>Low Perceived Security</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

** Significance p <= 0.05 (2-tailed).

Since the level of significance is less than 0.05 (p=0.00) in both groups, the hypothesis is accepted.

H2: Significant statistical differences exist in the trust towards Electronic Commerce among consumers with high or low perceived privacy.

Hypothesis H2 was composed of three (3) premises. The U Mann-Whitney in Table 3 revealed differences between the consumers that have high or little perceived privacy in relation to trust towards Electronic Commerce.

Table 3: Results of the test for the difference between Trust and Perceived Privacy

<table>
<thead>
<tr>
<th>Perceived Privacy</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Perceived Privacy</td>
<td>94</td>
<td>** .000</td>
</tr>
<tr>
<td>Low Perceived Privacy</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>

** Significance p <= 0.05 (2-tailed).

Since the level of significance is less than 0.05 (p=0.00) in both groups, the hypothesis is accepted.
H3: Significant statistical differences exist in the Trust towards Electronic Commerce among the consumers with a lot or low Perceived Risk.

Hypothesis H3 was composed of three (3) premises. The U Mann-Whitney in Table 4 revealed differences between the consumers that have a high or low perceived risk in relation to the trust towards Electronic Commerce.

Table 4. Results of the test on the difference between Trust and Perceived Risk

<table>
<thead>
<tr>
<th>Perceived Risk</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Perceived Risk</td>
<td>115</td>
<td>** .000</td>
</tr>
<tr>
<td>Low Perceived Risk</td>
<td>31</td>
<td></td>
</tr>
</tbody>
</table>

** Significance p <= 0.05 (2-tailed).

Since the level of significance is less than 0.05 (p=0.00) in both groups, the hypothesis is accepted.

H4: Significant statistical differences exist in Trust towards Electronic Commerce among consumers with a lot or a little Experience on Internet.

Hypothesis H4 was composed of three (3) premises. The U Mann-Whitney in Table 5 did not reveal differences between the consumers that have a lot or a little experience in relation to the trust towards Electronic Commerce.

Table 5. Results of the test on the difference between Trust and Experience on the Internet

<table>
<thead>
<tr>
<th>Experience on the Internet</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A lot of Experience on the Internet</td>
<td>143</td>
<td>.851</td>
</tr>
<tr>
<td>Little Experience on the Internet</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

It is not significant p > 0.05 (2-tailed).

Since the level of significance is higher than 0.05 (p = 0.851) in both groups, the hypothesis is rejected.

H5: Significant statistical differences exist in the Trust towards the Electronic Commerce among the consumers with a high or low Perception on the Quality of Websites.

Hypothesis H5 was composed of three (3) premises. The U Mann-Whitney in Table 6 revealed differences between the consumers with a high or low perception on the Quality of the Websites in relation to the trust towards Electronic Commerce.
Table 6. Results of the test on the difference between Trust and the perception about the Quality of the Websites

<table>
<thead>
<tr>
<th>Quality of the Websites</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is perceived that the Quality of the Websites is high</td>
<td>117</td>
<td>** .000</td>
</tr>
<tr>
<td>It is perceived that the Quality of the Websites is low</td>
<td>29</td>
<td></td>
</tr>
</tbody>
</table>

Significance $p <= 0.05$ (2-tailed).

Since the level of significance is less than 0.05 ($p=0.00$) in both groups, the hypothesis is accepted.

$H6$: Significant statistical differences exist in trust towards Electronic Commerce in Consumers taking into consideration Age.

The Kruskal-Wallis test in Table 7 did not reveal differences among the consumers taking into account age, in relation to trust towards Electronic Commerce.

Table 7. Results of the test on the difference between Trust and Age

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-30</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>31-40</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>41-50</td>
<td>33</td>
<td>.135</td>
</tr>
<tr>
<td>51 or more</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

No Significance $p > 0.05$ (k-tailed).

Since the level of significance is higher than 0.05 ($p = .135$) in the age groups, the hypothesis is rejected.

$H7$: Significant statistical differences exist in trust towards Electronic Commerce in Consumers taking into consideration Gender.

The U Mann-Whitney test in Table 8 revealed differences among consumers taking into account gender, in relation to Trust towards Electronic Commerce.

Table 8. Results of the test on the difference between Trust and Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masculine</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Feminine</td>
<td>105</td>
<td>** .050</td>
</tr>
</tbody>
</table>

**Significance $p = 0.05$ (k-tailed).
Since the level of significance is less than 0.05 (p=0.50) in both groups, the hypothesis is accepted.

**H8: Significant statistical differences exist in trust towards Electronic Commerce in Consumers taking into consideration Marital Status.**

The Kruskal-Wallis test in Table 9 did not reveal differences among consumers taking into account marital status, in relation with trust towards Electronic Commerce.

Table 9. Results of the test on the difference between Trust and Marital Status

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>16</td>
<td>.228</td>
</tr>
<tr>
<td>Widowed</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Not significance p > 0.05 (k-tailed).

Since the level of significance is higher than 0.05 (p = .228) in the groups by marital status, the Hypothesis is rejected.

**H9: Significant statistical differences exist in trust towards Electronic Commerce in Consumers taking into consideration Current Academic Preparation.**

The Kruskal-Wallis test in Table 10 did not reveal differences among consumers taking into account the current academic preparation, with relation to trust towards Electronic Commerce.

Table 10. Results of the test on the difference between Trust and Current Academic Preparation

<table>
<thead>
<tr>
<th>Academic Preparation</th>
<th>N</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Associate Degree</td>
<td>2</td>
<td>.145</td>
</tr>
<tr>
<td>Bachelor</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Master</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Doctorate</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Not significance p > 0.05 (k-tailed).

Since the level of significance is higher than 0.05 (p = .145) in the groups by academic preparation, the hypothesis is rejected.
4.2. Reliability of internal consistency

To measure the reliability of internal consistency of the study, one of the most accepted tests in this context was used: Cronbach Alpha (Cronbach, 1946; Sekaran, 2003).

Table 11 presents the Cronbach Alpha coefficients for the internal consistency of the instrument. The ranges of the constructs of the study were 0.775 to 0.931.

Table 11. Statistics on the reliability and internal consistency for each construct variable on trust towards Electronic Commerce

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach’s $\alpha$</th>
<th>Number of Premises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Security</td>
<td>0.819</td>
<td>2</td>
</tr>
<tr>
<td>Perceived Privacy</td>
<td>0.775</td>
<td>3</td>
</tr>
<tr>
<td>Perceived Risk</td>
<td>0.895</td>
<td>3</td>
</tr>
<tr>
<td>Internet Experience</td>
<td>0.862</td>
<td>3</td>
</tr>
<tr>
<td>Perception of Website Quality</td>
<td>0.826</td>
<td>3</td>
</tr>
<tr>
<td>Perceived Trust in Online Purchases</td>
<td>0.931</td>
<td>4</td>
</tr>
</tbody>
</table>

According to the results presented in Table 11, all of the coefficients are over 0.75, where an acceptable internal consistency was obtained (Hernández, Fernández, & Baptista, 2006).

Table 12 illustrates the Cronbach Alpha coefficient on the internal consistency related to all the construct variables altogether, that obtained 0.805, which is an acceptable internal consistency (Hernández, Fernández, & Baptista, 2006).

Table 12. Statistics on the reliability and internal consistency for all of the construct variables on trust towards Electronic Commerce

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach’s $\alpha$</th>
<th>Number of Premises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Security</td>
<td>0.805</td>
<td>18</td>
</tr>
<tr>
<td>Perceived Privacy</td>
<td>0.819</td>
<td>2</td>
</tr>
<tr>
<td>Perceived Risk</td>
<td>0.775</td>
<td>3</td>
</tr>
<tr>
<td>Perceived Risk</td>
<td>0.895</td>
<td>3</td>
</tr>
<tr>
<td>Internet Experience</td>
<td>0.862</td>
<td>3</td>
</tr>
<tr>
<td>Perception of Website Quality</td>
<td>0.826</td>
<td>3</td>
</tr>
<tr>
<td>Perceived Trust in Online Purchases</td>
<td>0.931</td>
<td>4</td>
</tr>
</tbody>
</table>

5. Conclusions

The results obtained indicate that significant differences exist in the trust towards Electronic Commerce among consumers according to how they perceive the level of
security, privacy, risk and quality of the websites. However, the experience on the Internet factor showed that no significant difference exists in the consumer trust towards the electronic commerce.

The factor of the consumer’s perceived security on trust towards the electronic commerce requires that the virtual businesses offer more security measures related to the interaction of transactions and personal information provided by the consumers to increase their level of trust. Guaranteeing protection in these activities from cyber-attacks or other similar threats, not only increases trust but also attracts new traditional consumers to the electronic commerce environment. The study agrees with related studies carried out by Cheung et al., (2001) and Yu-Wen (2006) that demonstrated that the perception of security affects the behavior and trust of the consumer towards electronic commerce. It also backs up Yang et al., (2002) study that indicates: how security is considered the most important factor when dealing with trust in buying online.

The consumer’s perception of privacy in the trust towards electronic commerce is a determining factor in any environment or activity especially when it is cybernetic. Effective rules, policies, and procedures in electronic commerce increase consumer’s trust and therefore diminishes the risk. The study matches the studies carried out by Brown et al., (2004) and Yang et al., (2002) that consider security and privacy as the most important factors when purchasing online. The cyber consumer feels more trust and secure if the companies do not share their personal and financial information with third parties without authorization, because if not, they would feel genuine concern about the matter.

As for perceived risk, it is evident that this factor affects the trust that the consumer might have towards electronic commerce. The study matches the hypothesis that: “The higher the perceived risk, the lower the consumer’s trust. The lower the perceived risk, the higher the consumer’s trust will be.” This confirms, in some way, the studies of Cheung et al., (2001), Yu-Wen, (2006), Flavián et al., (2007) and Pérez (2007) that virtual companies through their innovative strategies should: guarantee that the products and/or services offered through Internet comply with the consumer’s expectations. If there is any anomaly in the process or delicate situations, the company should include mechanisms to guarantee the consumer’s security and privacy.

The more experience that the consumers have using the Internet, the more knowledge they have of it and will have more participation in electronic commerce. Internet experience guarantees that the consumer will have knowledge about the cyber transactions environment, the rules, policies, and procedures in commercial activities. Nonetheless, the study found that both groups (see Table 5), related to this factor, have the same perception related to trust towards electronic commerce.

As for the perception of quality of the website and its relation to consumer trust towards Electronic Commerce, it is considered important that a website provide in its design: clear, precise, and reliable information to its products and/or services since we are dealing with different cultures. This study confirms the research of Song et al., (2001), Li et al., (2002), Sánchez (2012) and Prado et al., (2013), in relation to
the quality of websites and their categories, and the factors of hygiene and motivation, that contribute to consumer satisfaction; the same way that trust does towards electronic commerce. For this, the companies should employ resources that are indispensable and consistent to offer service that has interface quality and quality of the information offered as found in research by Eid (2011).

The results related to the hypotheses associated with the socio demographic constructs, such as, age, marital status, and current academic preparation, used in the study, show evidence that there is no significant difference in the level of consumer trust towards Electronic Commerce. This study coincides with the research of Yu-Wen (2006) that compared trust towards electronic commerce with the marital status of the participants.

However, when trust towards electronic commerce was compared with the gender of the participants, the study indicated that there is a significant difference in trust towards electronic commerce.

We can conclude that the factors presented in the research model influence the level of trust towards electronic commerce in Puerto Rico in some way. Based on these results, the research suggests that the virtual companies adopt innovative strategies, as well as, being consistent in fiscal and economic contributions to meet the multiple factors that affect the level of consumer trust towards electronic commerce.

6. Contributions

Firstly, to provide data and raise awareness of the business sectors that offer their products and/or services on the Internet, the importance that their websites must have, in relation to their structure and appearance, providing security, privacy, minimum risk, and quality in all matters related to the cyber consumer that we have today.

Secondly, knowledge about the factors that promote trust in the cyber consumer towards the Internet.

Thirdly, anticipate and alert future entrepreneurs that venture in the cyber world to consider the multiple factors and the perception of the cyber consumers towards electronic commerce.

Lastly, motivate the academic sector to include in the graduate and undergraduate programs courses where the students will have the opportunity to learn about and apply knowledge related to the electronic commerce environment.

7. Limitations

The sample was limited to one educational institution in the area of San Juan, Puerto Rico and the results cannot be generalized to other types of participants in Puerto Rico.
The participants of the study were limited to employees, faculty, and graduate students.

The participants of the study were exempt employees (full-time employees who do not have the right to compensation for overtime (executives, managers and professionals)), non-exempt employees (full-time employees who have the right to compensation for overtime (secretaries)), transitory employees (employees with fixed or temporary appointment time) or full-time faculty (permanent, multiyear, substitute or whole), 21 years or older, or students who were 21 years or older and from a graduate school.

Other important constructs may have been omitted from the research model that might have influenced and provided richer or precise information related to trust towards electronic commerce.

8. Recommendations for future research

The limitations suggest some future research related to trust towards electronic commerce.

First, add other relevant factors to the study, as well as, other data or socio-demographic characteristics (expand the research model).

Second, carry out a qualitative research design or combine the designs.

Third, apply the research to a larger population that includes personnel from off-site campuses of the Institution where the research was carried out.

Fourth, apply the research to business organizations, whether they are public, private, government agencies, and/or not-for-profit.

Fifth, develop a comparative study among public, private, and not-for-profit sectors on factors of consumer trust in electronic commerce.

Sixth, carry out a study that includes other cultures and examine differences and similarities.

Seventh, use other methodologies that can offer more depth to the study.

Lastly, replicate the study outside of the San Juan Metropolitan Area in Puerto Rico.

References


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